A COMPARATIVE STUDY OF THE JOB FUNCTIONS OF UNIVERSITY AND UNIVERSITY OF TECHNOLOGY GRADUATES AND DIPLOMATES IN SPECIAL LIBRARIES AND ENGINEERING FIRMS

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Submitted in fulfillment of the requirements of the Master of Technology Degree in Library and Information Studies in the Department of Information and Corporate Management, Durban University of Technology, Durban, South Africa.

2008

DECLARATION

I hereby declare that this study represents the original work by the author and has not been submitted in any form at another university. Where use is made of the work of others, it has been duly acknowledged in the text and included in the list of works cited.

A. Rajagopaul

Date

15 December 2008

Dedicated to my beloved father

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May ye give you the desire of your heart and make all your plans succeed.

(Psalms 20 : 4)

I thank my Lord Jesus Christ, for God's favour on me: in bestowing me the wisdom, knowledge, understanding, strength and determination all through this study.

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ABSTRACT

This study investigated the job functions of university and university of technology graduates and diplomates in the staff structures of special libraries and engineering firms in KwaZulu-Natal. The objective of the study was to draw on possible trends and best practices in the latter for the Library and Information Services (LIS) work environment, as engineering like LIS draws its personnel from both traditional universities and universities of technology (UoT). Hence, the main target population for the study was university and UoT graduates and diplomates in special libraries and engineering firms in KZN. Graduates and diplomates were chosen for inclusion in the study using a census because of the smallness of the staff complements in these organizations. Two sets of self-administered questionnaires were distributed, one to graduates/diplomates and the other to employers in the selected organizations. Data collected was analysed using descriptive statistics and content analysis. Findings of the study revealed inconsistencies with the National Diploma: Library and Information Studies (ND: LIS) where these diplomates occupy paraprofessional as well as professional positions in special libraries whilst engineering graduates and diplomates tend to occupy job titles according to their highest academic qualifications. In both special libraries as well as in the engineering environment there is much task overlap and downshifting of job functions between paraprofessional and professional university and UoT graduates and diplomates. This study has revealed a valuable best practice from the engineering discipline for the LIS profession, which is that of professional registration. Professional registration of engineering staff with the Engineering Council of South Africa is a statutory requirement in the engineering profession and allows for the growth and development of those in the profession. It is recommended that the LIS profession, and the Library and Information Association of South Africa (LIASA) specifically, investigate a mechanism for professional registration of library and information workers.

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LIST OF ABBREVIATIONS

ALA American Library Association ALIA Australian Library and Information Association B.Bibl**.** Bachelor of Library and Information Science B.Com. Bachelor of Commerce

Black Economic Empowerment
Eng. Bachelor of Engineering B.Sc. Bachelor of Science B.Tech. Bachelor of Technology CAD Computer Aided Design CAUT Canadian Association of University Teachers CEO Company Executive Officer DETYA Department of Education Training and Youth Affairs DHSM Bachelor of Surgery D.Sc. Doctor of Science D.Tech. Doctor of Technology DUT Durban University of Technology ECSA Engineering Council of South Africa GESS Graphical Engineering System Solutions HEQF Higher Education Qualifications Framework Hons. Honours HR Human Resources HSRC Human Sciences Research Council ICT Information and Communication Technology IFLA International Federation of Library Associations and

Institutions

IT Information Technology

KZN KwaZulu-Natal

LIASA Library and Information Association of South Africa

LIS Library and Information Science/Library and Information Services MBA Masters in Business Administration MBChB Bachelor of Medicine

MBL Masters in Business Law M.Com. Master of Commerce MLA Montana Library Association M.Sc. Master of Science M.Tech. Master of Technology MUT Mangosuthu University of Technology NCLIS National Council of Library and Information Services ND National Diploma

N. Eng. National certificate in Engineering NQF National Qualifications Framework NUST National University of Science & Technology (Zimbabwe) PhD Doctor of Philosophy Postgrad. Dip. Postgraduate Diploma Pr Professional RAU Rand Afrikaans University SAACE South African Association for Civil Engineers SABC South African Broadcasting Corporation SAICE South African Institute for Civil Engineers SALA South African Library Association SAQA South African Qualifications Authority SPSS Statistical package for the social sciences T4 Technical 4 UDW University of Durban-Westville UK United Kingdom UKZN University of KwaZulu-Natal UNISA University of South Africa UniZulu University of Zululand UoT University of Technology USA United States of America WiL Work Integrated Learning Wits Technikon Witswaterand Technikon Wits University Witswaterand University

CHAPTER 1: INTRODUCTION AND RESEARCH PROBLEM

1.1. Introduction

Apartheid in South Africa left a skewed education system that not only disadvantaged black students but also failed to meet the social and economic requirements of the country (South Africa.Info 2003: para. 2). Access to higher education was skewed along racial lines, which included a binary system demarcating "technikon" and university education as separate systems, with almost no opportunity to transfer from one system to another (Nassimbeni and Underwood 2007: 167; Bell 2002: 64). Historically library and information science (LIS) education and training in Africa was influenced by British and American trends (Raju 2007: 4). The pre-independence era saw students of LIS studying abroad or engaging in distance education with institutions overseas. Post-independence LIS education maintained this trend of following the British or American model in the delivery of LIS programmes. For example, professional LIS programmes were located in universities whilst paraprofessional certificate and diploma programmes were found in polytechnics and technical colleges (non-university institutions). Raju (2007: 2) notes that in the North American context, it takes up to five/six years to become a LIS professional. However, in the developing African context this may not be affordable. Writing in the South African context, Nassimbeni and Underwood (2007: 171) mention that the most common route to a professional career is through a four-year vocational qualification or a postgraduate diploma in LIS. There is a pressing need for a developing society such as South Africa to develop its own qualification model that would be realistic and relevant to the country, and significantly add value to library and information services, which play a major role in the growth and development of the African continent (Raju 2007: 1).

A study conducted by Raju (2004a: 18),

> confirms that the university Postgraduate Diploma in Library and Information Science and the B.Bibl. (or four-year equivalent university degree) are established professional LIS qualifications in South Africa. Whilst the technikon [now university of technology] National Diploma: Library and Information Studies (ND: LIS) is generally viewed as a paraprofessional

qualification, library and information service employers are not using this qualification in its paraprofessional context.

Howarth (1998) explains the paraprofessional in context. She explains the term paraprofessional to include library technicians who hold a diploma in LIS from a college (in the South African case technikons, now universities of technology) as well as those who hold an undergraduate degree but not a LIS diploma qualification. Based on the above one may conclude that university of technology (UoT) LIS diplomates are viewed as paraprofessionals able to fill paraprofessional positions such as those of library technicians. This study aims to investigate job functions of university and university of technology graduates and diplomates in special library services in comparison with that of engineering firms in the KwaZulu-Natal province. Engineering also draws its personnel from traditional universities and UoTs.

1.2. Research problem

Raju's (2004a: 18) study found that employers are utilizing the National Diploma: Library and Information Studies (ND: LIS) qualification as a requirement for support positions in libraries. It is common to find job titles such as library assistant, senior library assistant or even library technician assigned to staff holding the ND: LIS qualification. According to Raju (2004a: 12) library technician is a term used more commonly internationally than in South Africa. Further, in her study, Raju found that university graduates with the four-year university LIS qualification were assigned professional posts such as those of librarian, branch librarian, head librarian, and such. Accordingly many view the four-year university LIS qualifications as the established professional LIS qualifications in South Africa.

According to Neal (2006: para. 1), writing in the American context, there is an increased number of individuals hired in academic libraries to fill professional positions. Some of these individuals do not have the master's degree in library and information science, which in the American context is the basic professional qualification in LIS. On the other hand, still in the American context, Garber (2006: para. 15) claims that at the academic library where she is employed, there are personnel with advanced degrees but who choose to work in paraprofessional positions. Studies in South Africa by Mhlongo (1998) and Raju (2004a) revealed that

LIS graduates and diplomates from the erstwhile technikons (now UoTs) generally do not occupy positions for which they have been trained. Interestingly, Rajagopaul's more recent (2006: 46) but limited study concluded that employers in selected special libraries in the Durban area view both the ND: LIS and the Bachelor of Technology: Library and Information Studies (B.Tech.: LIS) as professional qualifications. Hence professional positions are assigned to graduates irrespective of their qualifications.

Nassimbeni and Underwood (2007: 172) recognize that the staffing of all libraries with suitably qualified professional staff is a desirable aim but it is presently an unrealistic expectation. The authors cite Davids and Fadeela (2006) who comment that:

> We have a large number of library practitioners who are either unqualified or underqualified…however, most of these practitioners are at times highly competent individuals who acquired their knowledge and skills about librarianship through years of practical experience and in-service training.

In view of this, Andrew (2007: para. 11-13) raises questions about persons who do not have LIS qualifications but have a lot of experience and those who were studying librarianship. His thoughts hinge on the possibility of the experienced person functioning as a professional librarian whilst the inexperienced LIS student is given a paraprofessional post such as that of a library technician. He argues that library duties do not always require a qualification although it does help. Observations in Durban by the researcher prove that this is not uncommon in a number of special libraries as well as academic and public library services. It is also common to find persons with a matriculation certificate employed in libraries. A 1997 staff interest survey by the American Library Association (ALA) confirms that the majority of support staff in libraries held just a high school diploma (Department for Professional Employees 2001: para. 6). The Library and Information Association of South Africa (2008: para. 8) explains that support staff or library assistants without any formal training fill non-professional positions where training is provided in-house by the library. Observations in South Africa by the researcher indicate that this is not always the case as 'matriculants' (those with year 12 schooling) also function as paraprofessionals or even professionals depending on the nature of the library. A critical issue relates to the role-played by experience and qualifications in assigning job functions to special library staff.

Whilst so many issues of qualifications exist within the LIS profession, there is evidence that librarians are battling for potential positions with graduates and diplomates from other disciplines. When Neal (2006: para. 1) mentioned individuals being hired for professional posts without professional LIS qualifications, he also raised the issue of employers not necessarily appointing librarians with the traditional LIS qualifications, but also 'librarians' who hold a variety of qualifications such as advanced degrees in subject disciplines, and with specialized language skills, teaching experience or technology expertise. Freeman (1993) discussed LIS schools producing specialist or generalist librarians. An observation by the researcher in South Africa found that a person with a LIS paraprofessional qualification was given the job title of librarian even before obtaining this qualification. This person had a medical technician's qualification from the then technikon. Interestingly, this individual was employed in a medical library. Further, Jenkins (2005: 2) discusses ancient libraries being staffed by persons with subject expertise rather than a library qualification. History seems to be repeating itself with graduates and diplomates from other disciplines 'beating' LIS graduates and diplomates for positions. Nassimbeni and Underwood (2007: 172) cite Reagon and Renee (2006) who contend that a LIS generalist degree with options in specialized areas is still a viable structure for the needs of the South African society. In addition, Andrew (2007: para. 23) purports:

> Who's to say that somebody with a qualification in child psychology and/or teaching wouldn't make a far better Children and Youth Services Coordinator than a children's librarian? or Who's to say that somebody with an MBA wouldn't make a better library manager than an experienced librarian with little management or administrative experience?

Interestingly, Andrew, a member of the LIS profession himself, comes to the conclusion that the best person for the job is not necessarily the one with the formal LIS qualification.

Not surprisingly then, an advertisement in South Africa for a special library Principal Librarian required a nurse with five years experience in the nursing field whilst general observations in local newspapers show that posts advertised for library technicians usually require a person with a Grade 12 pass and computer literacy. Melchionda (2007: para. 2) emphasizes that technology has become fundamental in every library operation and service. Hence, adding to the 'confusion', information

technology (IT) has also greatly impacted on job opportunities for graduates and diplomates: "A library system based on new information technology will relocate tasks between professionals and paraprofessionals" (Department for Professional Employees 2001: para. 1). Kutzik (1997: 11) remarked that as technology changes library operations, library support staff will take on a growing number of tasks that were once the domain of professional librarians. Observations by the researcher in South Africa finds IT graduates and diplomates functioning as librarians and archivists in special libraries. The literature is ripe with differing views on these issues as revealed in Chapter Two of this study. Hence do special libraries in KZN prefer to hire someone with subject expertise or a LIS qualification?

Staff utilization, role definition and articulation, task overlap, educational requirements, certification and status have been "cantankerous issues" within the library profession for years (Oberg 1995: para. 1). Writing in the European context on existing disparities in LIS education, Kajberg (2003: 220) stresses that despite the increased networking and communication efforts in the LIS discipline, joint degrees and established equivalence of qualifications are few. Similarly Dalton & Levinson (2000: 7) point out that "the issue of equivalence of qualifications throughout the world are difficult, although it may not be a situation that is unique to the LIS profession". There just seem to be so many distinctions and 'anomalies' regarding qualifications in the LIS profession as revealed in the above discussion. In an attempt to address one aspect of these many disparities that exist in the LIS profession, this study aimed to find out what roles do traditional university and UoT graduates and diplomates play in special library services as compared to university and UoT graduates and diplomates in engineering firms. The engineering firm in South Africa, like library and information services, receives graduates and diplomates from both the traditional universities and the universities of technology. Are there possibly trends and practices in engineering that we can draw on for the LIS discipline to help us 'make sense' or tease out and address existing difficulties or challenges relating to LIS job functions and qualifications.

1.3. Objective of the study

The objective of this study was to investigate the job functions of university and university of technology graduates and diplomates in the special library and engineering environments with the intention of drawing on possible trends and best practices from the engineering environment for the LIS workplace.

1.4. Research questions

The following research questions were used to address the above objective:

1.4.1. What are the job functions of university and university of technology graduates and diplomates in special library services in KwaZulu-Natal?

1.4.2. What are the job functions of university and university of technology graduates and diplomates in engineering firms in KwaZulu-Natal?

1.4.3. Are there any trends and best practices in staff structures in the engineering work environment that can be adapted or adopted for the LIS workplace?

1.5. Motivation for the study

Raju (2007: 1-2) and Kraak (2006: 135-136) discuss the effects the apartheid era produced in terms of LIS education and training in South Africa. Raju (2007) maintains that it is fundamental that South Africa develops its own realistic and relevant qualification models unique to the African context. Toward this end Langley, Gray & Vaughn (2003: 1-2) usefully suggest that libraries, known traditionally not to enthusiastically embrace change, should look outside the profession to other disciplines' models to see what LIS services can do better. In view of this, this study examined special libraries and the engineering discipline. Why the comparison with the engineering discipline? Both tertiary institutions (traditional universities and UoTs) produce LIS and engineering graduates and diplomates and, importantly, as pointed by Raju (2007: 2), both are "important disciplines contributing to African growth and development".

This research project builds on a limited study by Rajagopaul (2006), and is contributing to a larger study involving comparisons between LIS and various other disciplines to draw best practices for the LIS workplace in order to embrace both professional and paraprofessional staff in a non-conflicting and productive manner.

Rajagopaul's (2006) limited study revealed that special libraries in the Durban area view both the National Diploma and the Bachelor of Technology (B.Tech.) in LIS as professional qualifications and that university and university of technology graduates and diplomates in these special libraries have similar job titles and functions. In addition the study revealed that engineering firms in the Durban area tend to view the ND: Engineering as a paraprofessional qualification and the B.Tech.: Engineering as a professional qualification. Unlike LIS graduates and diplomates, engineering university and UoT graduates and diplomates are assigned job titles and functions according to their highest academic qualifications.

Rajagopaul's study (2006) with its small sample of employers and graduates and diplomates did not reveal any significant trends in the staff structures of the engineering work environment that can be applied to staffing the LIS workplace. In view of the smallness of the 2006 study it was deemed necessary to undertake a larger study with a bigger sample of employers and graduates and diplomates in special libraries and engineering firms in the KwaZulu-Natal (KZN) province, to reveal any significant trends and best practices that the LIS workplace may draw on to more efficiently accommodate university and UoT LIS qualifications in staff structures. The outcome of such a study would be beneficial to the LIS profession in that by investigating staff structures in another discipline with a 'similar problem' to ours, we will get a better idea as to whether we in LIS, are making the best possible use of our human resources.

1.6. Overview of research methodology

This study gathered data from university and university of technology graduates and diplomates in special libraries and engineering firms in KZN. A variety of literature was consulted by the researcher to provide insight into research methods and designs relating to sampling, data collection and data analysis (further discussed in Chapter Three) to facilitate the objective of this study. Self-administered questionnaires were distributed to staff in 27 special libraries and 80 engineering firms in the province. Items for the questionnaires were largely drawn from the literature reviewed for the study. As explained in Chapter Three, of the 739 questionnaires distributed, a total of 166 questionnaires generated a 22% return rate available for data analysis. The

researcher analysed the quantitative data collected using *Microsoft Excel*. Content analysis was used to analyze qualitative responses to open-ended questions. Any documents attached, for example job descriptions or organizational structures, were also subjected to content analysis. Data analyzed is presented in the form of tables and graphs so that trends and patterns become evident. Where necessary narrative explanations of results are provided. Based on this presentation of findings, discussion and interpretation of findings are provided which lead to conclusions and recommendations.

1.7. Definition of relevant terms

The section provides definitions of terms relevant to this study.

1.7.1. Special library services

Abels et al. (2003: para. 2) explain that special libraries deliver information-based solutions to a given market. Larson (1983: 476) cites Ashworth (1979) who clarifies that a significant characteristic of a special library is that it is "established to obtain and exploit specialized information for private advantage of the organization which provides its financial support". This is whether the parent organization is a government agency, a business or industrial company or group of companies, a non-profit organization, a private society or institution, a research institution or a hospital. North Central University (2004) views special library services as covering a specific discipline or as serving a group of people. Accordingly, examples of special libraries would include corporate libraries, law libraries, medical libraries, professional association libraries and research center libraries. Others include information centers, competitive intelligence units, intranet departments, knowledge research centers (Abels et al. 2003: para. 2). Although only a few special libraries are open to the public, they can provide more in-depth information on their specialized subjects than other types of libraries. Usually if you are a member of a professional association or employee of a big company, for example an engineering firm, you will have access to its special library. Some countries have special libraries that are designed to serve specific professional needs. Special libraries are an integral part of businesses, corporations, organizations and institutions. The employees or clients require the

services of these libraries in the course of their work (*Microsoft Encarta encyclopedia standard* 2005b: para. 8).

1.7.2. Engineering firms

According to the American Council of Engineering Companies (2005) engineering firms,

> in connection with any construction project, include any professional services requiring engineering education, training and experience and the application of special knowledge of mathematical, physical or engineering sciences to those professional services such as consultation, investigation, evaluation, planning, design or responsible supervision of construction for the purpose of assuring compliance with plans, specifications and design.

1.7.3. Library and information professional

Kerkham (1988: 7-8) defined library and information professionals as employees who work at the professional level, engage in high level planning, development, design, evaluation and synthesis and thus professional LIS education focuses on these competencies. According to Raju (2004b: 77) in the library context, the professional is referred to as the librarian; in other information contexts, these professionals are also known as documentalists, records managers, archivists, information scientists and museologists. Information professionals also include knowledge managers, information officers, web developers, information brokers and consultants (Abels et al. 2003: para. 1). Abels et al. (2003: para. 1) explain that information professionals use information strategically in their jobs to advance the mission of the organizations they are a part of. The professional through the development, deployment and management of information resources and services accomplishes this. These authors also highlight that the information professional harnesses technology as a critical tool to achieve these goals.

According to the Library and Information Association of South Africa (LIASA) (2008: para.2) library and information professionals select, acquire, organize, manage and distribute information resources relevant to their users' needs. Further, it highlights that to become a professional librarian requires professional training

towards a four-year university degree in Librarianship and Information Science or a three-year general university degree followed by a one-year postgraduate diploma in Librarianship and Information Science.

1.7.4. Library and information paraprofessional

A library and information paraprofessional is someone who engages in the application of known techniques and principles in the organization and supervision of systems designed by the professional (Kerkham 1988: 7-8). Kerkham pointed out that paraprofessional LIS education and training focuses largely on competencies that allow individuals to be proficient in skills such as comprehension, application and communication. Reitz (2007: para. 65) defines a paraprofessional as

> a member of the library support staff, usually someone who holds at least the baccalaureate degree, trained to understand specific procedures and applies them according to pre-established rules under normal circumstances without exercising professional judgment.

Paraprofessional LIS training (for example, the National Diploma in Library and Information Studies at a university of technology) is an alternative choice to the more academically oriented university programme (Library and Information Association of South Africa 2008: para.7).

According to Raju (2004b: 78) in the library context, the paraprofessional is commonly referred to as a library technician or library assistant and performs a supporting role alongside the professional librarian. Further, Reitz (2007: para. 65) talks about library paraprofessionals that are generally assigned high-level technical support duties such as copy cataloging and serials control. Similarly, the Library and Information Association of South Africa (2008: para. 8) explains that paraprofessionals are responsible for carrying out tasks of a technical nature in large libraries or even running smaller libraries.

1.7.5. Graduate

The verb ‘graduate’ denotes the action of conferring an academic degree or diploma on an individual (*The Free dictionary* 2005). Thus a graduate is a person who has completed a course of study and has received a degree from an institution of learning.

1.7.6. Diplomate

A 'diplomate' is one who holds a diploma after advanced training and experience in a field of study followed by an examination (*Merriam-Webster online dictionary* 2008a: para. 1). Hence a diplomate in this study is a person who has obtained a National Diploma from an higher education institution, in this case a university of technology (refer to 1.7.8.).

1.7.7. University

According to Wikipedia.org (2008a: para. 1) the word university is derived from the Latin word *universitas magistorum et schloraium* meaning "community of teachers and scholars". A university is an institution of higher education and research, which grants academic degrees at all levels which includes associate, bachelor, master and doctorate levels in a variety of subjects. The *Merriam-Webster online dictionary* (2008b: para. 1) describes universities as higher learning institutions providing facilities for teaching and research and authorized to grant academic degrees, specifically, one made up of an undergraduate division, which confers bachelor's degrees, and a graduate division that may confer masters' degrees and doctorates. These definitions point to universities focusing on scientifically oriented research, teaching and learning.

1.7.8. University of technology

Until recently, this higher education institution in South Africa was referred to as a technikon. According to Winberg (2005: 191) technikons have their roots in technical colleges. Raju (2004b: 78) quite rightly points out that the term 'technikon' was unique to South Africa; however, it was similar to other higher education institutions in other parts of the world such as the polytechnic. It emphasized vocational education and training. Winberg (2005: 193) highlights that technikons were established in South Africa to address the shortage of skilled personnel to meet the needs of commerce and industry.

The Technikon Act of 1993 allowed technikons to award degrees to their students and shortly thereafter they offered masters' and doctoral degrees (Winberg 2005: 193). Winberg (2005: 195) explains that,

the Higher Education Act of 1997 repealed in its entirety the Technikon Act of 1993, and later amendments (1999/2000/2002) established the principles by which technikons could become fully-fledged higher education institutions and entitled to adopt the new nomenclature of university of technology.

The LIS qualification programmes offered at UoTs (formally called technikons) offer vocational education and training qualifications (Ocholla & Bothma 2006: para. 8) According to Raju (2004b: 78) although there has been a name change, the focus on vocational education still exists. The UoTs main educational task is to provide education and training in order to supply the labour market with middle level and high-level personnel who possess particular skills and technological and practical knowledge that ensures that they practice their occupations effectively and productively. Kraak (2006: 137) points out that universities of technology concentrate on technology, the application of scientific principles to practical problems and prepare students for the "practice, promotion and transfer of technology within a particular occupation or industry". Hence Du Pré (2004: 12), reiterated by Winberg (2005: 192), emphasizes that Work Integrated Learning (WiL) was regarded as one of the strengths of technikon education and this is still a strong feature in UoT education. Thus while traditional universities focus on general education and lifelong learning UoTs focus on technological and vocational training.

1.7.9. Job function

The term 'job function' in this study refers to the work performed by an employee within the organization. This is commonly referred to as job description. A job description can be conceived to be a written document that describes the work to be performed by an individual or group of individuals within an organization. It would identify qualifying education; education, experience and competencies required; the professional duties to be performed; and the scope of responsibilities and reporting relationships associated with the position (Canadian Association of University Teachers 2007: para. 11). It is common for job functions to be confused with job titles. Organizations such as library services may have different job titles such as library technician, library assistant and head librarian; however their job functions may differ from organization to organization. The Canadian Association of University

Teachers (2007: para. 8) explains that job descriptions vary widely from single-paragraph job descriptions to multi-paged detailed accounts of specific duties and responsibilities.

1.7.10. Staff structure

A staff structure defines the relationships between entities in an organization. This includes the relationships between the parent company and the departments, and the various staff within a department (IBM Corporation 2005: para.1). Hence staff structures refer to the hierarchical arrangement of employees within the organogram of the organization. In this study staff structures refer to the organization of employees within the identified special library services and engineering firms in the KwaZulu-Natal region.

1.8. Limitations and delimitations of the study

Limitations are factors, usually beyond the researcher's control, that may affect the results of the study or how the results are interpreted (Baron 2008: para. 20). Stating limitations of the study may be very useful for readers because they provide a means of acknowledging possible errors or difficulties in interpreting results of the study. Bless, Higson-Smith & Kagee (2006: 100) stress that one should determine samples that best represent a population (known as a representative sample) so as to allow for an accurate generalization of results. A major limitation that developed as the study progressed was the low response rate (22% (166) of the 739 questionnaires distributed). Though reminders, follow-ups and fresh electronically mailed questionnaires were sent with an extension on data collection, responses trickled in and then stopped. Hence the limited samples sizes for the different target populations arising from low return rates made generalization of findings problematic. Notwithstanding this the study still revealed issues and trends that were worth reporting, even though they could not be generalized. Importantly, Baron (2008: para. 20) emphasizes that limitations should not be considered alibis or excuses. They are simply factors or conditions that help the reader get a truer sense of what the study results mean and how widely they can be generalized.

On the other hand, "what the researcher is not going to do is stated in the delimitations" (Leedy & Ormrod 2005: 55). Baron (2008: para. 21) describes delimitations as factors that affect the study which the researcher generally does have some degree of control over. Such delimitations include the scope of the study, established parameters, limits for the study, setting limits on the sample size, extent of the geographic region from which data are collected and such. Likewise, Gorman & Clayton (1997) define research as an inquiry process that has clearly defined parameters and has as its aim the discovery or creation of knowledge and theory. This definition describes research has having definite parameters as is the case with the current study. The limited study by Rajagopaul (2006) involved a comparison of three special libraries and three engineering firms in the Durban area to see what best practices could be drawn for LIS. However, it did not reveal anything novel for the LIS profession to embrace. This study takes this research further by embracing a wider geographic area hoping to reveal something significant. It focused on special libraries and engineering firms in the KwaZulu-Natal province. Within these special libraries and engineering firms in KZN, other limits were also set. For example, this study did not draw data from special library and engineering firm individuals who were studying towards qualifications. Hence its focus was on 'already qualified' university and UoT graduates and diplomates employed in engineering firms and special libraries. Further, while special library graduates/diplomates may be involved in employment decision-making for the library, this study aimed to gather data from those personnel in the parent organizations at senior management level. Persons with job titles such as Principal librarian or Librarian were required to complete the graduate/diplomate questionnaire. On the other hand, individuals with the job title Manager or Head were targeted as employers.

Baron (2008: para. 21) also states that response formats included in data-collecting instruments or the time frame for the researcher are other delimitations. Questionnaires used in this study included a majority of closed questions whilst open-ended questionnaires despite their potential to yield rich responses were kept to a minimum to encourage completion of questionnaires. Limitations of the research project that are not readily apparent may develop or become apparent as the study progresses (Baron 2008: para. 20). The same can be said of the delimitations of the study. This was evident in Rajagopaul's (2006) limited study as well as in the pre-test

of questionnaires in the current study. The researcher found that there was a mix-up with which of the two questionnaires was to be completed by graduates/diplomates and which by employers, despite the initial precautions taken to avoid this. Thus further mechanisms had to be put in place to separate the two categories, for example, attaching a note on different coloured paper tags (green: for engineering graduates and diplomates; blue: for those graduates and diplomates employed in special libraries and pink: for employers) onto each questionnaire. Though these mechanisms were in place, there was still confusion in the main survey. Hence, there were graduates/diplomates and employers completing the wrong questionnaires, unqualified persons and college graduates participating in the survey that contributed largely to the 15 spoilt questionnaires in this study. Another delimiting factor surfaced when the researcher contacted the relevant persons for collection. There was a time frame set for returns. Initially the researcher gave two weeks for completion to all organizations; however, using the postal services for distribution created a setback. Some organizations received the questionnaires well in advance whilst others received them later than was anticipated. Data collection was extended for approximately two months to allow for additional responses. Organizations had to be reminded and some asked that they be re-sent questionnaires. The researcher had to make sure ample time was given to all respondents.

1.9. Structure of the research report

The report consists of five chapters. The first chapter provides details about the background to the study, the research problem, importantly the research objectives and questions, motivation for the study, an overview of the research methods used, definitions of relevant terms used in the study, limitations and delimitations of the study and the outline of the overall research report. The second chapter reviews literature relevant to this study. Chapter Three discusses the methodology used to carry out the research whilst the findings are presented in Chapter Four. Finally, the fifth chapter provides discussions of the findings, conclusions and recommendations of the study.

1.10. Summary

This chapter introduced the research problem that the study investigated, provided relevant background to the study, its objective and the critical questions guiding the study, an overview of the study's methodology, relevant definitions, limitations and delimitation of the study, and an outline of the research report. The following chapter reviews the wealth of national and international literature consulted for the study.

CHAPTER 2: REVIEW OF RELATED LITERATURE

2.1. Introduction

This section focuses on literature that has been consulted by the researcher. According to Powell (1985) this section discusses work done by others, evaluating their methodologies and findings, and stating how the current research differs. Powell points out that the review of related literature is in effect an expansion of the historical background presented in the problem section. It cites and reviews the related research studies that have been conducted. Fink (2005: 3) defines a literature review as a systematic, explicit and reproducible method for identifying, evaluating and synthesizing the existing body of completed and recorded work produced by researchers, scholars and practitioners. Literature reviews summarize previous research on a topic (F.D. Bluford Library 2003: para. 1). Bless, Higson-Smith & Kagee (2006: 24) remind us that the process of literature review is an on-going process one pursued by reading whatever has been published that appears relevant to the research topic.

Further, the Study and Learning Centre (2005: para. 1) highlights that literature reviews establish a theoretical framework for the research topic or subject area; defines key terms, definitions and terminology; identifies studies, models, and case studies supporting the topic and establishes the area of study. The purpose of a literature review is to convey to the reader what knowledge and ideas have been established on a topic. Leedy & Ormrod (2005: 64) advise that literature reviews can offer new ideas, perspectives and approaches that may have not occurred to the researcher. It allows the reader to be brought up to date regarding the state of research in the field and familiarizes the researcher of any contrasting perspectives and viewpoints on the topic. The more you know about a research area, the stronger the base for generating new ideas will be. The literature review can aid in focusing the topic. It can also assist in developing a research design and choosing an appropriate methodology (Graziano & Raulin 2004). For this particular study the review of relevant literature was useful in throwing light on issues related to the study.

2.2. Universities and universities of technology and the National Qualifications Framework

Raju (2004c: 4) outlines that in the past university and technikon programmes in South Africa were regulated by separate qualification frameworks that led to impermeable boundaries between sectors. After 1994 the Ministry of Education endorsed that a single qualifications framework should be developed for all higher education qualifications in South Africa in line with the National Qualifications Framework (NQF). The South African Qualifications Authority's (SAQA) function is to oversee the development and implementation of the NQF. All approved and registered education and training qualifications in South Africa would be housed within this framework. This framework would be in the form of specific descriptions of learning outcomes that would be agreed upon by all major stakeholders in the particular area of learning. The NQF allows for learners to earn credits towards national qualifications through a range of learning providers such as schools, technikons (now UoTs), universities, colleges as well as on-the-job training (SAQA (1997) as cited by Raju (2004c: 4)).

Ten years on, the Higher Education Qualifications Framework (HEQF) maintains that the positioning of two or more qualifications on the same NQF level only indicates that the qualifications are broadly comparable in terms of the general learning achievements (Department of Education 2007: 11). However, it is emphasized that they do not necessarily have the same purpose, content or outcomes and does not necessarily demonstrate equivalence of qualifications. This new qualifications framework has been designed to meet demanding challenges facing the higher education system in the 21st century. Hence, it will guide higher education institutions in the development of programmes and qualifications that provide graduates with intellectual capabilities and skills which would enrich society, empower individuals and enhance economic and social developments (Department of Education 2007: 3). The policy permits the integration of all higher education qualifications into the NQF. According to MacGregor (2008: 4), the current Minister of Education, Naledi Pandor, admits that while "it has taken some time" the new 2009 framework will improve the coherence and flexibility of the education system and would integrate and facilitate articulation and credit transfer among universities and UoTs. Whilst the new qualifications framework establishes common parameters and criteria for qualification

design it also facilitates the comparability of qualifications across the system. But within the existence of such common parameters, programme diversity and innovation is encouraged. Hence, higher education institutions will be able to retain their different visions, missions and plans to meet the needs of those they serve. Central to this study is the issue of job functions of LIS and engineering graduates and diplomates from both types of learning providers, that being universities and universities of technology. Both these types of higher education institutions currently have qualifications registered on the NQF.

2.3. Difference between university education and UoT education

The word technikon was derived from the word 'technike' that refers to anything related to technique or technology and serves as an important basis for the difference in orientation between universities and technikons as discussed in Raju's (2004c) study. The corpus of scientific knowledge is not directly relevant to technikon (now UoT) education and training, as is the case in university education and training where it forms the basis of general education or liberal arts education (Raju 2004c: 3). Universities of technology were 'born' in 2004 following mergers of some technikons with one another and traditional universities (Gower & Pretorius 2008). Du Pré (2004: 15) differentiates the university of technology (erstwhile technikon) from the traditional university:

> It is not the use of technology within a university, which classifies it as a technological university, but that it is rather the interweaving, focus and interrelation between technology and the nature of a university, which constitutes a technological university. At a technological university the focus is therefore on the study of technology from the viewpoint of various fields of study rather than a particular field of study.

Further, Raju (2004c: 3) states that this distinction between the technological and occupational focus of a technikon (now UoT) education and training and general university education with its focus on life long learning, is a crucial issue as it is a fundamental difference between the two types of education and training. Raju (2004c: 3) points out that a hierarchy of qualifications unique to technikons (now UoTs) and parallel to universities had evolved. It is evident that there is a difference between the

education received from the respective higher education institutions, which is a central issue in this study.

According to Raju (2004c: 6) the Ministry of Education in South Africa recognizes the importance of the difference in education between these two types of institutions. She goes on to point out that although technikons are now called universities of technology, their main focus remains a technological one. Raju (2004c: 3) reiterated by Winberg (2005: 192) explains that technikon (now UoT) qualifications are often the result of constant interaction between relevant industries and the technikon (now UoT) through liaison committees, advisory boards and experiential learning programmes. Interestingly, in the European context, universities through employer consultative committees attempt to meet the needs of prospective employers (Sutharshan, Torres & Maj (2001: para. 1). It is suggested that universities pay attention to the needs of their students since these students come to university to gain skills, knowledge and a qualification that would assist them in gaining employment or enhancing their prospects for a promotion or for a more rewarding job (Campus review 1996 as cited by Sutharshan, Torres & Maj 2001: para. 4). Writing in the European context Sutharshan, Torres & Maj (2001: para. 1) highlight that universities should continue to collaborate with commerce and industry. An issue in South Africa is that greater interaction with industry is practised by universities of technology who focus on applied knowledge whilst traditional universities focus on fundamental knowledge.

Kraak (2006: 136) points out that employers, parents and learners see UoTs as institutions guaranteeing greater employment prospects than the universities because of their focus on application in learning and the greater interaction with industry in delivering their programmes. Imenda (2005: 1413) argues that the university's primary purpose is to undertake high-level scientific research pursuing knowledge for themselves. On the other hand, the UoT will primarily dwell on the applied value of knowledge and cultivation of job related skills. Rajagopaul's (2006: 25) study revealed that majority of graduates and diplomates in special libraries and engineering firms are from the now UoTs. If university and university of technology education have different foci, then are LIS graduates and diplomates and engineering graduates

and diplomates from UoTs open to the same job opportunities as compared to university graduates? This is a question central to the current study.

D'Almaine, Manhire & Atteh (1997: para 14), writing in the engineering context, emphasize that universities and technikons are intended to be complementary sectors. They go on to say that they have equal status but different missions. Their distinction is that universities have a role in general formative and professional education as well as in basic and applied research whist the university of technology's role is in vocational and career education and on 'product related' research and development. Further, D'Almaine, Manhire & Atteh (1997: para. 15) purport that in South Africa, both the university's Bachelor of Science (B.Sc.), a four-year degree, and the UoTs Bachelor of Technology (B.Tech.) in Engineering (also four years in duration) receive the same credentials. Rajagopaul's (2006: 37) study revealed that majority of engineering firm employers give the B.Tech.: Engineering and the B.Sc.: Engineering qualifications professional status while the ND: Engineering is seen as paraprofessional. The difference between the two qualifications seem to lie with the emphasis in the B.Tech. being on practical orientation, compared to the university B.Sc., due to the B.Tech.'s experiential training now referred to as Work Integrated Learning (WiL). WiL is the coordination of theory in the classroom with practical application in the workplace. Thus, it attempts to integrate classroom instruction with practical training and experience in the workplace, to allow for opportunities to review the curriculum on an ongoing basis. This cooperative education involves the UoT, the potential employer/the host institution and the student. The system of WiL relies on the contributions made by potential employers and the UoT towards the training of students for specific careers (Library and Information Studies Programme (DUT) 2008: 11). In this programme theory and practice complement and supplement each other to effect better and more efficient education and training of the student. Likewise, the Master of Technology (M.Tech.) and the Doctor of Technology (D.Tech.) degrees are said to have more practical emphasis than their university counterparts which are the Master of Science (M.Sc.) and the doctoral degrees such as the Doctor of Philosophy (PhD). Is this also applicable to the LIS equivalents? This literature review attempts to unpack this.

2.4. LIS education in South Africa

Facilities for training in librarianship have been a feature of the library profession in South Africa ever since the then South African Library Association (SALA) was formed in 1930 (Musiker 1986: 91). Before this, training for librarianship was not offered in South Africa. Thus librarians obtained oversea's qualifications which were mainly British and were pursued mainly via correspondence. Kerkham (1988: 7) discussed the origins of education in librarianship in South Africa. Education in librarianship began in 1933 introduced by SALA as correspondence courses following the British model of training. Five years later, it was offered at a university as a course. As years went by, different universities offered the librarianship course in their institutions. During the 1970s technikons which were being established as advanced technical education institutions also started to offer LIS programmes. According to Bell (2002: 55) during the 1980s and 1990s many librarians began to criticize the prevailing model of education for librarianship. Bell claims that librarianship had its own "apartheid" parallel to South Africa. There was an emergence of resource centers and company libraries that called for alternative training for information workers. Hence, there was a need for appropriate training. Rapid technological changes also necessitated curriculum revision. This was termed the "democratization" of LIS education (Bell 2002: 55). Currently 12 higher education institutions across South Africa offer library and/or information science programmes. According to Ocholla & Bothma (2007: 167-168) these include:

- **Durban University of Technology**
  Department of Library & Information Studies
- **Stellenbosch University**
  Department of Information & Knowledge Management
- **University of Cape Town**
  Department of Information & Library Studies
- **University of Fort Hare**
  Department of Library & Information Science
- **University of Johannesburg**
  Department of Information & Knowledge Management
- **University of KwaZulu-Natal**
  Information Studies Programme

- **University of Limpopo**
  Department of Information Science
- **University of Pretoria**
  Department of Information Science
- **University of South Africa**
  Department of Information Science
- **University of Western Cape**
  Department of Library & Information Science
- **University of Zululand**
  Department of Library & Information Science
- **Walter Sisulu University of Technology**
  Department of Library & Information Science

According to Raju (2004a: 10-11) the following first-level qualifications are offered at universities and UoTs in South Africa:

- **National Diploma: Library and Information Studies** (three years duration at a university of technology)
- **Bachelor of Technology: Library and Information Studies** (one year duration after completion of the three year National Diploma at a UoT)
- **Bachelor of Library and Information Science** (four years at a traditional university)
- **Postgraduate Diploma in Library and/or Information Science** (one year, after completion of a bachelor degree in any discipline. This is offered at a traditional university)
- **Bachelor's degree** (three years) with information related major such as Archival Science, Information Science, Knowledge Management, Publishing or Multimedia

Universities of technology also offer the master of technology and doctoral qualifications for those that want to further their studies.

According to Kennan, Willard & Wilson (2006: 18-19) in Australia the professional LIS association, namely the Australian Library and Information Association (ALIA), accredits entry-level professional LIS programmes. These programmes are offered at

universities. Entry-level programmes exist at undergraduate level (almost all of three years full-time duration), postgraduate diploma (one year full-time duration) and masters level (one and half years full-time duration). These authors highlight that this is different from the United States of America (USA) where the American Library Association (ALA) accredits the one LIS qualification, the master's degree. It seems evident that Australian LIS education is more aligned with LIS education in South Africa.

2.5. The engineering discipline

According to Answers.com (2007a: para. 14) engineering education is based on a strong foundation in mathematics and science, and thereafter courses emphasize the application of this knowledge to a specific field as well as studies in the social sciences and humanities to give the engineer a broader education. The *Microsoft Encarta encyclopedia standard* (2005a: para.1) defines engineering as a term applied to the profession in which a knowledge of the mathematical and physical sciences, gained by study, experience, and practice, is applied to the efficient use of the materials and forces of nature. The engineering profession includes engineer, technologist and technician roles, where practice involves activities or contribution to activities that serve economic, social or human needs, including:

- Designing materials, components, systems or processes;
- Planning for the physical location and capacity of infrastructure;
- Investigating, advising and reporting on engineering problems;
- Improvement of materials, components, systems or processes;
- Managing or operating plant and processes;
- Managing implementation or construction projects;
- Research development and commercialization of products; or
- Education, training and development of engineering personnel

where effective pursuit of these engineering activities is enabled by the performance of:

- Problem solving, analysis, synthesis, evaluation, communication, self-management, teamwork;

- Applying specialist and fundamental engineering knowledge and technologies, underpinned by relevant fundamentals of basic science and mathematics;
- Taking measures to protect the safety, health and welfare of people, to ensure sustainability and to protect the environment;
- Using judgment, guided by engineering knowledge, on decision making; and effective use of people, work processes and resources

while at all times:

- Adhering to a code of ethics; and
- Taking responsibility for the results of the activity.

(Engineering Council of South Africa 2007: para. 12-13)

The above definition applies to the engineer, engineering technologist and engineering technician based on specific outcomes for each of these levels. Further, a basic model of job functions of an engineer, technologist and technician is provided by the professional council. The 'engineer' denotes a person who has received professional training in pure and applied science. There are also individuals such as technicians, inspectors, and drafters, who apply scientific and engineering skills to technical problems. The US Department of Labor (2007: para. 8) explains that engineers apply the principles of science and mathematics to develop economical solutions to technical problems. Their work is the link between perceived social needs and commercial applications. Many engineers work in design and development, testing, production, or maintenance. A professional engineer is assigned responsibility for providing engineering expertise, guidance and technical assistance (Okladot.state.ok.us 1999: para. 1). On the other hand, the engineering assistant performs complex paraprofessional technical duties and support work (City of Woodland.org 2007: para. 1). The engineering technician performs paraprofessional and technical functions (Ci.Woodland.ca.us 2008: para. 1). Engineering technicians use the principles and theories of science, engineering and mathematics to solve technical problems in research and development, manufacturing, sales, construction, inspection and maintenance. Their work is more limited in scope and more practically orientated than that of the scientists and engineers. Many engineering technicians assist engineers and scientists in research and development. Others work in quality

control that includes inspecting products and processes, conducting tests or collecting data. In manufacturing the engineering technician may assist in product design, development or production (World Wide Learn 2005: para. 1; US Department of Labor 2000-1: para. 1).

Engineering education is offered at technikons (now UoTs) in South Africa (Human Sciences Research Council [HSRC] (1996) as cited by D'Almaine, Manhire & Atteh (1997)). Universities offer various engineering qualifications as well. Common engineering disciplines found in South Africa are electrical, electronic, mechanical, industrial, civil engineering and there are others such as architectural and building engineering, medical engineering as well as town and regional planning. The following qualifications are offered by the universities of technology: the National Diploma in Engineering (a three-year programme), the Bachelor of Technology (or B.Tech.) degree in engineering, the Master of Technology (or M.Tech.) in engineering and the Doctor of Technology (or D.Tech.) in engineering (Department of National Education (1996) as cited by D'Almaine, Manhire & Atteh (1997: para 10-15). On the other hand universities also offer a range of engineering qualifications. According to the University of KwaZulu-Natal (2008: 18), the undergraduate degree is offered as the Bachelor of Science in Engineering or B.Sc. (Eng.). This is offered as a four-year programme. Thereafter, postgraduate qualifications include the Master of Science (M.Sc.), Doctor of Philosophy (PhD) and the Doctor of Science in Engineering D.Sc. (Eng.). (Presumably the same applies at other universities.) There are also offerings of Advanced Postgraduate Certificates and Diplomas available in the various engineering disciplines. All these qualifications are attached to the different engineering disciplines such as B.Sc.: Chemical Engineering.

Studies prove that graduates are more likely to be in a related occupation if they hold a vocational degree (Prospects.ac.uk 2006: para. 9). For example, a study in the United Kingdom (UK) shows that of those civil engineers who graduated in 2004, very few moved away from the industry with 69.9% working as engineering professionals in small and large companies with job titles such as Building engineer, Structural engineer and Bridge engineer. Rajagopaul's (2006: 46) study revealed varying job titles/designations among engineering staff like with LIS graduates and diplomates. Engineering graduates and diplomates take on job titles/designations such

as Technician, Technologist, Packaging engineer, Systems engineering manager, Software validation engineer, Software design manager, Civil engineer, Environmental scientist, etc. How are these designations assigned and in terms of what qualifications and with what job functions? It would be useful for the LIS discipline to research this to see if it can draw any lessons from this context to address some of its own 'anomalies'.

2.6. Correlation between education and job functions

Hallam (2006: 48) emphasizes that professional bodies and industry groups have been strongly advocating the need for universities to offer courses that more adequately meets current industry needs. An example given is of a poll of employers in 2000 by the Department of Education, Training and Youth Affairs (DETYA) which revealed that employers believe that 75% of Australian university graduates were not suited for the jobs they applied for. The reasons indicated were not in the lack of preparedness in technical areas but in generic capabilities of oral and written communication, interpersonal dealings, critical thinking, problem solving and ethics training. In South Africa, Ocholla (2000: para. 23) conducted a tracer study of past LIS graduates in the workplace to ascertain whether their gained knowledge and skills from the University of Zululand's curriculum were adequate for their current job functions. While employers were generally pleased to retain these graduates, the study revealed that graduates found that skills and knowledge lacking included, amongst others, practical work, IT skills, management skills, online cataloguing, database management, interview skills and general knowledge. Interestingly, Hildebrandt (2007: 5) reveals the top five library technician competencies that employers rated significant but most difficult to fulfill when recruiting library technicians. These competencies from five to one are: ability to deal with a variety of users, ability to handle high volume workload, public service skills, information technology skills, and topping the list, ability to respond flexibly to change. Other competencies sought by employers include communication skills, commitment to organization's goals, ability to learn new skills, interpersonal skills, leadership potential, entrepreneurial skills, management skills, business skills and years of experience.

With regard to engineering, employers require higher education engineering graduates and diplomates to have developed a strong focus on the outcomes of education such as problem solving, communication, teamwork and the ability to continue learning based on a fundamental knowledge base (Engineering Council of South Africa 2006: para. 39). Kraak (2006: 135) highlights that in South Africa one of the defining features of the ex-technikon has been its production of skilled personal to meet the intermediate skill needs of the national economy. Hence, specific jobs require specific sets of competencies at various skill levels (Abels et al. 2003: para. 10). This study too hopes to find out from employers what are the necessary skills and knowledge that they require from university and university of technology graduates and diplomates.

Studies conducted by Mhlongo (1998) and Raju (2004a) revealed that LIS university of technology graduates and diplomates generally do not occupy positions for which they have been trained. This was also evident in Rajagopaul's (2006) limited study. Perhaps one of the reasons is the lack of knowledge among employers regarding the different LIS qualifications. Du Pré (2004: 17) emphasizes that to ensure that UoTs produce appropriately qualified graduates and diplomates for the labour market they should be allied to the business sector to ensure relevant curricula. The researcher foresees this interaction between industry and institution as having a two-fold benefit as employers would gain insight into what the different qualifications are aimed at and the institution gets to know what employers expect from graduates and diplomates. It seems that both types of education (university and UoT) train graduates and diplomates to fit certain job functions. In this study the researcher aims to find out what job functions do LIS and engineering graduates and diplomates from both the university and the UoT are performing and if there is a correlation with the type of training received.

2.7. Paraprofessional and professional

Oberg (1995: para. 3) discusses the causes resulting in the emergence of the paraprofessional. These causes are the automation of library processes, declining budgets and entry into the electronic information age that changed libraries. New library tasks have been created and others realigned. Thus this redistribution of the library workload has given rise to the new category of employee, the paraprofessional.

The Montana Library Association (MLA) Paraprofessionals' Interest Group (2000: para. 1) puts the paraprofessional in context. "Para" means "beside" or "near" where the paraprofessional is a person trained to assist a professional. The term paraprofessional "designates library positions with entrance level requirements that are distinctively different from those of librarians" (Oberg 1992: 111). Any library employee with such job titles as Support staff, Paralibrarian, Library assistant, Library technician, Library clerk, Library administrative assistant or Library associate is regarded as be a paraprofessional (Montana Library Association (MLA) Paraprofessionals Interest Group 2000: para. 1). Howath (1998) defines paraprofessional in the LIS context as a term used for library assistants with qualifications in LIS on a lower level than fully qualified librarians. According to Carito-Walmsely (2000: para. 1) library technicians are paraprofessionals who work in academic, public and all types of special libraries. Fiels (2003) laments about how sixty to eighty percent of people who work in libraries in the USA are described by "hurtfulness terms" such as non-professionals or non-librarians. He suggests that they be called support staff. However, Oberg (1992: 111) stresses that support staff (secretaries, other office related positions that require office related skills, photocopy and mailroom employees and student library assistants) are not paraprofessionals. Froehlich (1998: 445) reiterated Fiels's (2003) point when he pointed out that the term non-professional has a derogatory connotation. However, he admits that there are differences in skill levels and responsibilities of support staff and professional librarians. Garber (2006: para. 14) stresses that although some do not understand the differences between paraprofessionals and professionals, the two classifications of staff are necessary. Further, she argues that there "are or should be major differences in the job descriptions of paraprofessionals and professionals at your library."

The American Library Association (2005: para. 3) highlights that functions that were considered to require the educational background of a master's degree in librarianship (the recognized professional LIS qualification in America), such as online database searching are now being transferred to paraprofessionals with subject expertise. Yet Weihs (2004) discovers that there is no definition for the term 'library technician' in the American Library Association (ALA) glossary of library and information science. She states further that there is a definition for library technical assistant but it makes no mention of a certificate or diploma as a qualification for this post. This is common

in South African libraries. An issue in South Africa is that of the university of technology Diploma in LIS being a paraprofessional qualification and therefore one would assume that library technician positions are available to these diplomates but in most cases they are not. There is uncertainty about the LIS Bachelor of Technology (B.Tech.) qualification as it is seen by some as equivalent to the university four-year qualification entitling these graduates to a professional position such as that of a librarian. Others do not see it has being equivalent because of its technological focus. Yet, King (2006: 25), writing in the engineering context, emphasizes that engineers should hold qualifications that focus on technical skills.

Wilson & Hermanson (1998: para. 25) quote Rusell (1985) who states that, "the time has at last come when a librarian may, without assumption, speak of his occupation as a profession". Interestingly Edmondson (1995) as cited by Lukow (2000: para. 4), defines a profession as a:

> Field of remunerative work which involves university level training and preparation, has a sense of vocation or long term commitment, involves distinctive skills and expertise, worldview, standards and ethics, implies continuing development of its defining knowledge base, and of its individual practitioners.

Wilson & Hermanson's use of the quote by Rusell was in the context of earlier times when higher education training for library posts became a necessity. The curriculum then, did not differentiate between professional or supportive duties by different levels of staff. In South Africa today, the curricula of both universities and UoTs do prepare graduates and diplomates for library positions but the UoT education is generally seen as paraprofessional. If this is so it seems logical that the holder of a professional qualification would be regarded as a professional whilst a paraprofessional qualification holder is seen as a paraprofessional. Like in LIS, in the engineering field, graduates and diplomates from both types of institutions in South Africa are available on the job market but are UoT graduates and diplomates with a diploma or B.Tech. seen only as paraprofessionals available for support positions? This study aimed to investigate this.

2.8. Librarians and library technicians

A library technician uses his/her technical skills to assist librarians to acquire, prepare and organize information and assist patrons in finding information (Wikipedia.org 2007a: para. 1). This is reiterated by the US Department of Labor (2005b) which explains that library technicians usually work under the supervision of the librarian, but in certain instances they work independently. Work involves performing duties related to the distribution, cataloguing, shelving and selection of books, magazines, newspapers and also publications, and for assisting professional librarians on more difficult functions (Archives.state.al.us 2008: para. 1). They design posters, bulletin boards and displays. Library technicians perform computer searches, calculate statistics on circulation, do shelving and assist in customizing databases. Library technicians also answer user queries, assist users with finding information and assist them in using the computers. With advancements in technology, library technicians, who are known commonly as library assistants, can input into the computer data on new materials acquired by the library.

Wikipedia.org (2007b: para. 1) defines a librarian as an information professional trained in library science and information science, the organization and management of information and service to people with information needs. Abels et al. (2003: para. 5) enlightens that librarians play a unique role in gathering, organizing and coordinating access to the best available information sources for the organization as a whole. In addition Abels et al. (2003: para. 14-18) describe the job functions of the information professional. Librarians manage the full cycle of information from its creation and acquisition to organizing, categorizing, cataloging, classifying, disseminating, indexing information and doing analysis and synthesis, demonstrating expert knowledge of the content and format of information resources and building a dynamic information collection based on deep understanding of their users' needs. These professionals have the ability to critically evaluate, select and filter the information to the needs of their organizations. Further it is stated that although traditionally librarians were associated with books, modern librarians work with information in different formats. Librarians have expertise in managing information resources, including identifying, selecting, evaluating, securing and providing access to pertinent information resources that could be in any media or format (Abels et al.

2003: para. 14). These many formats include books, magazines, newspapers, audio recordings in various formats (both music recordings and audiobooks), video recordings in varying formats, photographs and other graphic materials, bibliographic databases and Internet resources. The job of librarians is also to manage staff (US Department of Labor 2005a).

The librarian provides other information services such as computer provision and training, coordination of public programmes, basic literacy education and help with finding and using community resources (Wikipedia.org 2007b: para. 1). Librarians assist people in finding information and using it effectively for personal and professional purposes. Hence librarians must have knowledge of a wide variety of scholarly and public information sources. These librarians must keep abreast with current affairs and trends relating to publishing and computers to assist with the selection and organization of library materials (Education, training, library and museum occupations 2006-7: para. 50). Abels et al. (2003: para. 18) highlight that librarians must maintain current awareness of technologies that are emerging which may not be relevant now but may become so in the future for their library functions.

The widespread use of computerized information storage and retrieval systems has resulted in library technicians handling technical services (such as derivative cataloguing) that were once performed by librarians (Wikipedia.org 2007a: para. 1). Library technicians can specialize if they are employed in a large library. According to Wikipedia.org (2007a: para. 2) the library technician's duties can vary depending on the size and type of library. Such duties include cataloguing and classifying of materials, data input to assist in acquiring print and non-print materials, and circulation procedures. In larger libraries, they could be responsible for clerical staff in a certain section or department. Reitz (2007: para. 65) observes that in smaller public libraries in the USA, paraprofessionals are branch librarians. Likewise in smaller libraries where the foundations and operations of the organization are already established, they may serve as managers (Wikipedia.org 2007a: para. 2).

According to the American Library Association (ALA) (2005: para. 4) the term 'routine' is used to differentiate between the work done by librarians and paraprofessionals. However, the distinction seems inappropriate to the jobs held by

paraprofessionals whose responsibilities nowadays require sophisticated judgment calls, supervision and complex operations. The word of the library technician is defined by Archives.state.al.us (2008: para. 1) as an "advanced paraprofessional library work in library operations". Employees perform a variety of functions, both difficult and routine in nature. Respondents in a study conducted by the ALA (2005: para. 10) on the roles of paraprofessionals and librarians commented that "support staff run day-to-day operations" and "librarians are involved in research, planning, report writing, attending meetings and decision making types of duties". A paraprofessional is "a trained worker who is not a member of a profession but assists a professional" (WordNet 2005: para. 1). On the other hand Howarth (1998) defines the paraprofessional librarian as being a "shadow librarian". There seems to be a very thin line separating job functions performed by librarians and library technicians. Functions and responsibilities are transferred from librarians to paraprofessionals. The transfer can occur the other way too (American Library Association 2005: para. 1). The American Library Association (2005: para. 3) observes how functions previously considered to require educational background are sometimes being transferred to paraprofessionals. Paraprofessionals are assigned complex duties that once characterized the work of librarians (Oberg 1995: para. 4). Moving of tasks once performed by librarians to support staff has thus become a trend (Neal 2006: para. 16). Oberg (1995: para.15) mentions support staff who argue that the MLS (in the American context) should not constitute a barrier to advancement and that librarianship ought to be a competency rather than degree based.

Hildebrandt (2007: 9) takes note of the rapid changes in technology and the way library users access information and hence that libraries are constantly changing and evolving. These changes adversely affect the library staff whether they are librarians or library technicians. The role of the library technician is expanding and evolving accordingly (Wikipedia.org 2007a: para. 1). Library technicians are facing role shifts. Due to libraries increasingly using new technologies (such as automated databases, CD-ROM, the Internet and virtual libraries), research reveals 77% of special library employers (in a Training Gaps Analysis, 2006 in the USA) believe there is a need for library technicians to perform professional librarian tasks (Hildebrandt 2007: 4). Technology is making it possible for library technicians to do many of the jobs that were once reserved for librarians (Wilson & Hermanson 1998: 11). Not surprisingly

then library managers find it attractive to hire library technicians because their salaries are lower than that of a librarian (Wikipedia.org 2007a: para. 1). Notwithstanding the above trends the job functions of librarians and library technicians vary from organization to organization. The distinction between these two categories of staff is critical to the current study.

2.9. Special library services and librarians

Dana (1991) (as cited by Library workforce (2007: para. 1)) explains that special libraries evolved since

> a few enterprises, private, public and quasi-public, discovered that it paid to employ a skilled person who would devote all his [sic] time to gathering and arranging printed material out of which he/she could supply the leaders of the enterprise, on demand or at stated intervals, with the latest information on their work.

Further, such individuals support the research and development work of their companies (Fourie 2007: 33). A special library is said to be a unit within a public or private corporation, government agency, or a non-profit organization. Poll (2007: 2) defines a special library as established and funded by a commercial firm, private association, government association, non-profit organization or special interest group to meet the information needs of employees, members or staff in accordance with the organization's mission and goals. Many corporations, private businesses, financial institutions, museums, hospitals, government departments and agencies, non-governmental organizations and other institutions establish and maintain their own libraries to serve the needs of their employees (Mostert 2007: 1). The scope of the collection is usually limited to the interests of the host organization. These special libraries, sometimes referred to as information centers, support the mission of their parent organizations excelling at providing highly specialized information and value added data with a very specific focus on their users (Library workforce 2007: para.1).

Larson (1983: 477) made a valid point that is still relevant today with regards to name changes of special libraries due to technological improvements:

> This trend toward taking on non-traditional services is one of the major reasons for the gradual metamorphosis of many special libraries into *bona fide*

> information centers. It is also part of the reason why some special libraries no longer use the title 'library' over the door. More and more the term 'information center' is replacing the term 'library' or is being used with 'library' to describe more accurately the dual purposes of the organizations. The distinctions between 'special library" or 'information center' or 'technical information center' of the library are becoming more blurred as improvements in technology increasingly permit the economical addition of new and sophisticated products and services to the repertoire of those traditionally provided by the library.

Mostert (2007: 1) points out that though the library is recognized as a special library they are sometimes called information centers, information analysis centers, documentation centers, information resource centers or knowledge management centers.

Special libraries offer services specializing in one subject field and are part of the organization. The library is generally not open to the public but to employees of the organization it serves. It is clear that they serve a particular user group within the organization. Hence, special libraries exist to serve the specific needs of their users by preserving and maintaining the archives of the organization, supporting current research needs, anticipating and preparing for the future (Owen & Rollerson 1997: para. 25). While special libraries are as diverse as these needs are, there are however, some commonalities in the services they provide. These common elements include their focused collections, and their knowledgeable employees who are able to adapt to the changing needs of their users. Larson (1983: 475) claims that special libraries include collections devoted to materials on a single subject or a related group of subjects. Examples of such libraries are art libraries, business libraries, law and medical libraries, among others. Other special libraries are described by the form of material collected such as map libraries and picture libraries whilst many can be described in terms of their parent organization as with museum and government libraries. Poll (2007: 2) subdivides special libraries into two groups:

- Corporate libraries, established within a company or organization to meet the needs of its employees. This includes industrial and commercial libraries, media libraries, health services and government libraries. These libraries serve a defined clientele; the members of their organization and

are most times not accessible for the general public. Their main task is the efficient and speedy delivery of all required information to their users, often by customized services. The collection building is based on actual user needs. Electronic collections are important.

- Libraries such as archives, museums, voluntary or professional associations with regional tasks. In many cases they do not serve a defined population but offer their services and collections to the general public. Their role involves building a comprehensive collection.

This study mainly focuses on libraries that support and serve users within the organization. It does not target libraries with specialized collections but functioning as academic and public libraries.

Owen & Rollerson (1997: para. 6) explain that special libraries vary not only in physical size but also in the size and focus of collections and in the number of staff members which is influenced by the client base served by the library. According to Poll (2007: 3) the main tasks of a special library include:

- A collection that is tailored to the needs of its users
- Speed and accuracy of reference service
- Proactive delivery of relevant information to users
- Customized user services (personal profiles, alerting services, selective dissemination of information)
- Efficient background services
- Cost efficiency of services

Lefbevre (1996) as cited by Mostert (2007: 1) emphasizes that the special library's role is closely linked to the parent organization's activities and it is mostly focused on making accessible any knowledge and expertise that is necessary to further these activities. This would suggest the need for knowledgeable persons with library expertise and with specialized subject knowledge. Ocholla (2007: 2) highlights that the private sector increasingly recognizes the need for proper information services that in turn demand knowledgeable and skilled information providers. It is a norm that although special libraries have a special collection there is usually a very small number of employees ranging from one person to perhaps the most four persons. Howarth (1998) states that "in some large academic or public libraries decisions about

which materials to purchase or repair and when, are the responsibility of a professional librarian". But, according to Howarth, "some medium sized libraries as determined by the size of the collection assign this task to the paraprofessional". Kerkham (1988: 7) mentioned that professionals engage in tasks that require conceptual skills. On the other hand paraprofessionals engage in tasks that require application of given concepts. Further, Kerkham went on to explain that for many years professional library staff were performing many paraprofessional functions. Is this still so in special libraries? This study investigates this issue.

Special libraries, as mentioned above, sometimes have one employee. This employee who would be termed the 'librarian' would have to perform all functions within the library. He/she would have to take on all the responsibilities of the paraprofessional as well as professional duties, which would otherwise be assigned differently in a public library or in an academic library. Hence if this special library employs a graduate/diplomate with a paraprofessional qualification, this person would automatically assume all responsibilities. This was evident at the Shepstone and Wiley Law Library as revealed in Rajagopaul's (2006) study where the librarian holds a paraprofessional qualification and assumes professional and paraprofessional duties. The researcher draws from personal experience in special libraries to point out that even today many professional staff are performing paraprofessional functions in special library services. Sometimes, these professionals may be the only persons employed in the special library service, as discussed earlier. This study hopes to reveal how special library employers distinguish between university and UoT LIS graduates and diplomates and to compare this with employment trends among university and UoT graduates and diplomates in engineering firms.

Wikipedia.org. (2007a: para. 2) highlights that in many western countries the librarian is a professional with a master's degree in library science. This librarian is educated to analyze information needs and to provide the variety of patrons with information resources appropriate to meet those needs. Further, Owen & Rollerson (1997: para. 52) mentions that special libraries will continue to exist and flourish, as long as users have specific information needs that can only be met by educated, experienced information professionals prepared to answer "any old thing". Abels et al. (2003; para. 5) reiterates that in the information and knowledge age where information

produced internally and externally is the lifeblood of the organization, it is essential to have specialists in information management. The information professional is said to provide "the competitive edge for the organization by responding with a sense of urgency to critical information needs." From the researcher's experience with special library services in South Africa, it is evident that even persons without any LIS qualification perform so-called professional tasks. This study investigates how 'special librarians' are employed. LIS graduates and diplomates from both universities and UoTs are available for such posts. The ND: LIS is seen as a paraprofessional qualification and the B.Tech. (LIS) is seen only by some employers as being a professional qualification. This study hopes to reveal how special library services and engineering firms view these different qualifications.

Jenkins (2005: 2) points out that in the ancient world, libraries were staffed by persons whose training was often in another field. These people were called 'librarians' because they possessed intelligence, management skills, cataloguing skills, search talents and incredible memories. Based on this a librarian of the past was defined as a person of intellectual distinction whose talents enabled them to catalogue, manage and find the accumulated knowledge of the past. This definition has changed. Jenkins purports the modern definition of a librarian as "someone who possesses the proper training". Jenkins (2005: para. 20) interviewed 'librarians' that did not hold any librarianship qualification but held qualifications in other fields. Interesting one respondent said, "there was not as much emphasis on the library degree in the special library world 20 years ago as now. If you could do the job you were in." Her response was that she learnt on the job and this proves that you do not need a master's degree (the basic LIS qualification in North American countries) to succeed as a special librarian. Another 'law librarian' said that she worked as a law librarian with a law qualification for six years until other librarians pointed out that "she's not a real librarian if she does not have the degree". She related that a colleague asked her about an acronym that the colleague felt she should know. Her colleagues' response was, " If you were a real librarian, you would know". This prompted her to study towards her library degree (Jenkins 2005: para. 35). In the same study conducted by Jenkins (2005: para. 26) another respondent was asked what it was like working in the information field holding a PhD in organic chemistry rather than a typical library degree. His response was:

> In general, I think it is far easier to take a person with an advanced degree and train them to do searching than it is to take a librarian and teach them about a specific field such as chemistry.

The respondent claims that he has the advantage of a broad knowledge base required of librarians, and as emphasized by Raju (2004b) in her discussion on the value of general education in LIS.

Andrew (2007: para. 3) shares thoughts about his profession as a librarian and about the wider library industry. He discusses that the job functions of a librarian are not "rocket science". In addition questions posed to whoever may read his blog enquired whether subject specific graduates would be able to provide a better service than a traditional librarian. He points out that anyone with a "decent brain" can follow collection development concluding that it helps to be a librarian but it's not mandatory. Interestingly, the *Microsoft Encarta encyclopedia standard* (2005a: para. 8) mentions that special library staff are usually trained in the appropriate subject areas as well as in library science. Muller (2007: 109) highlights that employers seek people with the 'applicable knowledge' in other words subject expertise. Hence there is a trend of special libraries to employing non-LIS professionals to manage their information and whom they believe add more value to the performance of their business. But Owen & Rollerson (1997: para. 38) argue that librarians and paraprofessionals have degrees and/or experience in the specific field of the special library. The authors quote Lefebvre (1996) who claims that "the background is integral because the function of a special library is to secure, assemble and present published and unpublished information in a specific field".

Engineers, on the other hand, are trained in a specific engineering discipline such as civil, mechanical, electrical engineering, etc. You are not likely to find an electrical engineer performing tasks that a civil engineer would perform. Interestingly an American, Hook (2003: para. 1), writes that he has an undergraduate degree in engineering but decided that he preferred to be a librarian. After working for years as an engineer, he went on to obtain his master's degree in LIS. Now working in a special engineering library, he finds having an engineering degree very helpful. Further, he adds that communicating with library users is easier as you can both speak the same "language". Library users show more respect towards him and are not afraid

to ask detailed reference questions. According to Hook (2003: para. 9-11) in his situation research can be done with more depth with better search results obtained. Do employers of special libraries prefer hiring persons with subject expertise to function as librarians? The study interrogates this important issue.

2.10. The impact of IT on LIS and special libraries

Hallam & Partridge (2005: 18) highlight that the LIS profession is changing. The social, cultural, political and technological changes and developments of the twenty-first century are having a significant impact on the evolution of the profession. Andrews & Ellis (2005: 57) point out that library and information work has changed over the years. The Department for Professional Employees (2001: para. 1) highlights that like many other professions, library services have been gravely affected by new technologies and changing job content. Larson (1983: 476-477) shows evidence that even back then in the eighties, with the increasing improvements in technology, special libraries were already calling themselves information centers or technical information centers. Nowadays there is a convergence of both library and information work. Wilson & Hermanson (1998: para. 21) emphasize that information science has become a significant theme in library education. Hence boundaries of the academic LIS discipline have become less clearly defined. Melchionda (2007: para. 28) advises that the best solution is for the profession to embrace these changes and accept a new idea of services as one which integrates the new technology with traditional ideas of service. Librarians and information professionals are increasingly combining traditional duties with tasks involving quickly changing technology (Education, training, library and museum occupations 2006-7: para. 55). Higher education institutions offering LIS education programmes have added ‘information’ to ‘library’ while some have even omitted the word library completely to try and embrace the diversification caused by information and communication technology (ICT) and employment trends (Lowe 2006: para. 3). Wilson & Hermanson (1998: para. 21), writing in the American context, provide an example of the University of Michigan changing its name from “School of Information and Library Science” to “School of Information” and enriching its curriculum with aspects of information science. Similarly, Ocholla & Bothma (2007: 151) discuss the name changes in the South African contexts: Departments of Library Science, Library Studies or Librarianship

were renamed Departments of Library and Information Science/Studies (note the varying department and programme names in Section 2.5. of this chapter). Further Lowe (2006) highlights that there are more and more jobs but fewer and fewer ones where LIS education and professional status is a prerequisite.

According to St. Clair (2006: para. 6) all "branches" of information work are a "piece" of the information industry. This implies that general librarianship as well as specialist librarianship are part of the larger information industry. There is the recently emerged the information management profession or knowledge management profession. Librarians are often now known as information professionals. In an Australian study of students' perceptions of a librarian by Hallam & Partridge (2005: 17), the stereotyping of the librarian seemingly diminished and librarians were now being described with words such as information, knowledge, technology, people and learning. Andrews & Ellis (2005: 58) are explicit that information technology has had major effects on the profession including employment in special libraries. Muller (2007: 112) discusses that many special libraries in South Africa have closed, downsized or outsourced due to lack of financial and managerial support. According to Salonen (2004: 5), special libraries are downsizing and becoming digital. For many years librarians were stereotyped as holding a collection that was physical. Owen & Rollerson (1997: para. 32) highlight that a special library's collection includes not just books but electronic resources in-house and via the Internet. Hence information services can be thought of as any work that has anything to do with the identification, capture, organization, storage, retrieval, analysis, interpretation, packaging, and dissemination of information (St. Clair 2006: para 7). Librarians have generally been viewed as part of a 'manual' profession in a physical environment as mentioned above. Abels et al. (2003: para. 21) quite rightly concludes that while the core of the profession remains the same, the methods and tools for information delivery continue to change. Kennan, Willard & Wilson (2006: 35), writing in the Australian context, reiterates this:

> While librarianship is not the only profession grappling with dramatic changes brought about by technology and the resultant workplace change, librarianship is one of the few professions suffering the appearance of a decline, and a great deal of questioning from within as well as externally about the ongoing need for, or viability of the profession. This is despite today's information rich

> society; the LIS skills and competencies of organizing and managing information, and providing people with the information they need when and where they require it have never been more necessary.

Today library and information work are combined (Andrews & Ellis 2005: 57). Raju (2004c) made distinctions between university and UoT education and concluded that UoT education has a technological focus. These LIS graduates and diplomates are trained in managing information in a digital age but do employers see these graduates and diplomate's skills as being adequate for job opportunities in special libraries? An empirical investigation such as the current one hopes to unpack this.

In Andrews & Ellis's (2006) study it is particularly interesting to note that qualifications in other subject disciplines were requested for information posts much more than LIS qualifications in special libraries compared to academic or public librarian posts. Another notable finding was that LIS qualifications were also requested more frequently for special library positions than subject qualifications but the difference was only marginal. This may seem to run counter to other studies that suggest special libraries sought individuals with subject expertise qualification rather than LIS qualifications (Andrews & Ellis 2006: 63). Notwithstanding this, there seems to be a greater emphasis on subject qualifications in information work because of the need to recognize the significance of information and present it in a meaningful way. Many of the sample posts that Andrews & Ellis surveyed requested subject degrees and reflected job contents to which they related. Whilst this study's focus was in the UK, the researcher has observed a similar trend in South Africa where a special library advertised for an archivist's post with the minimum requirement being a B.Tech. in Archives Science or equivalent. Many persons applied including an applicant with a B.Tech. (LIS) qualification obtained from a university of technology with pertinent subjects covered such as Information Retrieval, Information Management, Preservation and Conservation, Research Methodology and Library and Information Practice. A graduate degree in library science with courses in archival science is preferred by most employers seeking archivists (Educating, training, library and museum occupations 2006-7: 212-213). One would thus assume that in the above case the B.Tech. (LIS) graduate would be an appropriate candidate for the archivist position - but it was not to be.

Wilder (2007: para. 1) states that “if you work in an academic library and are under 35, you are far more likely to work in areas beyond the confines of traditional librarianship, often in information technology and less likely to hold a degree in library science”. These conclusions were based on 2005 demographic data from the Association of Research Libraries. This can also be likened to the special library situation. Technology, globalization and dependency on international trends affect changes in the labour market (Prospects.ac.uk 2006: para. 1). Muller (2007: 108) reiterates this, adding that special librarians are affected by organizational transformation and performance as well as economic growth factors. Further, Library workforce (2007: para. 8) remarks that the range of jobs within special libraries are becoming more diverse as technology stimulates change within organizations. Wilson & Hermanson (1998: 11) claim, “now that technology has made crucial the handling of large amounts of information, there will be opportunities for the expertise embedded within LIS to be of broad value”. Graduates of LIS programmes may work as web developers, information brokers, content developers, trainers, software engineers, digital archivists or metadata librarians. Now that computers are increasingly being used to generate and maintain archival records, knowledge of technology is increasingly being required (Educating, training, library, and museum occupations 2006-7: para. 6). Observations by the researcher found that a special library in South Africa employed an individual studying towards a National Diploma in Electronic Engineering obtained from a university of technology. Xaba (2006) rationalizes that this candidate had the relevant IT skills.

Kennan, Willard & Wilson (2006: 34) discuss academic libraries employing staff with qualifications in computing, information technology and information systems as opposed to librarianship qualifications due to the effects of IT. Neal (2006: para. 3) invented the phrase “feral professionals” to describe individuals in such positions. These “feral professionals” work in jobs that do not require them to have a background in library education, and they bring to the library a ‘feral’ set of values, outlooks, styles and expectations. Further, he talks about the proliferation of new tasks in libraries, where professional staff may have experience working in a library, however, they are not expected to hold a professional LIS qualification. As a result other degrees and thus expertise are typically favoured and recruited (Neal: 2006 para. 13). Sometimes employers look for librarians with these skills and at other times other

individuals with these skills. This is irrespective of whether they are librarians or not and whether or not the place of employment is a library (Kennan, Willard &Wilson 2006:34). While these authors' discussions are in the academic library context, these trends are also applicable to special libraries.

Evidently information technology (IT) has affected the LIS sector where employers are looking for IT skills (Andrews & Ellis 2005: 58). Cullen (2002: para. 45) concluded that the most sought after skills by employers in Ireland besides communications and management abilities was in information technology. Similarly, an Australian study by Kennan, Willard & Wilson (2006: 20) of job advisements revealed that there was an increasing requirement for skills in information technologies and behavioral and communication skills in both traditional and non-traditional job markets. In the South African context, Ocholla (2006: 8) conducted a study of job advertisements. These findings too, reiterate the findings in the studies by Cullen (2002), Andrews & Ellis (2005) and Kennan, Willard & Wilson (2006). Knowledge management and information and communications technology skills are essential. Muller (2007: 117) maintains that special librarians are always able to exploit information technology effectively. Larson (1983: 476) points out that special librarians provide services to their users that are considered to be traditionally out of the scope of librarianship. The librarian in providing that service to his/her organization has developed the skills of a records manager, an archivist, word processing expert, editor and public affairs assistant. Melchionda (2007: para. 44) emphasizes that library and information professionals adjust their competencies to the new technologies, "as a natural evolution to their traditional jobs". Likewise, with modern scientific and technological endeavors, computers and software play an increasingly important role in the engineering discipline (Answers.com 2007a: para. 22). In this vein, King (2006: 26) points that information technology has also impacted on job opportunities for engineers. As technology becomes more sophisticated, employers continue to search for technicians who are skilled in new technology and require a minimum of additional training for the job (World Wide Learn 2005: para. 30). Are LIS graduates being sidelined in special libraries because of the lack of adequate IT skills? This study hopes to find this out.

2.11. Experience and qualifications

St. Clair (2006: para. 2), writing in the American context, talks about information workers from a management perspective and who have been troubled by the lack of quality in their fellow information worker employees. These managers believe that employees are either accomplished in their work or become bored and uninterested. In their opinion one gets information workers who are well educated in the management of information and others who may not be that well qualified in information work but have bundles of background experience. From observations by the researcher in South Africa it is clear that special libraries too have either of these categories of information workers if not both. Like St. Clair, Andrew (2007: para. 2) discusses the 'library technician versus librarian' issue. The issue raised is that there are library technicians whose knowledge is often greater than their qualifications. They demonstrate skills and knowledge comparable to that of a librarian. On the other hand there are individuals studying to become librarians. They have not yet completed their studies but have reached a stage deemed to be equivalent to the skills and knowledge of a library technician. Andrew argues:

> Why shouldn't the library technician be considered for librarian positions? And the student studying be considered for library technician positions?

Andrew goes on to say that if it were so library technicians would perform librarian duties but be paid as library technicians resulting in exploitation. At the same time they would be "stealing" potential vacancies for qualified librarians and 'degrading' the profession. However librarians in training or qualified librarians who opt for library assistant posts merely do so as a stepping-stone.

Further, employers seek individuals capable of performance excellence. According to Tammaro (2005: para. 1),

> a number of developments are beginning to affect the recognition of qualifications and quality assurance tradition in LIS. These developments reduce the value of formal qualifications and academic titles and place more emphasis on labour market orientated competencies and life long learning.

Graduates need to be 'employable' (Prospects.ac.uk 2006: para. 3). This means having the ability to acquire and retain work at an appropriate level. To achieve this graduates and diplomates would need to exhibit a portfolio of personal skills and

knowledge appropriate to the chosen career (in this case Engineering and LIS), and the aptitude to demonstrate through selection processes, such as interviews, that they would make a positive contribution to the organization. Du Pré (2004: 10) points out that nowadays there are so many people with degrees, many of which are irrelevant in the market place. Employers are looking at additional criteria as determinants in employing such as relevance of knowledge and demonstration of application of skills. Hence Ward (2001) as cited by Tammaro (2005: para. 6), points out that LIS graduates who are seeking first appointments or promotions within an information organization should be able to provide employers with the assurance of the currency of their knowledge, skills and competences.

Maatta (2007: para. 5), reiterated by Prospects.ac.uk (2006: para. 4), highlights that employers are looking for LIS graduates and diplomates with experience. Andrews & Ellis's (2004: 63) study revealed emphasis on experience for information posts in special libraries. Ocholla's (2006: 8) South African study too stress that experience is required for most jobs advertised. Maatta emphasizes that LIS programmes should be more proactive in encouraging students to participate in fieldwork or internship activities and service learning projects and volunteer at library and information agencies. Maatta's (2007: para. 13) study found that many graduates continued to do temporary jobs while searching for a permanent LIS position. One graduate reported that her lack of experience hindered her attempts to find the 'perfect' job. LIS graduates are accepting jobs that are usually done by persons without LIS degrees in order to gain experience or simply to find a job (Maatta 2007: para. 6). Further, it is acknowledged that many LIS graduates have unique and specialized skills on their curriculum vitaes. However despite their background knowledge, employers were unconvinced that the graduates and diplomate's lack of practical library experience would not inhibit their job performance (Maatta 2007: para. 34).

Elliott & Kennedy (2005: para. 1) at a roundtable discussion with some prominent industrial engineering employers focused on what kinds of training, education and skills they sought in their engineering professionals. Like Maatta (2007), Elliott & Kennedy emphasize that the "tried-and-true tactic of increasing marketability through real-world work experience remains a winner". One of the engineering managers claimed that the best thing a student can do is take advantage of any internship

opportunities. For him the degree just demonstrates the technical skills and fundamental understanding. The respondent laments that engineering graduates spend all that time at higher education institutions but at an interview one gets asked, “Oh, that’s nice, but what else have you done?” He sums up the situation in the following way:

> The biggest advantage is having some work experience to relate in interviews so in response to questions you can relate it directly to actual situations-demonstrating performance.

Kennan, Willard & Wilson (2006: 34) found in Australia an increased number of library vacancies for persons with experience or no qualifications and the authors claim that this adds to the decreasing enthusiasm to study LIS. It seems professional positions are obtainable without professional qualifications. In Rajagopaul’s (2006) study employers of special library staff were not persons with any LIS background and did not seem to distinguish between qualifications. In addition the traditional trend of the past of employing ‘anyone’ to do the job in special libraries seems to be prevalent today. This study hoped to find out how employers view the different LIS qualifications.

Kennan, Willard & Wilson’s (2006: 26) Australian study revealed that library employers are increasingly seeking persons with experience rather than qualifications. According to Kennan, Willard & Wilson (2006: 34) there is an increase in posts for new graduates in fields such as engineering but potential LIS workers may not see jobs advertised specifically for beginners in the profession. St. Clair (2006: para. 17) emphasizes that the Special Libraries Association [SLA] (USA) as an organization should decide whether “we are information professionals in word or in recognition of our qualifications”. While this is in the American context, many in South Africa too believe that information workers should be recognized for the qualifications they have attained.

Akin to the LIS discipline, some American employers take on engineering technicians with no formal training. World Wide Learn (2005: para 16) explains that while engineering technicians are usually not required to hold a qualification, most employers prefer to hire someone with at least a two years accreditation in engineering technology which would be a competitive advantage to job seekers.

Engineering technicians without formal training may qualify for some positions but may require additional training and experience. Further, it is mentioned that engineering technicians usually begin with routine duties under the close supervision of an experienced technician, technologist, engineer or scientists. As experience is gained more difficult tasks are assigned to them with only general supervision. Some move up the ladder by becoming supervisors (Word Wide Learn 2005: para 20). Rajagopaul's (2006: 37) study revealed that engineering employers generally see the ND: LIS as a requirement in hiring engineering technicians. However in the LIS discipline this is not a consistent practice.

Still in the American context, employers appropriately treat a college bachelor's degree (a four-year degree) in engineering as a requirement for hiring engineers whilst a college bachelor's degree (a four-year degree) in the social sciences (such as in librarianship) certifies nothing and simply is a screening device for employers (Murray 2007: para. 10). From observations it seems this could be likened to the situation in South Africa (however, note that in South Africa colleges and UoTs are not the same type of higher education institutions although some use the terms interchangeably). It seems evident that South African engineering employers place emphasis on qualified engineering technicians such as those diplomates holding a ND: Engineering qualification. Rajagopaul's (2006) study revealed that while the B.Sc. and B.Tech.: Engineering graduates held positions of engineers, the same consistency did not prevail when it came to LIS graduates. There was a blur amongst LIS graduates and diplomates with positions they held. Both the LIS and the engineering disciplines have university and UoT graduates and diplomates with qualifications and experience. How are these credentials accommodated in the staff structures of special libraries and engineering firms? This is an issue investigated in this study.

2.12. Pressures on the LIS curriculum

Detlefsen (2007: para. 2) emphasizes that "as a profession we need to look at the changing demographics of library education as well as the issue of recruiting the next generation". Tenopir (2002: para. 3) stresses that professional organizations and schools of library and information science are concerned about the challenges of

recruitment and of keeping curricula relevant for new jobs in new settings and new responsibilities in old settings. Writing in the Australian context, Hallam (2006: 45) advises that it is essential that the curriculum is current and relevant to a dynamic field like LIS. She stresses that the curriculum itself needs to be dynamic to provide graduates with the knowledge and skills they will need as soon as they join the workforce. Libraries and information centers today are very different places compared to twenty or even ten years ago (Hallam 2006: 45). Further, Freeman (1993: 13) discusses the pressures on the finite curriculum to add new subjects and training for the modern librarian. He mentions subjects such as communication, interpersonal skills, management, etc. to be added to the curriculum and there is still IT that seems to take precedence in LIS as the information society grows.

A study in Kenya by Gathegi & Mwathi (2007: 3) revealed dissatisfaction by students with their university curriculum. There was a need to review aspects of their curriculum due to developments in technology. The university also introduced a service-learning component into the curriculum. This was in the form of an attachment to a library or other information center, where students learn the practical aspects of the profession and are visited and assessed by their faculty members. Hallam (2006: 48) points out that the concept of developing a student's generic skills have become increasingly popular in recent years in Australia. Skills such as problem solving, critical thinking, effective communication, teamwork and ethical thinking form the core set of workplace skills and abilities desirable in graduating new students and new employees. There is now increasing interaction between industry and education and the significant role played by the higher education sector as a supplier of employees to the marketplace has become critical. This is also a practice in South African universities of technology (UoTs) as discussed in Section 2.4. of this chapter. Hallam emphasizes the need for universities to offer courses that more adequately meet current industry needs. With regard to this, Du Pré (2007: 2) points out the crucial role of WiL at the universities if technology. He highlights that the "high premium placed on co-operative education means the curriculum in the respective programmes must be adjusted accordingly. Du Pré demonstrates enthusiasm in the WiL policy which allows for cooperation with persons who have widespread industrial experience. This collaboration with industry is of value in producing graduates and diplomates that meet the requirements of employers.

Ocholla & Bothma (2006: para. 4) provide an overview of the trends affecting LIS in South Africa. Essentially such trends include growth of LIS schools, review and revision of curricula, increase use of ICTs, rise and fall of student numbers, amalgamation and reorientation of LIS programmes, relocation of the academic administration of LIS schools, expansion and closure. Ocholla & Bothma (2006: para. 9) point out that some LIS schools have completely closed down LIS programmes, others have changed the names of their departments whilst a lot more have diversified their qualification programmes by providing additional qualifications in related information areas such as knowledge management, multimedia, records management, publishing and information technology. There are other schools that have enriched their curricula by adding market orientated courses and/or academic subjects. Many schools seem to no longer target libraries alone but broader information or emerging markets. There is evidence of an increased integration of information technology in LIS curricula. Hence, the LIS curriculum, according to Freeman (1993), seems to have a shelf life of about five years and has to be reviewed all the time.

The UK, like North America, is prophesized to make the master's degree the standard basic LIS professional qualification and thus the profession will become a postgraduate profession (Freeman 1993: 13). According to King (2006: 25) 21st century engineers should be able to broaden their outlooks to obtain flexible careers. Further King, writing in the American context, points out that the professional engineering credential will have to be the postgraduate degree which Freeman (1993: 13) also points out with regard to the LIS profession. What is our situation in South Africa where only some employers view the B.Tech. qualification as a professional one? This study hopes to throw some light on how employers view various higher education qualifications.

Another issue of concern to Freeman (1993: 13) is that of the 'generalist' versus the 'specialist'. Should LIS schools produce specialist librarians (law librarians, music librarians) or should they concentrate on producing generalist 'basic model' practitioners who can add in later life the specialization appropriate to the professional posts they then occupy? Interestingly, Jenkins (2005: 2) cites the *Merriam-Webster online dictionary* that defines a librarian as a "specialist in the care or management of a library." The word 'specialist' refers to a specific or narrow field, one that is deep

rather than broad. Jenkin's views are that nowadays librarians are holding masters' degrees in librarianship and the degree itself makes them specialists.

One feature that dominates LIS work today is the speed and universality of change: "Change is not new to librarianship" (Markgren et al. 2007: para. 2). Technological change, social change, industrial change and generational change are all key features in the profession, all of which impact on staffing and delivery of services to users (Hallam & Partridge 2005: 21-22). The ability to respond to change, to be flexible and adaptable are key attributes for the workforce. Librarians need to keep up with new technologies, new users and new environments, amongst others. Information professionals recognize and embrace the expanding challenges facing them (Abels et al. 2003: para. 21). According to Hallam & Partridge (2005: 20) LIS professionals are now being pictured as being confident, dynamic, adaptable and flexible. Hence Freeman (1993: 13) is quite right when he says that there is a need for personnel who are flexible, adaptable, eager and swift to learn and who possess a basic cluster of professional competencies acquired at LIS schools. These competencies he says are highly sought by employers. However, there is difficulty in getting top students into LIS schools because of the poor image of librarianship, which is a universal problem. Attracting young people to the LIS profession is difficult due to past stereotyping of librarians (Muller 2007: 109). Library workforce (2007: 10) suggests that aggravating to this perception is the mediocre image of librarians especially in the entertainment world that portray the profession in a stereotypical fashion. Regarding engineering, this field is sometimes seen as uninteresting in popular culture and thought to be in the domain of nerds (Answers.com 2007a: para. 37). Further, it is said that increasing public awareness of the profession is difficult since people in their daily run of life do not have any personal dealings with engineers even though they benefit from their work everyday. Such can be said about the library profession too.

LIS higher education institutions usually produce graduates and diplomates that have a generalist education in the discipline and should be able to evolve and adapt into specialist job positions. According to Winberg (2005: 196) UoT education develops students' scientific and technological 'literacy' in a broad rather than a narrow sense. Erstwhile technikons have prided themselves on providing career-focused education, and producing highly employable graduates and diplomates (Du Pré et al. (2001) as

cited by Winberg 2005: 197). In Rajagopaul's (2006: 27) study the majority of special library graduates and diplomates were from technikons (now UoTs) whilst in the engineering firms, the majority of the engineering staff were from traditional universities. However, both special library and engineering firm employers have university and UoT graduates and diplomates with this generalist knowledge and skills at different levels in terms of qualifications in the profession. This study focuses on how these graduates and diplomates are accommodated in the staff structures of special libraries and engineering firms.

2.13. Professional organizations

The UK based study by Dalton & Levinson (2000: para. 5) highlighted that library associations, professional bodies and organizations such as the International Federation of Library Associations and Institutions (IFLA) lack the information to enable them to appreciate the complexities of equivalencies of LIS qualifications. A concern in South Africa, however, is that such a professional association does exist, namely, the Library and Information Association of South Africa (LIASA) but membership is voluntary. There is no statutory requirement for registration of practitioners as with Engineering and other professions. Joint & Wallis (2005: 213) highlight that professional associations can promote employment opportunities for LIS workers. In view of libraries not having only professional staff, Raju (2005: 148) asked a valid question, that is: "Is there a place for all library workers in a professional association? Further in a discussion at a local conference (2008) of job descriptions in advertisements for library positions, an individual brought up the pertinent question of library technician posts requiring just a matriculation (year 12) qualification. In this discussion Sentoo (2008) quite rightfully asserted that human resource managers specify such requirements because there is no professional body to specify otherwise. Hence, library associations have an important role to play in the protection and professional development of their members (Raju 2005: 151). Further, Raju highlights that this is imperative especially in view of changing scenarios in the academic libraries where there is re-distribution of 'professional' tasks. This is also prevalent in the special library arena (discussed earlier in this chapter).

It is commonly known that in the engineering discipline, graduates and diplomates must belong to the Engineering Council of South African (ECSA) in order to advance their career prospects. Such professional registration is also applicable in other professions. A study by Khomo (2007: 86) of LIS workers surveyed from special libraries in KZN to ascertain membership with their professional body revealed that 69% of special library respondents were not members of LIASA, of which 51% held professional posts. This could perhaps be one of the factors contributing to the 'inconsistencies' between qualifications and job functions of LIS workers. Khomo's (2007: 91) study recommended that LIASA consider involving itself with industry concerns such as the role of paraprofessionals qualifications in LIS services and traditional university LIS degrees versus UoT LIS degrees. As Hallam & Partridge (2005: 23) point out:

> "If our profession is to thrive and progress, there needs to be strong interplay between educators and employers, between research and practice and between individual professionals and the professional associations".

The literature reviewed in this study throws light on many issues related to this study and helps to provide the study with relevant context, both nationally and internationally. Importantly, this detailed literature review provided the researcher with areas to probe and hence was most useful in the design of the data collection instruments for the study.

2.14. Summary

This chapter discussed a significant body of literature that highlights issues relevant to the study and hence gives it relevant context. The researcher consulted an interesting selection of local and global literature in diverse scenarios accessible in monographic form, journal articles, conference papers and online websites, the last mentioned being particularly useful in areas where information in traditional information sources is difficult to come by. Issues such as the distinction between traditional university and university of technology education, library and information paraprofessional and professional job functions, varying job titles among library staff, employer expectations from graduates and diplomates, qualifications or experience required in employing individuals, the impact of IT and subject expertise on employment trends

in special libraries, among others, were brought to light. These concerns were discussed parallel to similar issues in the engineering discipline, where possible. The next chapter will focus on the methodology that had been employed to conduct this study.

CHAPTER 3: RESEARCH METHODOLOGY

3.1. Introduction

Research methodology is the philosophy or the general principle which will guide your research. It is the overall approach to studying your research topic and includes issues you need to think about such as constraints, dilemmas and ethical choices within your research (Dawson 2002: 14). According to Graziano & Raulin (2004) research methodology is concerned with answering specific research questions. In this study, three critical questions needed investigation. Briefly, these questions addressed issues related to the job functions of university and university of technology (UoT) graduates and diplomates in the staff structures of special libraries and engineering firms in KwaZulu-Natal (KZN), and possible trends or best practices that can be adapted or adopted from the engineering work environment for the LIS workplace.

Busha & Harter (1980: 169) provide a useful definition of comparative librarianship conceptualized by J. Periam Danton (1973), a pioneer in comparative library studies:

> …the analysis of libraries, library systems, some aspect of librarianship or library problems in two or more national, cultural or societal environments, in terms of sociopolitical, economic, cultural or ideological and historical contexts. This analysis is for the purpose of understanding similarities and differences, and for determining explanations of the differences, with the ultimate aim of trying to arrive at valid generalizations and principles…

This comparative concept in LIS is reiterated by Powell & Connaway (2004: 64) who further point out that comparative librarianship involves a comparable comparison. In comparative research "your objects are specimens or cases which are similar in some respects (otherwise, it would not be meaningful to compare them) but they differ in some respects" (Routio 2007: para. 2). In view of this, this study compared special libraries and engineering firms in KZN. Both environments draw their personnel from traditional universities and universities of technology (UoTs).

In order to achieve the objectives of social research, a careful thought out strategy is required (Bless, Higson-Smith & Kagee 2006: 72). Babbie & Mouton (2001: 97) point out that though research design occurs at the beginning of a research project, it

involves all the steps of the subsequent project. Hence, research design should provide an explicit plan for action. This includes three different categories, which are population and sampling, data collection and data analysis (Durrheim 2006a: 48-49).

3.2. Population and sampling

This study aimed to gather data about job functions of university and UoT graduates and diplomates from special library services and engineering firms in the KwaZulu-Natal (KZN) province. Durrheim (2006a: 49) refers to the process of sampling as the selection of research participants, and involves decisions about which people, settings, events, behaviours and/or social processes that need to be observed. Further, sampling is defined as a process of selecting units (organizations) from a population of interest so that by studying the sample we may fairly generalize our results back to the population from which they were chosen (Trochim 2006: para. 1). The terms population and universe are used inter-changeably in the literature (Mouton 1996: 134). A population is a collection of objects, events or individuals having some common characteristics that the researcher is interested in studying (Busha & Harter 1980: 56). Bless, Higson-Smith & Kagee (2006: 73) note that formally structured organizations may be used as the units of analysis in social research. However, the questions that need to be answered may relate to certain employees from different organizational structures and individuals are the most common element for analysis chosen because they belong to a certain group. Populations are often defined in terms of demography, geography, occupation, time or some combination of the above (Simon 2008: para.1). Further, Bless, Higson-Smith & Kagee (2006: 73) point out that the population could be an entire group that can be compared to another group. Aptly so, this study's population are traditional university and UoT graduates and diplomates from special libraries and engineering firms only in the province of KZN. As mentioned already, LIS services, like the engineering discipline, draw their employees from both traditional universities and universities of technology. Hence the comparative study of university and UoT graduates and diplomates (target population) in special libraries and their counterparts in the engineering environment. Employers within these organizations were also targeted for data collection, making them also a target population for this study.

According to Payne & Payne (2004: 209) it is not possible to study the whole population (in this case all special library and engineering firm university and UoT graduates and diplomates in KZN). Sampling is as a practical way to collect data when the population is infinite or extremely large, thus making a study of all its elements impossible (Bless, Higson-Smith & Kagee 2006: 99). Researchers overcome this problem by selecting a smaller and manageable number of people to participate in their research (Dawson 2002: 47). A sample is a portion of elements of a larger group selected in some way from a population (Fink 2005: 82). A target population may include institutions, persons, problems and systems to which or whom the study's findings can be applied or generalized. Sekaran (2003: 267) advises that instead of collecting data from several hundred or even thousands of elements in a population, which would be prohibited by time, cost and other human resources, sampling is used. Hence, the aim of sampling is to save time and effort but also to obtain consistent and unbiased estimates of the population status in terms of the research (Schofield 1996: 25). The main concern in sampling is representativeness (Durrheim 2006a: 49; Mouton 1996: 110). It is believed that if sampling is done carefully using the correct procedure and is representative of the population, it is possible to generalize the results to the entire research population (Dawson 2002: 47).

Probability sampling is a sampling method where each member of the population has an equal chance of being included in the sample whilst in non-probability sampling members are selected from the population in some non-random manner using convenience, judgement or quota sampling (Statpac.com 2007: para 4; Babbie & Mouton 2001: 173). In other words, non-probability sampling is defined as instances where the researcher cannot specify the probability of a specific element of the population being included in the sample while probability sampling refers to instances where each element of the population has an equal and known probability of being included in the sample. This study had to deliberate on the choice of sampling methods, as explained below.

3.2.1. Sampling frame

Babbie & Mouton (2001: 174) define a sampling frame, also termed a population frame (Sekaran 2003: 265), as the actual list or quasi-list of sampling units/elements

in a population from which a probability sample is selected. It is said that the sampling frame must be representative of the population (Bless & Higson-Smith 2000: 86; Wikipedia.org 2008b: para. 9). Since there is no official listing of all the special libraries in the province, the researcher secured from Mayela (2007) a list of libraries that the Durban University of Technology's Inter-Library Loans Department currently uses. According to Neuman (2006: 225) a specific list (sampling frame) that closely approximates all the elements in the population is often difficult since there may be no good list of elements in a population. The researcher believed that Mayela's list would be a useful list to use as such inter-library loan lists are shared commonly among established libraries in the country and would be a good indication of established special libraries. From this list, 34 special libraries that are located in KZN were identified. *The South African Association of Consulting Engineers : directory of firms* (2005: 146-169) was used as a 'sampling frame' for the engineering firms. Commonly such lists do not record all the engineering firms in KZN. Babbie (1992: 174) cautions that even though lists of elements exist for sampling purposes, the lists are usually somewhat incomplete. Hence, "the difficulties are extreme when the population and the frame are disjoint" (Wikipedia.org 2008b: para. 9). The above-mentioned directory of engineering firms is divided into different regions such as Durban, Richards Bay, Vryheid and so on. Many of these engineering firms listed were duplicated with branches in other regions. According to Fink (2005: 86) systematic sampling should not be used if repetition is a natural component of the list from which the sample is to be drawn. If for example, systematic sampling was to be used, the same organization but in different regions could be included in the sample. This had to be avoided. The researcher examined the directory list identifying engineering firms that were established such as those that had two or more branches listed. The branches of engineering firms in other regions were excluded and the engineering firms totaled to 111. According to Sekaren (2003: 294) for a population of 35 special libraries and 110 engineering firms, an appropriate sample size would be 32 and 86, respectively. On the basis of this the researcher then randomly selected using the "lottery technique" (Bless, Higson-Smith & Kagee 2006: 101) 86 engineering firms from the 111 identified. Due to the neglible difference between 32 and 34 special libraries, the researcher decided not to sample but do a census of all 34 identified special libraries.

3.2.2. Preparing for data collection

De Vos et al. (2005: 279) emphasize the importance of gaining permission to enter the 'research field' (in this case the potential respondents in special libraries and engineering firms) that has been decided on, in order to get the study started. During late February 2008, in preparation for data collection, special libraries and engineering firms from the above lists were telephonically contacted. This activity revealed situations (mergers, one-person businesses) that needed careful thought so as to stay true to the objective of the study.

Of those engineering firms selected at the outset, about seven firms were 'one-person businesses'. It was realized that these persons would not be able to provide effective data in terms of the current study, as they are neither employees nor employers. Mergers also appear to be a common trend among engineering firms. Many firms listed were in the process of merging but fortunately this was to be official later in the year and by then the required data would have been collected using the identified sample of engineering firms. Two engineering firms had already merged. Hence, only one organization was used.

Neuman (2006: 226) points out that a sampling frame could include units outside the target population. Whilst three libraries were initially listed as 'special libraries', it was found that although they served a specific user group with specialized collections, these libraries functioned largely as academic and public libraries. This study focused on special libraries that serve the members of the organization they are part of. Hence, these three were left out. There was also a special library that was currently non-existent and one that seemed to have disappeared with the Ethekwini restructuring process and needed exclusion. Hence the special libraries list now totaled 29. As this study targeted university and UoT graduates and diplomates the *Survey questionnaire for graduates/diplomates* could not be sent to one of the special libraries identified as the librarian had resigned and the post was still vacant. The library was still operating but with the secretary helping when users needed information. Nevertheless, the employer was still targeted for data collection.

Several organizations, especially engineering firms, could not be contacted. Thus obtaining an appropriate sample of engineering firms from which to extract the population of engineering graduates and diplomates was a frustrating process. There were instances when telephone numbers did not match the name given in the directory. Some of the so-called incorrect telephone numbers led to the correct ones numbers. Further, telephone numbers had changed and the researcher kept hearing "this number does not exist" to her dismay. Once again, the engineering directory was consulted, this time for their e-mail addresses. The Durban telephone directory and the Internet were also searched for other contact details. Some organizations were planning for mergers, others moved premises or changed their names.

Similar contact problems were experienced with some special libraries. For example, the SAPS Chatsworth Basic Training Library would not answer their telephone. The researcher called for weeks on end and left messages with no response. E-mailing was also attempted. Finally, contact was made but it was discovered that the individual working in the library was actually a police inspector. The Ethekwini and Pietermaritzburg Municipalities were contacted with the hope of any contact information to the identified libraries but to no avail at most times. Other special libraries were searched for on the Internet successfully.

Bless, Higson-Smith & Kagee (2006: 108) identify these conditions as non-response errors. Such errors, frequently unavoidable, are caused by changes in residence and name, or the sample person may be absent whenever the researcher calls or the person could refuse to participate in the research (Bless, Higson-Smith & Kagee 2006: 108; Wikipedia.org. 2008b: para. 38). In any pre-selected sample, it is inevitable that some individuals would have changed address (Projects.ex 2003: para. 2). The risk of this type of non-response is generally dependent on how current the sampling frame is. The 'sampling frame' of engineering firms consulted in this study was a 2005 publication. Due to difficulties obtaining a list of engineering firms in the province, this was used as an authoritative list (the latest available to the researcher).

Most persons contacted were friendly and eager to help. If they were unable to help, they provided referrals. These 'contacts' ranged from directors, human resource managers, librarians, engineers and secretaries. Others did not understand what was

required for the study and needed clarification. It was also explained that those individuals still studying towards their qualifications were not eligible for data collection. Then, as expected, there was some that refused to help. Reasons for refusal were that they are busy with the building of the 2010 Soccer World Cup stadium; load shedding or some just did not want to help. Numerous organizations asked questions such as to how long the questionnaires were, how many questions were there to answer, to provide them with some types of questions or requested an e-mail copy of the questionnaires prior to them consenting to assist. Others needed permission from directors or managers. One such engineering firm individual in senior management adamantly refused to divulge even an e-mail address for fear of fraud. He requested an official letter faxed to him pertaining to this research which was later sent but there was no reply for weeks. Another employee contacted, willingly disclosed the information required for data collection. However, closer to the time for data collection, she refused. The researcher was referred to the initial person contacted for permission. He consented after the researcher explained the events that had transpired since their last conversation and hoped that the questionnaires may be sent for consideration. Many engineering firms needed persuasion to help. Persuasion entailed informing potential respondents that they were not compelled to complete the questionnaires although naturally it was hoped they would. Informing organizations that two weeks would be given for completion with extensions, if necessary, was most welcomed by many.

Several engineering firms chosen in a certain branch suggested the use of the branch in another location. In persuading them for assistance, it was explained that sampling was done of that particular branch and they understood. There were, however, times when the researcher opted to use the other branch since there was no way of contacting the one identified initially or the branch in that region had closed. As each engineering firm was called, each approval for assistance was of value contributing to the expected sample size. Again, from this list, problems with mergers, ‘one-person businesses’ and unwillingness to be of assistance were encountered. Each and every engineering firm identified was called in the hope of making the suitable sample size. Eventually the directory of engineering firms was exhausted. With each call, the researcher kept count of the firms that were available and kept consulting Sekaren (2003: 294) for an appropriate sample size.

The Richards Bay Minerals Technical Library refused to answer such questions required due to confidentiality issues. Bless and Higson-Smith (2000: 100) discusses anonymity as a major issue especially when employees are asked to make statements about their employers and working conditions. Babbie & Mouton (2001: 523) clarify the differences between anonymity and confidentiality. However, even though this potential respondent was assured that the data collected would be used strictly for research purposes, she was not convinced. Nevertheless, she willingly disclosed that she has an archives qualification from a university. She also indicated that likewise the employers would not complete a questionnaire of this nature, based on a confidentiality policy in place. For similar reasons, the Shepstone and Wiley Law Library would not complete the employer survey. Due to these difficulties, questionnaires were not distributed to these libraries.

3.2.3. A final sample

After approximately three months of persevering, liaising, gaining essential information with each phone-call whilst maintaining a 'guide' of an apt sample size (about 86 engineering firms or less (depending on the total number) as indicated by Sekaren (2003)), a final sample was obtained. Taking into account the branches of engineering firms in other regions; the merged company which now counted as one organization as well as the exclusion of 'one-person businesses', engineering firms for KZN totaled to 103. Special libraries totaled 29. According to Sekaren (2003: 294) for a population of 30 special libraries and 100 engineering firms, an appropriate sample size would be 28 and 80, respectively. Initially, on the basis of this the 80 engineering firms obtainable from the various locations in KZN were randomly selected using the "lottery technique" (Bless, Higson-Smith & Kagee 2006: 101). However with the difficulties encountered (as explained above) only 80 firms were available hence amounting to a census. Due to the neglible difference between 28 and 29 special libraries, it was decided not to sample but to do a census of all 29 identified special libraries. However, whilst a census of special libraries was decided, failure to contact an organization and refusal by another resulted in 27 special libraries actually participating in the study.

The special libraries and engineering firms eventually selected for inclusion in this study are listed in Table 3.1. It is not surprising that both the lists (refer to Table 3.1.) show a bias towards Durban and Pietermaritzburg as these are the main centers of the province of KZN. Notwithstanding this, the researcher is confident that the province was well covered.

Table 3.1.

List of special libraries and engineering firms in KZN

	Special Libraries	**Location in KZN**
1	Addington Hospital, Medical Library	Durban
2	Allerton Provincial Veterinary Laboratory Library	Cascades
3	Cedara Library, KwaZulu-Natal Department of Agriculture & Environmental Affairs	Pietermaritzburg
4	Durban Museum Library	Durban
5	Edendale Hospital, Medical Library	Plesislaer
6	Grey's Hospital, Medical Library	Pietermaritzburg
7	Hulett Aluminuim (Pty) Ltd. Library	Pietermaritzburg
8	Inkosi Albert Luthuli Central Hospital Library	Durban
9	Jeffares & Green Inc. Library	Pietermaritzburg
10	King Edward VIII Hospital, Nursing College Library	Durban
11	KwaZulu-Natal Department of Transport, Resource Centre	Pietermaritzburg
12	KwaZulu-Natal Education Department, Education Library	Pietermaritzburg
13	KZN Wildlife Library	Cascades
14	Lever Ponds SA (Pty) Ltd., Knowledge Centre	Durban
15	Natal Sharks Board Library	Durban
16	National Bioproducts Institute, E.K. Dunning Library	Durban
17	Oceanographic Research Institute Library	Durban
18	R.K. Khan Hospital Library	Durban
19	Richards Bay Coal Terminal, Technical Library	Richards Bay
20	Richards Bay Minerals, Technical Library	Richards Bay
21	SAPS Chatsworth, Basic Training Library	Durban
22	SAPS KwaZulu-Natal, Provincial Library	Durban
23	Shepstone & Wiley Law Library	Durban
24	South African Sugarcane Research Institute (SASRI) Library	Durban
25	Stewart Scott Inc. Library (SSI Library)	Pietermaritzburg
26	Umgeni Water Library	Pietermaritzburg
27	Valley Trust Library	Botha's Hill
28	Voortrekker Museum Library	Pietermaritzburg
29	Wentworth Hospital, Medical Library	Durban
	Engineering Firms	**Location in KZN**
1	Africon	Durban
2	Anderson Vogt & Partners	Mtubatuba
3	Arcus Gibb (Pty) Ltd.	Durban
4	Artwicar Consulting (Pty) Ltd.	Southbroom
5	Arup (Pty) Ltd.	Durban
6	Asha Sunker (Pty) Ltd.	Durban
7	B & A Group (Pty) Ltd.	Durban
8	BCP Engineering (Pty) Ltd.	Newcastle
9	BFBA Consultants (Pty) Ltd.	Pietermaritzburg
10	Bigen Africa	Durban

	Engineering Firms	Location in KZN
11	BKS (Pty) Ltd.	Richards Bay
12	BVI Consulting Engineers	Durban
13	C.A. Du Toit (EDMS) BPK	Durban
14	CBI Consulting Engineers (Pty) Ltd.	Durban
15	Charles Pein & Partners Inc	Pietermaritzburg
16	CSM Consulting Services (Pty) Ltd.	Pietermaritzburg
17	CVG Consulting Engineers CC	Durban
18	D.E. Consultants CC	Durban
19	D.P. Barnard & Associates CC	Durban
20	Davies Lynn & Partners (Pty) Ltd.	Durban
21	Delca Systems (prev. DE Leuw Cather Emtateni)	Durban
22	Dennis V. Cress & Associates	Durban
23	Dihlase Consulting Engineers (Pty) Ltd.	Pietermaritzburg
24	DMV Richards Bay	Richards Bay
25	DPA Specialist Consulting Engineers (Pty) Ltd.	Durban
26	Drennan Maud & Partners	Durban
27	Duncan Hemingway & Partners	Ladysmith
28	Elliot Breytenbach & Gray	Durban
29	Endecon KwaZulu-Natal (Pty) Ltd.	Richards Bay
30	EVN Africa (Pty) Ltd.	Pietermaritzburg
31	Eyethu Engineers CC	Durban
32	Gavin R. Brown & Associates CC	Durban
33	Goba (Pty) Ltd.	Durban
34	Henwood & Nxumalo Consulting Engineers CC	Pietermaritzburg
35	Igoda Projects (Pty) Ltd.	Durban
36	Iliso Consulting Engineers (Pty) Ltd.	Durban
37	Ingerop Africa (PtY) Ltd	Durban
38	Jeffares & Green (Pty) Ltd.	Pietermaritzburg
39	Kantey & Templer (Pty) Ltd.	Port Shepstone
40	Knight Piesold (Pty) Ltd.	Durban
41	Kwezi V3 Engineers (Pty) Ltd.	Newcastle
42	LSC Brunette CC	Durban
43	Lebone Engineering (Pty) Ltd.	Durban
44	Lekwa Consulting Engineers (Pty) Ltd.	Mtunzini
45	Liebenberg Jenkins & Vennote Ing	Pietermaritzburg
46	Madan Singh & Associates CC	Durban
47	Mahesh Khoosal & Associates CC	Durban
48	MAP Africa Consulting Engineers (prev. MPA Africa…)	Durban
49	MBB Consulting Engineers Inc	Pietermaritzburg
50	MMC Engineers	Durban
51	Moore Spence Jones (Pty) Ltd.	Durban
52	Ndawonye Networks CC	Richards Bay
53	Ninham Shand (Pty) Ltd.	Pietermaritzburg
54	Palace Engineering Services	Durban
55	P.D. Naidoo & Associates (Pty) Ltd.	Richards Bay
56	Raws (prev. GFK Consulting Engineers CC)	Vryheid
57	RCE Consulting Engineers	Durban
58	RPP Consulting Engineers	Durban
59	Saunders & Wium Trust	Pietermaritzburg
60	Sivest SA-(Pty) Ltd.	Durban
61	SKC Engineers Coastal Division	Durban
62	SKP Engineers CC	Durban
63	SMA Consultants CC	Kwadukuza
64	SNA Civil & Development Engineers (EDMS) BPK	Pietermaritzburg
65	Sookan & Associates CC	Durban
66	Spoormaker & Partners Incorporated	Durban

	Engineering Firms	Location in KZN
67	SRK Consulting	Durban
68	Stewart Scott Inc. (Pty) Ltd. (SSI (Pty) Ltd.)	Hluhluwe
69	Sukuma Consulting Engineers (Pty) Ltd.	Pietermaritzburg
70	Thekwini Geocivils CC	Durban
71	Tobbell Stretch & Associates	Durban
72	Ulungeni CC	Empangeni
73	UWP Consulting (Pty) Ltd.	Empangeni
74	Vawda Engineers CC	Durban
75	Vela VKE Engineers	Durban
76	Vigar and Associates CC	Pietermaritzburg
77	Vishnu Ulassi & Associates CC	Durban
78	WSP Consulting Engineers SA (Pty) Ltd.	Durban
79	Young & Satharia	Durban
80	Zai Consultants CC	Empangeni

Coincidently, two organizations ended up being surveyed for their special library service as well as an engineering firm. There were: Jeffares & Green Inc. Library (Pietermaritzburg) and Jeffares & Green (Pty) Ltd. (Pietermaritzburg); Stewart Scott Inc. Library (Pietermaritzburg) and Stewart Scott (Pty) Ltd. (Hluhluwe).

The knowledge gained from survey research allows generalizations to be made about characteristics, opinions, beliefs and attitudes of the entire population being investigated (Busha & Harter 1980: 54). Sometimes the researcher is unable to survey the entire population and so a small proportion of the population (a sample) is selected to generalize the findings to the larger group. Dawson (2002: 47) points out that sometimes there will only be a small number of people within the research population, which might make it possible to contact everyone. As each of the engineering firms and special library services identified had relatively small staff complements, there was no need to draw a sample of UoT and university graduates and diplomates within these organizations. Rather a census was done. Special library and engineering firms were asked to indicate the number of graduates and diplomates that were employed in their organization so that the researcher would know how many questionnaires to send. In the majority of engineering firms all graduates and diplomates were included. However, in a few engineering firms where there was a large number of engineering staff (in various engineering fields), hence an adhoc sample of graduates and diplomates were included as the target population in those organizations. In some cases, there were about 25 or 50 engineering staff. Some ‘engineers’ were on-site or gone overseas or sometimes the ‘contact’ would stipulate the number of questionnaires to send for distribution. Hence, the researcher had to compromise with

the organization as to how many questionnaires to distribute or they were unwilling to cooperate. Powell & Connaway (2004: 124) define triangulation as a process where researchers use two or more research techniques and methods to test hypotheses and measure variables. To triangulate data obtained from graduates and diplomates, another set of questionnaires targeted the relevant person/s responsible for employment decision-making, that is, employers (e.g. directors, managers), and this included at least one in each of the respective organizations. To secure at least one employer response, some organizations, where possible, were sent two employer surveys. In a few engineering firms a few more questionnaires were sent for the employers to complete.

3.3. Data collection

Data collection involves measuring some research phenomenon such as a process, an object or human behaviour (Busha & Harter 1980: 12). A data collection plan defines all the details concerning data collection, including how much and what type of data is required and when and how it should be collected (Tooling University 2008: para. 1). Leedy & Ormrod (2005: 196) highlight that questions such as, What data is needed? How will the data be secured? and How will the data be interpreted? need to be answered. This study aimed to gather data about the job functions of university and UoT graduates and diplomates in special libraries and engineering firms. Employers were also targeted for data collection. According to Mouton (1996: 110) the process of data collection allows for the collection of empirical information or data accomplished through various techniques and methods. Blaxter, Hughes & Tight (2006: 178) claim that questionnaires are most widely used in social research. Survey data collection is an activity of the survey life cycle for gathering data from respondents and recording it for further processing (Glossary of statistical terms 2005: para. 1). According to Boynton & Greenhalgh (2004: para. 2) questionnaires offer an objective means of collecting information on people's knowledge, beliefs, attitudes and behaviour. Blaxter, Hughes & Tight (2006: 178) and McKeown, Bremer & Prikazsky (2006: para. 7) point out that questionnaires can be sent by post and via the Internet to the intended respondents who are expected to complete and return them. Two sets of questionnaires were administered and employed the above-mentioned methods of delivery. The *Survey questionnaire for university and university of*

technology graduates/diplomates was distributed to university and UoT graduates and diplomates of special libraries and engineering firms in KZN and the *Survey questionnaire for employers* to the managers of these organizations.

3.3.1. Data collection instruments

Research methods are the tools you use to collect data (Dawson 2002: 27). There are various types of data collection instruments, which include questionnaires, interviews, observation, focus groups, telephone surveys and more. The most common types, however, are questionnaires and interviews. Kirakowski (2000: para. 1) highlights that a questionnaire is a method for the elicitation and recording, and collecting of information. A questionnaire is a printed document listing a series of questions pertaining to the problem under investigation and is addressed to a statistically significant number of subjects; the investigator requires answers to these questions and sufficient space is provided for responses from respondents through self completion (Kumar 1992; Payne & Payne 2004: 186; Answers.com 2007b). It is given, sent or mailed to respondents. While it has many advantages, its negative side is that mailed questionnaires generally have a low return rate (Sekaran 2003: 256; Powell & Connaway 2004: 126; McKeown, Bremer & Prikazsky 2006: para. 9). An interview, on the other hand, is a face-to-face conversation between the researcher known as the interviewer and the respondent known as the interviewee. May (2001: 120) points out that interviews allow the interviewer to yield deep insight into the interviewee's opinions. Interviews seemed a possibility in this study especially with the employer population as it almost guarantees your population to give you the required data. In this study the use of questionnaires was preferred although interviews would have provided immediate results, for reasons explained below.

Questionnaires as data collection instruments seemed the appropriate data collection instrument. This became evident when contacting each engineering firm describing the nature of this study. Many presumed that an interview was required and said that 'they' were too busy to assist. However, when told that they needed to complete a questionnaire within two weeks with more time given if need be, they were keener to help. It became apparent that interviews would be problematic in this study especially with the engineering employees and employers. Mailed questionnaires is

advantageous as they can be sent to a large number of people including those geographically dispersed thus saving on travel costs (Sekaran 2003: 257; Blaxter, Hughes & Tight 2006: 179; McKeown, Bremer & Prikazsky 2006: para.5; Gatech.edu 2008: para. 1). In view of this study collecting data throughout the province of KZN where in many cases the researcher would not be able to visit all organizations personally, mailed questionnaires were of convenience. Questionnaires allow respondents to complete them at their leisure, which would give them time to think about issues that did not cross their minds previously. Furthermore, unlike interviews, self-administered questionnaires ensure the respondents anonymity (Bless & Higson-Smith 2000: 109). According to Leedy & Ormrod (2005: 185) participants can answer more truthfully than they would in a personal interview, particularly when they are talking about sensitive or controversial issues. Anonymity can be of great significance when employees discuss their employers and working conditions (Bless & Higson-Smith 2000: 100) as was the case with this study. Thus the questionnaire was considered an appropriate data-gathering instrument to use among the graduate/diplomate and employer populations.

Total anonymity is not always appropriate as the researcher would need to do follow-ups and record the returns (Projects.ex 2003: para. 15). The researcher assured respondents their confidentiality. As a result respondents could be as honest as possible and provide the researcher with reliable data. Special libraries by nature, however, tend to have very few employees. Some of the special libraries included in this study had just one employee so it was impossible for the researcher not to know who responded to which questionnaire. In these cases the researcher reassured the respondents that their input would be treated with strict confidence and would be used for research purposes only. However, some special library and engineering firm graduates/diplomates maintained their organization's anonymity. These employees did not provide the name of the organization they were employed in (refer to question 1 of Appendix A).

3.3.2. Questionnaire design

According to Coombes (2001: 132) and Bless & Higson-Smith (2000: 113) the presentation of your questionnaire is important. If it is badly designed the respondents

can lose their way and miss important questions. McKeown, Bremer & Prikazsky (2006: para. 4) claim that a well-designed questionnaires will more likely be completed. Further, Coombes (2001) points out that the layout of the questionnaire is as important as the wording of the questions themselves. The questionnaires used in this study (refer to Appendices A and B) targeted four sets of populations: the university and university of technology graduates and diplomates and the employers in special libraries and engineering firms, respectively. Blaxter, Hughes & Tight (2006: 183) advise on the layout and presentation of questionnaires. They should be typed and printed clearly, include a covering letter and contact details. Every attempt was made to design the questionnaires such that they capture the attention of participants who would in turn enthusiastically respond to them. A valid point made by Coombes (2001: 132) and reiterated by Bless, Higson-Smith & Kagee (2006: 126) is that all instructions should be easy to understand and unambiguous. Hence, the title of this study was clearly and boldly indicated at the beginning of the questionnaires. Contacting the special libraries and engineering firms in preparation for data collection, brought to light that persons did not understand what was needed for the study and that there was confusion as to who is a graduate. Most considered this to only encompass university-qualified staff. To avoid confusion, brief instructions for completion of the questionnaires were also included. The researcher had to make this clear by including *graduates/diplomates* in the questionnaire, in the title of the study and wherever else necessary. With the pre-test of this study as well as in the Rajagopaul (2006) study there was confusion as to which of the target populations should answer which questionnaire. The final questionnaire thus clearly indicated that it is a *"Survey questionnaire for graduates/diplomates (who are not in senior management positions)"* and a *"Survey questionnaire for employers (directors, managers)"*. Further, a paragraph at the top of each questionnaire was included as well as a header note on each page, to ensure that there would be no confusion as to who should answer the respective questionnaires. A reminder on brightly coloured paper with bold font size (green: for engineering graduates and diplomates; blue: for those graduates and diplomates employed in special libraries and pink: for employers) was attached to each questionnaire as a further mechanism to ensure that appropriate individuals completed each of the questionnaires. A covering letter explaining the purpose of the current study and a self-addressed return envelope which Projects.ex

(2003: para.18) and Leedy & Ormrod (2005: 193) claim promote a high return rate, was also included (refer to Appendix A and Appendix B).

While this study used two different questionnaires to gather data from the two broad sets of populations (graduates/diplomates and employers), some of the items in each of the two questionnaires were similar. The reason for this is to allow for comparison of responses between the graduates and employers and thus allow for richer data collection and, importantly, to ensure validity of data collected. Coombes (2001: 132) emphasizes that the questionnaires should be clearly printed, consistent in display and presented logically with plenty of space for replies. Printing professionalism was achieved by utilizing the Durban University of Technology's (DUT) Printing Service. Every attempt was made to formulate questions in language that was clear to comprehend and with no ambiguity.

Questionnaires may be designed to gather either qualitative or quantitative data (Gatech.edu 2008: para. 7). However, there were open-ended and closed questions which according to Dawson (2002: 31) many researchers use a combination of in questionnaire design to collect the required data. Open-ended questions allow the respondents to openly express their views and opinions on the issues addressed, giving freedom to the respondents. Once they have understood the intent of the question, they can let their thoughts roam freely (Oppenheim 1992). Dawson (2002: 31) claims that this type of question allows the researcher to find out the respondents thoughts on certain issues. However, since there are no standard answers to these questions, data analysis becomes more complex. These questions require them to be read individually. Further there is often no way to tabulate or perform statistical analysis on them (Gatech.edu 2008: para. 19). Boynton & Greenhalgh (2004: para. 15) advise that if you plan to use open-ended questions, you must plan in advance how you will analyze the data collected. Nevertheless, open-ended questions allow the respondents to openly express their views and opinions on the issues addressed thus allowing for rich data collection. Closed questions, on the other hand, provide the researcher with the necessary quantitative data. Closed-ended designs enable researchers to produce aggregated data quickly (Boynton & Greenhalgh 2004: para. 13). However, the range of possible answers is set by the researcher and not respondents, and the richness of potential responses is lowered. Hence, closed

questions often cause frustration usually because researchers have not considered all potential responses. Such items on the questionnaires in this study provided an 'Other (please specify)' option and provided space for written responses where necessary. This study used a combination of open-ended and closed items in the questionnaires (refer to Appendices A and B) to collect the required data, thus incorporating both qualitative and quantitative elements in the study. Items in the questionnaires were drawn from the literature and were informed by the research questions guiding the study. Questions were made brief, interesting, concise and to the point which was aimed to motivate persons to respond to them.

Further, to facilitate data analysis coding was done. Coding involves applying a set of rules to data to transform the data into meaningful numerical formats that can be read by the computer for data analysis. The computer must be able to recognize the data collected. This recognition is achieved best with numbers (Babbie & Mouton 2001: 412; Durrheim 2006b: 190). Hence, the quantitative options were pre-coded in the construction stage of the questionnaires. As a result, the questions follow a set format and can be captured easily with a computer for ease of analysis (Dawson 2002: 31; Gatech.edu 2008: para. 21). Aspects of the questionnaire design discussed above aimed at reliability of the instruments in gathering data required for this study.

3.3.3. Reliability and validity

Reliability is the consistency of your measure, or the extent to which an instrument measures the same way without bias the various items in the data collection instruments each time it is used under the same conditions (Sekaren 2003: 203; Social research methods.net 2008: para. 1). Bless, Higson-Smith & Kajee (2006: 151) claim that to assess the reliability of the instrument the same measurement procedure be applied to the same group of people called a test re-test reliability. Reliability means dependability to which the results are repeatable (Neuman 2006: 188; Van der Riet & Durrheim 2006: 92). A reliable questionnaire yields consistent results when filled out by repeated samples and different researchers over time in similar circumstances (Kirakowski 2000: para.17; Boynton & Greenhalgh 2004: para.10). Hence, a survey question must be answered by respondents the same way each time (Colorado State University 2008: para. 1). As a result, high reliability would produce similar results.

The differences in results should come from differences between participants not from inconsistencies in how the items are understood or how different observers interpret the response. This study targeted four populations on the job functions of university and UoT graduates and diplomates in special libraries and engineering firms using two sets of questionnaires. These four populations were graduates and diplomates and employers in special libraries and engineering firms, respectively. In view of this (Boynton & Greenhalgh 2004: para. 10) advise that standardizing a measure increases reliability. A standardized questionnaire is one that is written and administered so all participants are asked precisely the same questions in an identical format and responses are recorded in a uniform manner. Hence, questions formulated were carefully designed and applied to all participants (for example, special library and engineering firm graduates/diplomates) so as to maintain reliability of the instruments.

However, whilst testing reliability can be measured by a test re-test reliability method, the researcher chose not to do a test re-test considering the 'problems' of obtaining a sample of special libraries and engineering firms (as discussed in this chapter). It also seemed strange that respondents would succumb to complete a questionnaire for the second time after all the endeavors by the researcher to get them to respond the first time, which still yielded a low return rate. Rather a pretest was done of the data collection instruments. These aspects are discussed later in this chapter.

Validity, on the other hand, tests how well the instruments developed measure the concept it was intended to measure. According to Blaxter, Hughes & Tight (2006: 221) validity has to do with whether the research methods, approaches and techniques actually relate to or measure the issues the researcher intended to explore. A valid questionnaire measures or collects data about what it claims to measure or collect data (Kirakowski 2000: para.18; Boynton & Greenhalgh 2004: para. 9). The researcher consulted an array of literature (refer to Chapter 2) to provide a conceptual framework for the study. The detailed literature review and general observations by the researcher brought to light issues pertaining to this study. This helped in constructing a questionnaire that was able to extract the required data from respondents. Employers were also targeted for data collection to validate responses from graduates and diplomates.

Reliability estimates the consistency of your instruments whilst validity involves the degree to which you are measuring what you are supposed to (Social research methods.net 2008: para. 48). Hence, the accuracy of your measurement. Further it is believed that validity is more important than reliability because if an instrument does not accurately measure what it is supposed to, there is no reason to use it even if it measures consistently (reliably). Neuman (2006: 188) makes it clear that perfect reliability and validity are virtually impossible to achieve, rather there are ideals researchers strive for.

3.3.4. Pre-testing the questionnaires

Galloway (1997: para. 1) and Dawson (2002: 95) stress that once your questionnaire has been constructed, you should "pilot it" (test it) to check that it is going to function effectively. A suitable comparison made is just like any manufactured product, your questionnaire needs to go through quality testing (Gatech.edu 2008: para. 39). This entails administrating some questionnaires to the type of target population, preferably those that are not targeted for the study. Pilot studies are preliminary studies done on small samples to help identify potential problems with the research design (Van der Riet & Durrheim 2006: 94). Pre-testing can help you determine the strengths and weaknesses of your survey concerning the format, varied meaning of items, wording and order (Colorado State University 2008: para. 1). Further, it is important to pilot a questionnaire to test how long it takes to complete, to check that questions are not ambiguous, that all instructions are clear and that allow you to eliminate questions that do not yield usable data (Galloway 1997: para. 2). Thus it helps to refine the data collection instruments (Powell & Connaway 2004: 140). This assists in testing the data collection instruments to check whether changes need to be made to avoid data collection 'problems' later on in the actual data collection process.

During the months of March and April 2008, the pre-test of the questionnaires were done. In a previous limited study by Rajagopaul (2006), there was confusion between graduates/diplomates and employers as to which questionnaire should be completed. In that study, even though the questionnaires were personally distributed and instructions were given, there were still questionnaires that were incorrectly completed. In view of this and the thought that these questionnaires were going to be

distributed all over the province, in some cases where no personal contact would be possible, every attempt had to be made to avoid such confusion. Some of the precautions taken have been outlined in Section 3.3.2.

In the pre-test five questionnaires were distributed to an 'engineering firm'. However the questionnaires were returned incomplete in some cases and others had responses that did not make sense. It was discovered that this firm did have engineers but they were part of the Information Technology industry. This study focused on engineers in the civil, electrical, electronic, chemical fields, to name just a few popular engineering disciplines in South Africa. Being aware that the context was mistaken, questionnaires were re-distributed to the Ethekwini Water and Sanitation Department (an engineering entity). The South African Broadcasting Corporation Media Library (SABC-KZN region) was used to pre-test the instruments in a special library service. In total 8 questionnaires were administered in the pre-test (2 for graduates and diplomates and 2 for employers in the respective organizations). Both organizations were initially given a week for completion. However, a further extension of five days was later given. There was a response of 63% on the pre-test, shown in Table 3.2.

Table 3.2.

Distribution and collection of the pre-test questionnaires

Organization	Survey questionnaire for university and U0T graduates/diplomates (No. distributed)	Survey questionnaire for employers (No. distributed)	Survey questionnaire for university and UoT graduates/diplomates (No. returned)	Survey questionnaire for employers (No. returned)	Total Return
SABC Media Library	2	2	1 (50%)	1 (50%)	2
Ethekwini Water & Sanitation	2	2	2 (100%)	1 (50%)	3
Total	**4**	**4**	**3 (75%)**	**2 (50%)**	**5 (62.5%)**

According to Powell & Connaway (2004: 140) pre-test samples are often selected by convenience sampling because of the potential respondent's close proximity and willingness to participate. It is however stressed that the pre-test samples should be representative of the final study groups. Hence, it should be piloted to a group similar to the one that will form the population of your study (Galloway 1997: para. 3).

Ideally those included in the pre-test should not be surveyed again in the main study. As a result the researcher did not go for a bigger pre-test sample because she was mindful of 'losing' special libraries and engineering firms for her survey especially in view of the problems encountered (as explained in 3.2.2 in this chapter) in getting individuals from special libraries and engineering firms to participate.

Examination of the responses revealed as anticipated, that all three engineering firm respondents completed the 'wrong' questionnaire though instructions were given to the employer who distributed the questionnaires. It was apparent that these individuals did not read the preface to the questionnaire and went on straight to complete their responses. This was not so with the special library service. This was avoided because the researcher was able to personally distribute the questionnaires and explain the instructions. The researcher immediately took steps to avoid this. These measures have been explained in Section 3.3.2. of this chapter. It also found that those questions needing responses from only special library graduates/diplomates and employers were being completed by their counterparts in engineering firms (refer to Appendices A and B). This was despite instructions provided in the questionnaires. To counter this before questionnaires were sent out, the researcher manually struck out those questions not applicable to the engineering discipline. Apart from these no other changes were deemed necessary.

3.3.5. Questionnaire distribution

According to Watson (1998: 151) a simple method for conducting a survey through the mail includes sending a questionnaire with a letter explaining the purpose of the study to participants. A self-addressed envelope should be enclosed to facilitate the return of the questionnaires. Each of the two questionnaires was appended with a covering letter (refer to Appendices A and B) in traditional letter format with the DUT logo and which explained the purpose of the data collection, its relevance to the organization chosen and what it hoped to achieve. The letter also informed respondents of the value of their responses and assured confidentiality. It also included the researcher's contact details in case of enquiries and included a realistic indication of the time frame required for completion of the questionnaire. To encourage completion and return of questionnaires from those organizations where

collection was not going to be done personally, a return envelope (in the Business Reply Service format, printed especially for this study) was attached to each questionnaire mailed to those organizations.

Harris & Hugh (1978: 290) tested the effect of business reply permits versus stamped envelopes in mail surveys. Historically stamps showed a significantly higher response rate. However, with the increase in business reply permits and permit-returns in the USA, the authors deemed it prudent to re-examine this area. Babbie & Mouton (2001: 259) weighs the pros and cons between postage stamps and business-reply formats but maintains the preference of postage stamps. The researcher saw the business reply format as being cost effective, less time consuming to prepare and conveyed professionalism. The above-mentioned aspects promote a desired high return rate (Projects.ex 2003: para. 15-18). In addition, to maximize responses, each questionnaire was sent off with a personalized hand-written signature and the researcher expressed appreciation with statements of thanks in all communications from the initial contact to after collection was done as encouraged in the literature (Projects.ex 2003; para. 5). Notwithstanding all these efforts, it was inevitable that some individuals would refuse to participate. With interviews, refusals are generally explicit, however, with postal surveys it is implicit, as persons simply do not return the questionnaire (Projects.ex. 2003: para. 2).

A total of 739 questionnaires were administered. The distributed *Survey questionnaire for university and university of technology graduates/diplomates* totaled 559. A total of 44 of these questionnaires were distributed to special libraries with 515 to engineering firms. The other set of questionnaires: *Survey questionnaire for employers* targeted 180 employers in total, of which 40 were special library employers and 140 engineering firm employers. These totals were determined by inquiring from 'contacts' in the special libraries and engineering firms, the number of graduates/diplomates there were in their organizations and employers that could be engaged (as explained earlier in Section 3.2.3. of this chapter). The number of questionnaires distributed to the special library and engineering firms are presented in Table 3.3. where:

- **(G/D)**= *Survey questionnaire for university and university of technology graduates/diplomates* **(No. distributed)**

- **(E)**= *Survey questionnaire for employers* **(No. distributed)**
- **(0)**= No LIS graduates/diplomates employed in special library
- **(-)**= Organization/ Employer refused to participate, hence no questionnaires were sent
- **(*)**= Organization used for special library and engineering firm as employer (both same location)

Table 3.3.

Number of questionnaires distributed to organizations

	Special Libraries	**Location in KZN**	**G/D**	**E**
1	Addington Hospital, Medical Library	Durban	1	1
2	Allerton Provincial Veterinary Laboratory Library	Cascades	10	2
3	Cedara Library KwaZulu-Natal Department of Agriculture & Environmental Affairs	Pietermaritzburg	3	2
4	Durban Museums Library	Durban	1	1
5	Edendale Hospital, Medical Library	Plesislaer	1	2
6	Grey's Hospital, Medical Library	Pietermaritzburg	2	2
7	Hulett Aluminuim (Pty) Ltd. Library	Pietermaritzburg	1	1
8	Inkosi Albert Luthuli Central Hospital Library	Durban	3	1
9	Jeffares & Green Inc. Library	Pietermaritzburg	1	*
10	King Edward VIII Hospital, Nursing College Library	Durban	1	1
11	KwaZulu-Natal Department of Transport, Resource Centre	Pietermaritzburg	2	2
12	KwaZulu-Natal Education Department, Education Library	Pietermaritzburg	2	2
13	KZN Wildlife Library	Cascades	1	2
14	Lever Ponds SA (Pty) Ltd., Knowledge Centre	Durban	1	1
15	Natal Sharks Board Library	Durban	1	1
16	National Bioproducts Institute, E.K. Dunning Library	Durban	2	2
17	Oceanographic Research Institute Library	Durban	1	2
18	R.K. Khan Hospital Library	Durban	2	1
19	Richards Bay Coal Terminal, Technical Library	Richards Bay	1	2
20	Richards Bay Minerals, Technical Library	Richards Bay	-	-
21	SAPS Chatsworth, Basic Training Library	Durban	-	-
22	SAPS KwaZulu-Natal, Provincial Library	Durban	2	2
23	Shepstone & Wiley Law Library	Durban	1	-
24	South African Sugarcane Research Institute (SASRI) Library	Durban	1	2
25	Stewart Scott Inc. Library (SSI Library)	Pietermaritzburg	0	2
26	Umgeni Water Library	Pietermaritzburg	1	1
27	Valley Trust Library	Botha's Hill	0	2
28	Voortrekker Museum Library	Pietermaritzburg	1	2
29	Wentworth Hospital, Medical Library	Durban	1	1
	Total of questionnaires distributed		**44**	**40**
	Engineering Firms	**Location in KZN**	**G/D**	**E**
1	Africon	Durban	37	2
2	Anderson Vogt & Partners	Mtubatuba	1	2
3	Arcus Gibb (Pty) Ltd.	Durban	14	2
4	Artwicar Consulting (Pty) Ltd.	Southbroom	2	1
5	Arup (Pty) Ltd.	Durban	8	1

	Engineering Firms	Location in KZN	G/D	E
6	Asha Sunker (Pty) Ltd.	Durban	1	1
7	B & A Group (Pty) Ltd.	Durban	15	2
8	BCP Engineering (Pty) Ltd.	Newcastle	8	2
9	BFBA Consultants (Pty) Ltd.	Pietermaritzburg	3	2
10	Bigen Africa	Durban	8	1
11	BKS (Pty) Ltd.	Richards Bay	5	2
12	BVI Consulting Engineers	Durban	9	1
13	C.A. Du Toit (EDMS) BPK	Durban	1	1
14	CBI Consulting Engineers (Pty) Ltd.	Durban	14	2
15	Charles Pein & Partners Inc	Pietermaritzburg	1	2
16	CSM Consulting Services (Pty) Ltd.	Pietermaritzburg	24	2
17	CVG Consulting Engineers CC	Durban	2	1
18	D.E. Consultants CC	Durban	1	2
19	D.P. Barnard & Associates CC	Durban	3	2
20	Davies Lynn & Partners (Pty) Ltd.	Durban	2	1
21	Delca Systems (prev. DE Leuw Cather Emtateni)	Durban	12	1
22	Dennis V. Cress & Associates	Durban	1	1
23	Dihlase Consulting Engineers (Pty) Ltd.	Pietermaritzburg	5	1
24	DMV Richards Bay	Richards Bay	5	1
25	DPA Specialist Consulting Engineers (Pty) Ltd.	Durban	3	2
26	Drennan Maud & Partners	Durban	2	3
27	Duncan Hemingway & Partners	Ladysmith	3	1
28	Elliot Breytenbach & Gray	Durban	3	1
29	Endecon KwaZulu-Natal (Pty) Ltd.	Richards Bay	10	3
30	EVN Africa (Pty) Ltd.	Pietermaritzburg	3	2
31	Eyethu Engineers CC	Durban	8	2
32	Gavin R. Brown & Associates CC	Durban	2	2
33	Goba (Pty) Ltd.	Durban	50	2
34	Henwood & Nxumalo Consulting Engineers CC	Pietermaritzburg	8	2
35	Igoda Projects (Pty) Ltd.	Durban	4	2
36	Iliso Consulting Engineers (Pty) Ltd.	Durban	22	2
37	Ingerop Africa (Pty) Ltd	Durban	8	1
38	Jeffares & Green (Pty) Ltd.	Pietermaritzburg	10	2
39	Kantey & Templer (Pty) Ltd.	Port Shepstone	3	1
40	Knight Piesold (Pty) Ltd.	Durban	6	1
41	Kwezi V3 Engineers (Pty) Ltd.	Newcastle	4	3
42	LSC Brunette CC	Durban	3	2
43	Lebone Engineering (Pty) Ltd.	Durban	6	2
44	Lekwa Consulting Engineers (Pty) Ltd.	Mtunzini	3	2
45	Liebenberg Jenkins & Vennote Ing	Pietermaritzburg	3	1
46	Madan Singh & Associates CC	Durban	6	3
47	Mahesh Khoosal & Associates CC	Durban	2	1
48	MAP Africa Consulting Engineers (prev. MPA…)	Durban	3	3
49	MBB Consulting Engineers Inc	Pietermaritzburg	10	2
50	MMC Engineers	Durban	2	3
51	Moore Spence Jones (Pty) Ltd.	Durban	15	2
52	Ndawonye Networks CC	Richards Bay	2	1
53	Ninham Shand (Pty) Ltd.	Pietermaritzburg	6	2
54	Palace Engineering Services	Durban	1	2
55	P.D. Naidoo & Associates (Pty) Ltd.	Richards Bay	1	1
56	Raws (prev. GFK Consulting Engineers CC)	Vryheid	3	2
57	RCE Consulting Engineers	Durban	6	2
58	RPP Consulting Engineers	Durban	2	1
59	Saunders & Wium Trust	Pietermaritzburg	7	2
60	Sivest SA-(Pty) Ltd.	Durban	20	1
61	SKC Engineers Coastal Division	Durban	1	1

	Engineering Firms	Location in KZN	G/D	E
62	SKP Engineers CC	Durban	3	1
63	SMA Consultants CC	Kwadukuza	3	1
64	SNA Civil & Development Engineers (EDMS) BPK	Pietermaritzburg	8	2
65	Sookan & Associates CC	Durban	1	1
66	Spoormaker & Partners Incorporated	Durban	3	1
67	SRK Consulting	Durban	10	2
68	Stewart Scott Inc. (Pty) Ltd. (SSI (Pty) Ltd.)	Hluhluwe	4	1
69	Sukuma Consulting Engineers (Pty) Ltd.	Pietermaritzburg	3	2
70	Thekwini Geocivils CC	Durban	4	3
71	Tobbell Stretch & Associates	Durban	2	1
72	Ulungeni CC	Empangeni	3	2
73	UWP Consulting (Pty) Ltd.	Empangeni	4	8
74	Vawda Engineers CC	Durban	3	1
75	Vela VKE Engineers	Durban	1	1
76	Vigar and Associates CC	Pietermaritzburg	5	1
77	Vishnu Ulassi & Associates CC	Durban	2	2
78	WSP Consulting Engineers SA (Pty) Ltd.	Durban	15	2
79	Young & Satharia	Durban	7	3
80	Zai Consultants CC	Empangeni	1	1
	Total of questionnaires distributed		**515**	**140**

Note: Jeffares & Green Inc. Library (Pietermaritzburg) and Jeffares & Green (Pty) Ltd. (Pietermaritzburg) were surveyed as a special library and engineering firm in the same location. Hence, the employer questionnaire was sent to two employers to be completed as special library and engineering firm employers.

A drop off survey is delivered by hand to the intended recipient who completes it at their leisure (Watson 1998: 152). The questionnaires are either picked up personally by the researcher or returned by mail. Questionnaires were initially to be hand-delivered in the Durban area. However, due to time constraints, the large number of engineering firms in the Durban area as well as transport difficulties for the researcher, majority of the questionnaires were posted to the organizations marked for attention of the 'contact' which was established during the preparation for data collection stage. The DUT Registry Department made available their postal services for distribution of questionnaires to the various organizations in KZN, with the researcher personally delivering to a few organizations. Some engineering firms had a large number of staff incumbents (such as 25 or 50) resulting in bulky envelopes or two A3 envelopes used to accommodate the questionnaires. Hence in these cases the questionnaires were personally dropped off at the organization.

After weeks of preparation of the questionnaires for send-off (attaching the return envelopes and colour 'reminder' tags, crossing off the sections not applicable to the

engineering respondents, handwriting return dates and signing of each questionnaire, addressing the larger envelopes, counting the number of questionnaires to be sent off), data collection started on the 22 May 2008. These were posted in batches depending on the scheduled collection on 29 May 2008 and 5, 12, 19 June 2008. Those that were not going to be collected personally were posted on the 12 June 2008 requesting a response by 27 June 2008. Hence, two weeks were given to all potential respondents for completion and return of the questionnaires. Three engineering firms (Dennis V. Cress & Associates, SKC Engineers Coastal Division and Vela VKE Engineers) in the Durban area preferred that the questionnaires be e-mailed to them. One of these organizations insisted that the questionnaires be e-mailed to the 'contact' and she would make copies for distribution to the relevant persons. This created many difficulties. It had to be explained that if this were to be done, the researcher would not have control over the distribution numbers and this could alter the distribution and return rates. The 'contact' maintained that she would inform the researcher about the number of questionnaires distributed. Not being left with a choice, the questionnaires were electronically mailed and instructions given to distribute to each of the relevant target populations. The researcher was reluctant to do so with other organizations that suggested the same for fear of the instrument getting 'scrambled' during electronic transmission and persuaded these organizations to use the hard copy. However, in the case of the three engineering firms mentioned above, electronic mail had to be used as it was made explicit that they would only participate if it were so. The questionnaires were e-mailed to them on the 19 June 2008. Respondents were asked to respond as soon as they possibly could for fear of them reading the mail and forgetting about it. As these were sent as attachments, the mechanism of coloured paper tags used to avoid the confusion discussed earlier, could not be implemented as with the others. Hence, the e-mail was sent with very clear instructions as to who should complete which questionnaire. Considering all this, two of the three engineering firms participated in the study and responded appropriately to each of the questionnaires. A pre-notification to alert the population of the arrival of the questionnaires is useful to increase the response rate (Projects.ex 2003: para. 13). Hence this was done.

3.3.6. Questionnaire collection

Babbie & Mouton (2001: 259) claim that if the research worker delivers the questionnaires, picks them up, or both, the completion rate seems higher than the straightforward mail survey. Further, to facilitate a desired high return rate, personal collection of the questionnaires from most organizations in Durban (location of the researcher) was done whilst in the case of those special libraries and engineering firms outside Durban and some within Durban but not in close proximity to the researcher, the postal services was used. Two weeks after distribution, follow-ups were made and this entailed calling organizations in Durban that were scheduled for collection personally. Some had the questionnaires ready on time whilst others needed more time. It was assumed that by informing the organization that the researcher would be coming for collection on a particular day would prompt them to have the questionnaires ready. However, with the majority of organizations this was not the case, although they were reminded a few days in advance in the hope that if the questionnaires were not completed as yet that they still could have it ready in time. Many a time, the researcher ended up getting to the organization under difficult circumstances (transport 'problems', time constraints, difficulties in locating the organizations), only to be told that they were not ready. Knowing the value of their responses and their willingness to help, more time was given to them. A few organizations were willing to complete the questionnaires whilst the researcher waited.

An engineering firm reminded of collection, a day later refused to participate. The researcher explained that more time is allowable, however, the person was not persuaded; and then rather unexpectedly just hung up. Leedy & Ormrod (2005: 101) highlight that participants should be given the choice of either participating or not participating and they have the right to withdraw from the study at any time. Therefore, after that conversation it was decided that there was no use forcing the matter as this organization, although willing in the beginning to complete the questionnaires, had the right to decline later.

Others maintained that they did not receive the questionnaires. This was peculiar, as the mail was not returned to the DUT Registry, as one would expect if something is

undelivered. Perhaps it was misplaced, but the envelopes were marked for attention by the relevant persons who were informed to expect this mail. Another 'contact' was on leave and the 'replacement' had no idea of 'any questionnaire' and assumed that the questionnaires are misplaced. Replacement questionnaires were then electronically mailed, as desired, to the relevant persons for distribution. Some engineering firms said they would try to locate the questionnaires in the post which they did. Another maintained that they did not receive the e-mailed questionnaires even after being re-sent to the 'contact' twice.

A special library misplaced the questionnaires and eventually located them incomplete. These were e-mailed to the researcher with pages missing. As a result the researcher asked for the originals but on going there, the originals were lost. Eventually after some 'paper jams' with the printer, the librarian managed to retrieve them. Another library worker did not consider herself eligible to complete the questionnaire and forwarded it to their Legal Department. However, there was no response from this organization. One employee completed the wrong questionnaire (employer questionnaire). To rectify this the researcher reposted a fresh questionnaire.

Some organizations that were scheduled for collection were courteous to inform the researcher, the day before or on the day that the questionnaires were not ready and she should not come. Due to time constraints, difficulties locating some organizations and transport difficulties, those organizations that did not have the questionnaires completed were asked to post them, if possible, as soon as they could. They did so readily whilst others agreed to do so but never did. Where possible, some organizations were revisited for collection. Two engineering firms where hard copy questionnaires were posted, sent the completed questionnaire via e-mail (perhaps knowing it would reach the researcher faster since this was from out of Durban) whilst the other personally dropped them off at the DUT.

After constant liaising with an engineering firm, the 'contact' (secretary) insisted that the engineers are too busy and would not complete them. Suggesting more time for any response was negatively accepted. Time passed but there was still no response. The researcher felt that this person was making the decision for the employees without even distributing the questionnaires. Attempts to contact anyone else for help

failed, thus the researcher visited personally. Two engineering staff promised to complete them but that never happened. Other organization 'contacts' passed the task of distribution and collection to fellow workers; most times these were the secretaries.

Blaxter, Hughes & Tight (2006: 182) recommends that during the data collection process, the researcher needs to keep notes of the project and about "chasing up" on potential respondents. Babbie & Mouton (2001: 260) advise on monitoring and recording the returns. Although eventually there was a return rate to work with, a concern surfaced regarding those 'out of town' questionnaires sent with the return envelopes indicating a response by 27 June 2008. According to Babbie & Mouton (2001: 260) "if potential respondents have not returned their questionnaires after two or three weeks, the questionnaires probably have been lost or misplaced". Whilst questionnaires were received beyond the due date, a week after there were no returns. Respondents may have received the questionnaires later than the researcher anticipated considering the postal service was used. Perhaps respondents thought it was too late to complete them. This prompted the researcher to e-mail reminders of an extension on the data collection.

Sending follow-up reminders can increase the return rate (Projects.ex 2003: para. 14). A difficulty here was, as Babbie & Mouton (2001: 261) highlight, some respondents did not identify the organization that they were employed at (for example, the special libraries answered that they were employed at the KZN Department of Health and engineering respondents answered "consulting firm" or both answered "anonymous"). This makes it impossible to follow-up non-respondents only. Some organizations had forgotten about the research and needed the researcher to refresh their memory whilst others asked that questionnaires be "re-sent" to them. Including a replacement questionnaire (in case the original has been misplaced) can increase the number eventually returned (Projects.ex 2003: para. 13). Hence, fresh questionnaires were e-mailed to the relevant persons. Others replied that they had "posted them ages ago" or that "they handed out all and some are posted already". Reminders and fresh questionnaires as attachments were also sent to other Durban based organizations that needed extensions. In spite of the follow-ups and extensions given of one, then two weeks (many of which were to engineering firms which 'promised' to have the questionnaires completed), very few responses were received.

Data collection is valuable but difficult and labour-intensive (PubMed 2001: 133) as confirmed in this study with the 'problems' experienced from the planning stage to the end of data collection.

3.3.7. Return rate of questionnaires

Data collection ended on 22 August 2008 amounting to three months of collecting data (data collection began on 22 May 2008). Despite the 'problems' outlined above, of the 739 questionnaires distributed, due to the researcher's perseverance there was a return of 181 (24%) questionnaires.

Bless, Higson-Smith & Kagee (2006: 132) advise that once the data has been collected and before coding the data, the researcher has to make sure that each question has been answered and the answers properly recorded. The completeness of each questionnaire is often essential to decide whether to discard the questionnaire. Further, Sekaran (2003: 302) discusses the handling of blank responses as not all respondents will answer every item in the questionnaire for reasons of not understanding the question, not knowing the answer, or simply not willing to answer. She points out that if 25% of the questionnaire is left incomplete then it may be a good idea to regard it as a spoilt questionnaire. Whilst some questionnaires did have some minor incompleteness and could still be used, in total 15 were discarded as spoilt questionnaires, for reasons of duplication of responses, completion of the incorrect questionnaires, college graduates and not yet qualified individuals completing questionnaires.

Thus the effective return rate was 166 (22%) of the 739 questionnaires distributed, as shown in Table 3.4., together with the individual return of each of the target populations.

Table 3.4.

Questionnaire distribution and collection

	Survey	No. of questionnaires distributed	No. of questionnaires returned	%age return	Spoilt questionnaires
1	Special library university and UoT graduates/diplomates	44	15	34%	2
2	Special library employers	40 *(+2)	11*(+2)	31%	2
3	Engineering firm university and UoT graduates/diplomates	515	100	19%	8
4	Engineering firm employers	140	40	29%	3
	Total	**739**	**166**	**22%**	**15**

*Jeffares & Green (Pty) Ltd. was targeted as special library and engineering firm employers

Interestingly, Neuman (2006: 299) claims that mailed questionnaires are very effective and response rates may be high for a target population that is well educated or has a strong interest in the topic. However, in this study, this was not so. Babbie & Mouton (2001: 261) point out that while a response rate of questionnaires of at least 50% is adequate for data analysis and reporting, it is just a rough guide having no statistical basis. Sekaran (2003: 237) considers a 30% return rate as acceptable. However, according to Bless, Higson-Smith & Kagee (2006: 121) out of the total number of questionnaires sent out, generally only 20 to 40% are returned. This study, with its overall return rate and with the individual return rates for each of the four targeted populations seems to have fallen into this category. According to Leedy & Ormrod (2005: 192-193) "potential respondents have little or nothing to gain by answering and returning the questionnaires and many of them do not". It should also be noted that personal collection of questionnaires in the Durban area found that not all questionnaires (especially in the organizations that had larger numbers of engineering staff) were distributed within the engineering firms as there were 'extras' returned. It is possible that other 'out of town' engineering firms may have done the same, which in turn may have contributed to the low return rate. Bearing in mind that this study delved into a discipline which is not that of the researcher (and in which many organizations needed persuasion to help); that a much larger number of questionnaires were distributed to a larger number of engineering firms compared to the special libraries; and in view of the endeavors undertaken to gain responses, the

researcher felt satisfied to proceed with data analysis. While the return rate might not be adequate to generalize findings, the researcher believed it was important in terms of the objective of the study to analyze the data collected and report the findings.

3.4. Data analysis

Durrheim (2006a: 51) defines data as the basic material with which researchers work. Hofstee (2006: 117) explains that once your data is collected, you have to analyze it to convert it to information. According to Cody & Johnson (2008: para. 1) one of the first and most important steps in any data processing task is to verify that your data values are correct or atleast conforms to some set of rules. Powell & Connaway (2004: 89) advise that after data collection, the data should be checked for completeness, comprehensibility, consistency and reliability. As completed questionnaires are received, each should be opened, scanned and assigned an identification number (Babbie & Mouton 2001: 260). In view of this study targeting four populations, each questionnaire received was examined to check that the appropriate individual responded. These were then bundled into the four different groups to allow for easy access and control.

Durrheim (2006b: 189) advises that the first stage of data analysis is to prepare the raw data. Data are transformed into a data set in machine-readable format involving coding, entering and cleaning of data. Coding is the process by which items or groups of data are assigned codes to simplify and standardize the data for analytical purposes (Blaxter, Hughes & Tight 2006: 203). Sekaran (2003: 303) advises the use of a coding sheet as opposed to flipping through each questionnaire to avoid confusion. However, in this study, closed questions were designed with each option pre-coded for easy data capturing. With regards to coding here, both questionnaires (refer to Appendices A & B) sent to the four populations and their questions were jointly numbered from 1 to 181 (returned questionnaires) and 1 to 45 (questions in both questionnaires), respectively. Though the questionnaires were numbered 1-181, this number altered (as discussed later) because of the detection of spoilt questionnaires and the addition of others. Codes were also assigned to the four populations: 1= *Survey questionnaire for university and university of technology graduates/diplomates* in special libraries; 2= *Survey questionnaire for university and university of*

technology graduates/diplomates in engineering firms; 3= *Survey questionnaire for employers* of special library employees and 4= *Survey questionnaire for employers* of engineering firm employees. Some qualitative questions, only pertained to graduates/diplomates and employers of special libraries, others were non-applicable depending on the respondent's responses. Hence, these non-applicable items were assigned the code 911 (randomly selected for easy identification). Questions that required responses but were not completed were given a '0' code. Babbie & Mouton (2001: 415) point out that data entry is increasingly accomplished by data being keyed directly into the computer. Hence, a template was created by means of the spreadsheet program *Microsoft Excel* in which quantitative and qualitative responses were captured accordingly.

Durrheim (2006b: 192) recognizes that coding and entering data are labour-intensive and boring tasks and where errors can easily occur. Every data set contains errors and if those errors are not rooted out, it results in wrong conclusions (Analysis 2008: para. 1). Hence the next step is the elimination of errors (Babbie & Mouton 2001: 417). This process is termed the 'cleaning' of data. There are a number of terms used by different people that refer to the same process such as error checking, error detection, data validation, data cleaning, data cleansing, data scrubbing and error correction. Chapman (2005: para. 4) defines data cleaning as a process used to determine inaccurate, incomplete or unreasonable data and then improving the quality through correction of detected errors and omissions. Chapman (2005: para. 1) and Babbie & Mouton (2001: 417) point out no matter how carefully and efficiently the data was captured, some errors are evitable especially when working with large quantities and numbers. These errors may exist whether data capturing is done by the researcher herself or, as was the case in this study, by a hired data capturer. These errors may result from incorrect coding, incorrect reading of written codes and so forth. Common sources of errors are missing data coding, 'not applicable' or 'blank' coded as 0, typing errors in data entry, or data for one variable column being entered under the adjacent column, or data could be fabricated. Data cleaning is a two-step process including detection and then correction of the dataset (Analysis 2008: para. 4). Thus, cleaning the data involves checking the data set for errors and correcting these errors (Durrheim 2006b: 192). According to Babbie & Mouton (2001: 418) although data cleaning is essential, it can be sometimes avoided but it should not significantly affect

your results. Further, he stresses that one should not use this comment as rationalizations for sloppy research. “Dirty” data will almost always produce misleading research findings. As this study generated data from four populations using only two sets of questionnaires, data capturing was not ‘straightforward’. Hence, it was imperative to engage in data “cleaning”. This process was able to detect an additional nine spoilt questionnaires that would have affected the quality of results if gone undetected. Therefore, those spoilt questionnaires were removed from the *Microsoft Excel* datasheet, bringing the total to 164. There was also an organization that responded later to the respective questionnaires and this was added for data analysis bringing the total return to the final 166.

According to Bless, Higson-Smith & Kagee (2006: 163) once data collection and checking of questionnaires have been completed, the process of data analysis begins. This process detects consistent patterns within the data, hence to draw results and conclusions. Such qualitative research explores attitudes, behaviour and experiences (Dawson 2002: 13) as was the case in the current study. This enables the researcher to explore and describe social patterns and explain reasons such patterns exist. The questionnaires included a variety of open-ended and closed questions. Although opened-ended questions can be difficult to analyze, they have the advantage of allowing respondents to express their views thus providing richness of data. Dawson (2002: 118) suggests that content analysis can be used for open-ended questions. Content analysis is a detailed and systematic examination of the contents of the open-ended responses for purpose of identifying patterns, themes or biases (Leedy & Ormrod 2005: 142). Content analysis seeks to demonstrate the meaning of written sources by systematically allocating their content to predetermined, detailed categories and quantifying and interpreting the outcomes (Payne & Payne 2004: 51). Any documents attached, for example job descriptions or organizational structures, were subjected to content analysis. Closed questions have the advantage of being easier to analyze. Further, content analysis involves tabulating the frequency of each characteristic initiated from data collection (Leedy & Ormrod 2005: 143). Thus content analysis is qualitative as well as quantitative. Quantitative responses in this study were dealt with by means of descriptive statistics such as frequency and percentage distributions. As special libraries and engineering firms generally have a small number of staff, the number of organizations surveyed and the low return rate,

the study did not necessitate the use of a statistician to analyze data. Furthermore, the 'smallness' of this situation allowed the researcher to interrogate the data creatively as analysis proceeded and trends revealed themselves, thus giving the study more depth-something that might have not been possible to do with a 'bigger return rate' and employment of a statistician.

Dawson (2002: 121) mentions that the quickest and easiest way to analyze data is by using computer software, for example, the *Statistical package for the social sciences (SPSS)*, which is compatible with *Microsoft Excel*. Dawson (2002: 123) highlights that such software packages are able to produce professional graphs, tables and pie charts, which can save a lot of time and effort. *SPSS* allows these goals to be accomplished in a fast, efficient and cost effective manner (Babbie 1992: A 33). It can be helpful to manipulate large amounts of data, in finding patterns and testing hypotheses. However, as already explained, the manageable amount of data collected made it possible to do the necessary analysis using *Microsoft Excel*. This personal handling of the data, as reiterated already, gave the researcher more control over manipulation of the data through cross-tabulations to extract interesting findings. *Microsoft Excel* was sufficient to effect such analysis. Data analyzed are presented in the form of tables using *Microsoft Word*, pie charts and graphs (generated via *Microsoft Excel*) so that trends and patterns become evident. Where necessary narrative explanations of results are provided. Based on discussion of the main findings in terms of the objective of the study and in context of the literature reviewed, conclusions are drawn and recommendations are made.

3.5. Evaluation of the research methodology used

Bless, Higson-Smith & Kagee (2006: 150) claim that no measurement technique in social research is perfect. It therefore becomes important that researchers evaluate the measures that they use. Measurement techniques are evaluated in terms of the principles of reliability and validity (Bless, Higson-Smith & Kagee 2006: 149). As discussed in this chapter, the choice of questionnaires as data collection instrument was adequate in generating data for this study. However, it is recognized that there were a smaller number of questionnaires sent to special libraries as compared to the engineering firms. This was based on the 'sampling frames' that were available. As

explained in this Chapter, every effort was made to encourage return of questionnaires. Despite the low return rate, which may not lend itself to generalization of findings to the entire populations surveyed, the findings are still useful in revealing issues and trends for the LIS profession and therefore warrant reporting. Further, the four different populations surveyed and the extent to which they were probed via the two questionnaires, adds value to the study, despite the low returns. Descriptive statistics and content analysis as methods of data analysis were deemed sufficient for this study.

3.6. Summary

This chapter discussed in detail the research methodology employed in this study. It provided comprehensive discussions on the 'problems' that had to be overcome in the process of determining the survey populations. It described the research design, the pre-testing of the data collection instruments, its distribution and collection. Further, it outlined how data was analyzed. The following chapter presents the findings of the study.

CHAPTER 4: PRESENTATION OF FINDINGS

4.1. Introduction

The previous chapter focused on the research methodology and data collection techniques used to gather the required data for this study. This chapter presents findings emanating from the self-administered questionnaires which were used to survey university and university of technology (UoT) graduates and diplomates and employers in special library services and engineering firms in KwaZulu-Natal (KZN). A total of 739 questionnaires were administered to special library and engineering firm graduates and diplomates as well as to their employers. A return of 181 questionnaires (24%) was acheived. However, of the 181 questionnaires returned, 15 questionnaires (8%) were regarded as spoilt questionnaires (as explained in Chapter 3). As these were discarded, there was an effective return of 166 out of the 739 questionnaires (22%) distributed.

4.2. Presentation of findings

Data collected was analyzed and is presented using tables and graphs, where possible. Percentages are rounded off to the nearest whole to effect easier presentation of findings. Further, in some figures percentages are only reflected for larger and more significant numbers for ease of presentation. Findings from content analysis of responses to open-ended questionnaires are presented in narratives. The two sets of questionnaires (refer to Appendices A and B) targeted four populations:

- University and UoT graduates/diplomates in special libraries;
- University and UoT graduates//diplomates in engineering firms;
- Special library employers; and
- Engineering firm employers.

In view of the objective of this study:

- To investigate the job functions of university and university of technology graduates and diplomates in the special library and engineering environments with the intention of drawing on possible trends and best practices from the engineering environment for the LIS workplace

and the three research questions guiding the study:

- What are the job functions of university and university of technology graduates and diplomates in special library services in KwaZulu-Natal?
- What are the job functions of university and university of technology graduates and diplomates in engineering firms in KwaZulu-Natal?
- Are there any trends and best practices in staff structures in the engineering work environment that can be adapted or adopted for the LIS workplace?

findings for the four populations are first presented separately. Cross tabulations and comparisons of relevant findings among the four populations are then done to reveal any interesting trends and best practices.

4.2.1. Special library graduates and diplomates survey

The *Survey questionnaire for university and university of technology graduates/diplomates* targeted graduates and diplomates employed in special libraries in KZN.

4.2.1.1. Distribution and return of questionnaires

The number of questionnaires distributed to special library graduates and diplomates were 44. Fifteen (15) of the 44 questionnaires (34%) were completed and returned. Table 4.1. illustrates this more explicitly.

Table 4.1.

Distribution to and return of questionnaires from participating special libraries (graduates/diplomates)

	Special Libraries	No. of graduate/ diplomate questionnaires distibuted	No. of questionnaires returned	%	Spoilt
1	Addington Hospital, Medical Library	1	1	100%	0
2	Allerton Provincial Veterinary Laboratory Library	10	0	0	0
3	Cedara Library KwaZulu-Natal Department of Agriculture & Environmental Affairs	3	0	0	1
4	Durban Museums Library	1	0	0	0
5	Edendale Hospital, Medical Library	1	0	0	0
6	Grey's Hospital, Medical Library	2	0	0	0
7	Hulett Aluminuim (Pty) Ltd. Library	1	1	100%	0
8	Inkosi Albert Luthuli Central Hospital Library	3	1	33%	0
9	Jeffares & Green Inc Library	1	1	100%	0
10	King Edward VIII Hospital, Nursing College Library	1	1	100%	0
11	KwaZulu-Natal Department of Transport, Resource Centre	2	0	0	0
12	KwaZulu-Natal Education Department, Education Library	2	0	0	0
13	KZN Wildlife Library	1	0	0	0
14	Lever Ponds SA (Pty) Ltd., Knowledge Centre	1	0	0	0
15	Natal Sharks Board Library	1	1	100%	0
16	National Bioproducts Institute, E.K. Dunning Library	2	1	50%	0
17	Oceanographic Research Institute Library	1	1	100%	0
18	R.K. Khan Hospital Library	2	0	0	0
19	Richards Bay Coal Terminal, Technical Library	1	0	0	0
20	Richards Bay Minerals, Technical Library	Refused to participate			
21	SAPS Chatsworth, Basic Training Library	Could not contact the library			
22	SAPS KwaZulu-Natal, Provincial Library	2	1	50%	0
23	Shepstone & Wiley Law Library	1	1	100%	0
24	South African Sugarcane Research Institute (SASRI) Library	1	1	100%	0
25	Stewart Scott Inc. Library (SSI Library)	0	-	0	0
26	Umgeni Water Library	1	0	0	0
27	Valley Trust Library	0	-	0	0
28	Voortrekker Museum Library	1	0	0	0
29	Wentworth Hospital, Medical Library	1	1	100%	0
~	Anonymous responses		3		1
	Total	**44**	**15**	**34%**	**2**

- = No questionnaires were distributed to these organizations because no graduates/diplomates were currently employed at their special library

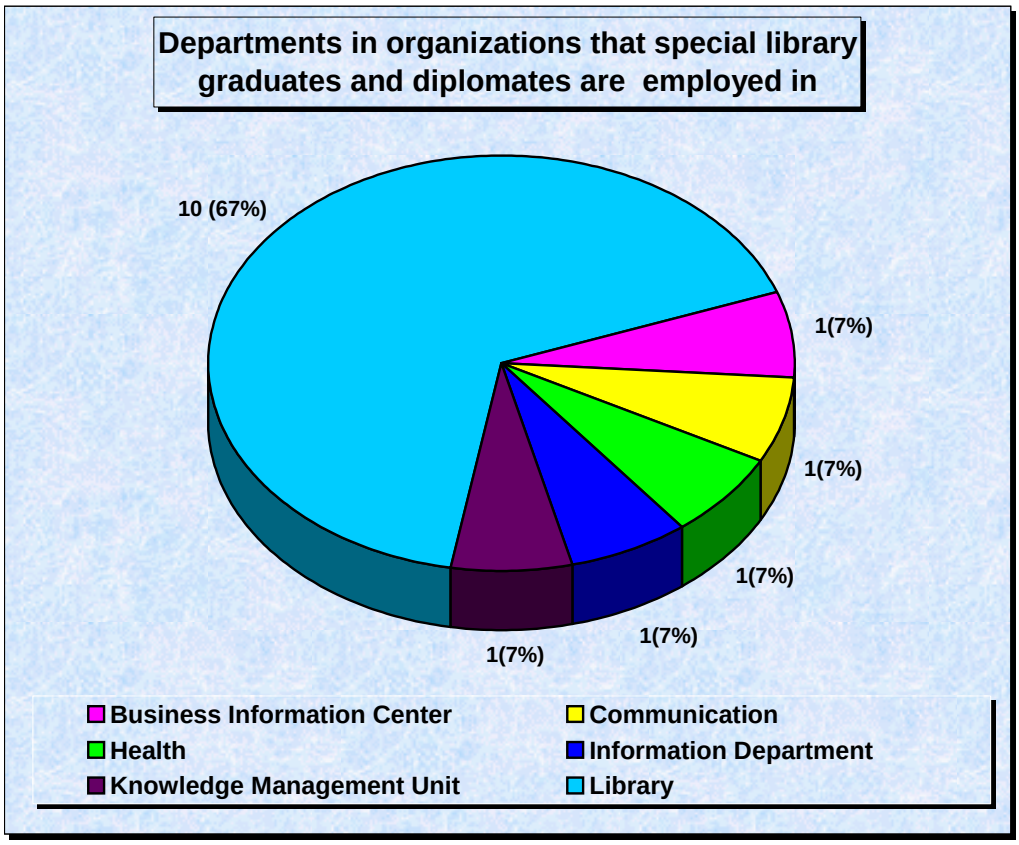
~ = Respondents did not specify the organizations that they were employed in

4.2.1.2. Departments

Special library service graduates and diplomates were asked to indicate the departments they are currently employed in. Ten of the 15 respondents (67%) indicated the library as being this department. The remaining five included Business Information Center, Health, Communication, Information Department and Knowledge Management as shown in Figure 4. 1 below.

Figure 4.1.

[N=15]



4.2.1.3. Job titles/designations of and highest academic qualifications obtained by graduates/diplomates

Special library employees stated their current job designations and their highest academic qualifications obtained. Majority of the 15 respondents held job titles of Senior Librarian/Principal Librarian and Librarian. The National Diploma: LIS seems to be the most common qualification among respondents. Nevertheless, job titles

seem to vary. There was one respondent holding a B.Sc. Environmental Management (subject related) qualification. Table 4.2. captures these findings.

Table 4.2.

Job titles/designations and qualifications of special library graduates/diplomates

Job title/Job designation	Highest academic qualification						%
	National Diploma: Library and Information Science	B.Tech.: Library and Information Studies	B.Bibl. (Bachelor of Library and Information Science) or equivalent	Postgrad. Diploma in Library and Information Science	Other	Total	[N= 15]
Senior Librarian/Principal Librarian	1	1	3	0	1	**6**	40%
Librarian	2	0	0	3	0	**5**	33%
Senior Library Assistant/Principal Library Assistant	0	0	0	0	0	**0**	0
Library Assistant	2	0	0	0	0	**2**	13%
Other	0	1	0	0	1	**2**	13%
Total	**5 (33%)**	**2 (13%)**	**3 (20%)**	**3 (20%)**	**2 (13%)**	**15**	

The **'Other'** job titles indicated by respondents included:

- Information Officer
- Research Assistant

The **'Other'** qualifications indicated by respondents included:

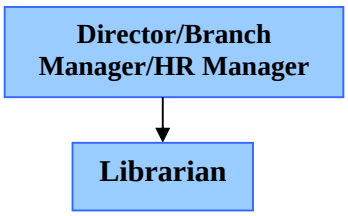
- M.Phil. Knowledge Management
- B.Sc. Environmental Management

4.2.1.4. Location of current positions in the organizational structures of the organizations

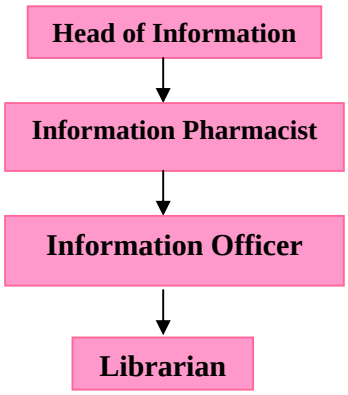
Respondents were asked where their current positions are located in the organogram/organizational structure of the department/organization that they are currently employed in. Eight of the 15 (53%) special library graduates/diplomates did not respond to this item. Those that did preferred to indicate this on the space provided in the questionnaire. Only a Senior Librarian/Principal Librarian from the Addington Hospital, Medical Library attached an organogram but indicated the organizational structure on the questionnaire as well. Of the 7 who responded, one indicated that the special library did not have an official organogram. The most

common structure is one that starts at senior management level (Directors, HR Managers, Partners) and incorporates the Library. It is indeed surprising to find that in these cases the library is so closely located to senior management. An explanation could be that 'the library' is seen as a support entity in the organization. It does not fit into other departments. Hence it seems to fall under senior management. Two typical structures found were:

(1)



(2)



4.2.1.5. Institutions highest academic qualifications obtained from

Graduates were asked from which higher education institutions did they obtain their highest academic qualifications. One (7%) of the 15 respondents did not provide the name of the institution from which he/she obtained her ND: LIS qualification (though presumably a UoT). Six of the 14 (43%) that did respond were from UoTs whilst eight (57%) were from traditional universities. A larger number of respondents were traditional university graduates. There were also a significant number of diplomates and graduates from the Durban University of Technology (DUT) and the previous M.L. Sultan Technikon. It should be noted that the M.L. Sultan Technikon merged

with Natal Technikon to become DUT, the only UoT in KZN offering a LIS programme. Results are captured in Table 4.3.

Table 4.3.

Institutions highest academic qualifications obtained from (special library graduates/diplomates)

Institution	Job title/designation					
	Senior Librarian/ Principal Librarian	Librarian	Senior Library Assistant/Principal Library Assistant	Library Assistant	Other	Total
Durban University of Technology (DUT)	1	0	0	1	1	**3**
M.L. Sultan Technikon (now DUT)	1	2	0	0	0	**3**
Mangosuthu Technikon (now Mangosuthu University of Technology (MUT))	0	0	0	0	0	**0**
Natal Technikon (now DUT)	0	0	0	0	0	**0**
Technikon South Africa (TSA- now UNISA)	0	0	0	0	0	**0**
University of Durban-Westville (UDW-now UKZN)	0	0	0	0	1	**1**
University of KwaZulu-Natal (UKZN)	0	1	0	0	0	**1**
University of Natal (now UKZN)	0	1	0	0	0	**1**
University of South Africa (UNISA)	2	1	0	0	0	**3**
University of Zululand (UniZulu)	1	0	0	0	0	**1**
Other	1	0	0	0	0	**1**
No response	0	0	0	1	0	**1**
Total	**6**	**5**	**0**	**2**	**2**	**15**

The **'Other'** institution indicated by a respondent was

- Stellenbosch University

4.2.1.6. Year highest academic qualifications obtained, time period in current positions and promotion details

Respondents were asked to indicate the year they obtained their highest academic qualifications, the time period they have occupied their current positions in the organization and whether they have gained promotion/s. One respondent with a ND: LIS qualification secured a promotion but did not reveal any further details. Three of

the eight (38%) university respondents and one of the six (17%) UoT (erstwhile technikon) graduates/diplomates indicated that they secured promotions in their organizations. Ten (five university and five UoT) of the 15 respondents (67%) did not secure any promotions in the special library. Table 4.4. reflects their responses. It is evident that obtaining a qualification and the period of service in the special library did not guarantee a promotion.

Table 4.4.

Year highest qualifications obtained, time period in current positions and promotion details (special library graduates/diplomates)

University/UoT graduate/diplomate	Job title/Job designation	Year highest qualification obtained	Number of years in current position	Secured promotion/s
University	Senior Librarian/Principal Librarian *(4)	1978	6-10	No
		1996	6-10	No
		1999	1-5	No
		2000	6-10	Yes
	Librarian *(3)	1980	1-5	No
		1990	6-10	Yes
		1998	1-5	Yes
	Research Assistant	2005	1-5	No
UoT	Senior Librarian/Principal Librarian *(2)	1992	6-10	No
		2003	1-5	No
	Librarian *(2)	1989	6-10	No
		1996	1-5	No
	Library Assistant	2006	Under 12 months	Yes
	Information Officer	2007	1-5	No
No response	Library Assistant	No response	No response	Yes

*(Number of respondents that hold this job title)

The remaining five of the 15 (33%) respondents who indicated that they secured promotion/s in their organization provided the responses captured in Table 4.5. regarding their previous and current job titles and core responsibilities of each. One respondent did not respond to the question though he/she secured a promotion. Most respondents saw a change in job title and functions.

Table 4.5.

Previous and current job titles/designation and job functions (special library graduates/diplomates)

	Previous job designation	Job functions of previous job designation	Current job designation	Job functions of current job designation
1	**Library Assistant**	Issues, returns, faxing, scanning, etc.	**Librarian (Postgrad. Dip.-university graduate)**	Attend to patron requests, research cataloguing
2	**Librarian**	Administering library collection, journals, provide information, news and research service	**Librarian (Postgrad. Dip.-university graduate)**	Same as previous job functions plus webmaster, intranet implementation, project manager for document management, sustainability report coordinator
3	**Librarian**	Managing all aspects of the library	**Principal Librarian (M.Phil. Knowledge Management-university graduate)**	In charge of the library
4	**Student Library Assistant**	Shelving, shelf reading, OPAC assisting, circulation desk	**Library Assistant (ND:LIS-UoT diplomate)**	Shelving, photocopying, circulation, database searches
5	No response	No response	**Library Assistant (ND:LIS-UoT diplomate)**	No response

4.2.1.7. Current job functions of university and UoT graduates/diplomates

The current job functions of all graduates and diplomates (those that did gain promotion, presented in Table 4.5. and those that did not gain promotion) were compared. Graduates and diplomates (14 of the 15 participants - 93% responded) were required to list the core job functions of their current job designations. A library assistant did not respond to this item. Many of respondents shared common tasks. Table 4.6. reveals common job functions among university and UoT graduates and diplomates.

Table 4.6.

Common job functions between university and UoT special library graduates and diplomates

Common job functions	No. of university graduates	No. of UoT graduates/diplomates
Administrative duties	**2** (B.Sc. Environmental Management, Postgrad. Dip. LIS)	**2** (ND: LIS, B.Tech.: LIS)
Budget maintenance	**1** (B.Bibl.)	**1** (ND: LIS)
Cataloguing	**1**(Postgrad. Dip.)	**2** (ND: LIS)
Circulation	0	**2** (ND: LIS)
Classification	0	**1** (ND: LIS)
Collection Development	**1** (Postgrad. Dip. LIS)	**2** (ND: LIS)
Conduct literature and information searches	**1** (Postgrad. Dip. LIS)	**1** (ND: LIS)
Correspondence Liase/library meetings	**2** (Postgrad. Dip. LIS)	**1** (B.Tech.: LIS)
Databases	0	**2** (ND: LIS, B.Tech.: LIS)
Document production/management	**1** (Postgrad. Dip. LIS)	**1** (B.Tech.: LIS)
Ensuring accessibility of collection	**3** (2 B.Bibl., Postgrad. Dip. LIS)	0
Filing	**1** (B.Bibl.)	**1** (ND: LIS)
Indexing	**1** (B.Bibl.)	**1** (ND: LIS)
Inter-library loans	**1** (Postgrad. Dip. LIS)	**2** (ND: LIS)
Internal customer interface	**1** (Postgrad. Dip. LIS)	**1** (B.Tech.)
Library marketing and promotion	0	**1** (ND: LIS)
Management of library including collection	**5** (3 B.Bibl., B.Sc. Environmental Management, M.Phil. Knowledge Management**)**	**4** (3 ND: LIS, 1 B.Tech.)
Provision of information	**2** (B.Bibl.)	0
Record keeping	**1** (Postgrad. Dip. LIS)	**1** (ND: LIS)
Reference service and queries	**2** (Postgrad. Dip LIS)	**2** (ND: LIS)
Support for projects	**1** (B.Sc. Environmental Management)	0
Report coordinating	**1** (Postgrad. Dip. LIS)	0
Photocopying	0	**1** (ND: LIS)
Standard Code of Practice	**1** (Postgrad. Dip. LIS)	0
Teaching, guidance and supervision of staff software usage	**1** (B.Bibl.)	**1** (ND: LIS)

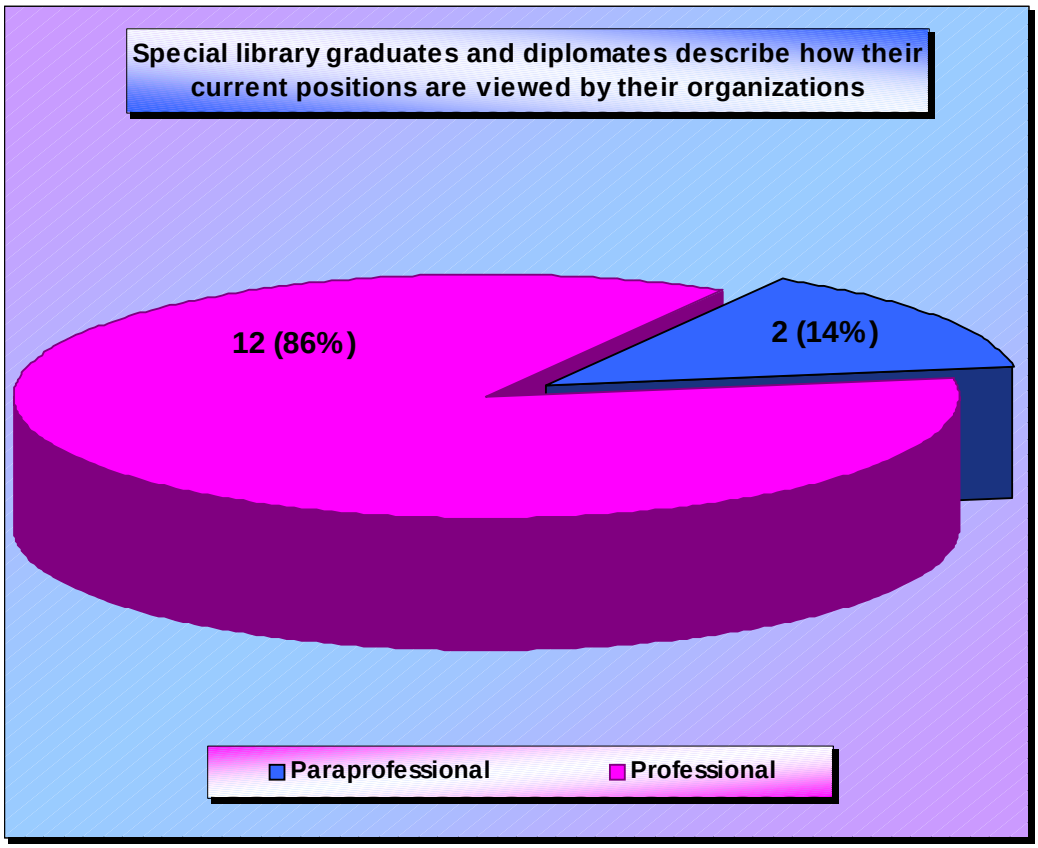
4.2.1.8. Paraprofessional or professional

Paraprofessional or professional were terms given as options to special library graduates/diplomates to describe the way their current positions are viewed by their organizations. The B.Sc. Environmental Management graduate did not respond to the question posed. Of the 14 respondents, that answered this question, 12 (86%) responded that their positions were viewed a professional. Two (14%) librarians, one with a ND: LIS and one with a Postgraduate Diploma in LIS, responded that their

positions are viewed as paraprofessional. Whilst the majority believe their positions are viewed as professional by their organizations, it will be interesting to see what view their employers hold (triangulated later). Figure 4.2. captures these findings.

Figure 4.2.

[N=14]



4.2.1.9. Skills and knowledge

University and UoT graduates and diplomates were asked whether their skills and knowledge acquired via their highest academic qualifications were adequate in equipping them to perform their current job functions. If **No**, they were required to list the skills and knowledge that their qualification did not equip them with. If **Yes**, they were asked to explain their response, but many did not. Majority of the university and UoT respondents (13 of the 15 - 87%) including the respondent with a ND: LIS who did not reveal the institution his/her qualification was obtained from, but evidently a UoT) felt their skills and knowledge were adequate. However, two university graduates (including the one with a B.Sc. Environmental Management) indicated that

despite believing their skills and knowledge were adequate they felt they were lacking in the following areas:

- General knowledge of animals that the library specializes in.
- Not enough IT knowledge.

The two UoT diplomates that responded **No,** provided the following respective reasons:

- There is a need for the academic curriculum to include more work experience.
- Lack of skills and knowledge in computer programming, supervisory skills, customer services, service excellence, HR practices, time management, administration.

4.2.1.10. Further training

Respondents were asked whether they required further training in their current positions. If they did not require further training they were posed the question as to who provided the required further training. There was a significant number of UoT graduates and diplomates that required training. It was interesting to note that 50% (4 of the 8 university respondents) did and 50% did not require further training. The results are captured in Table 4.7.

Table 4.7.

Further training (special library graduates/diplomates)

[N= 15]

Graduates/ Diplomates	Did graduates/diplomates require further training?			
	YES	**What Training?**	**NO**	**Total**
University	4 (50%)	• Computer system that is used in department • General library training • Indexing, storing on database • Scanning archival documents	4 (50%)	8 (100%)
UoT	5 (71%)	• Business writing skills • Computer application training programme • Computer training in Ms Office • Customer services • Information retrieval workshop • Internet searching • Knowledge management • Legal research • Open access issues • Secretarial training • Supervisory skills • Time management	2 (29%)	7 (100%)
Total	**9 (60%)**	**Who provided the training?**	**6 (40%)**	**15 (100%)**
Majority of the training provided was done in-house. External training was done by hired consultants and via LIASA (LIS professional body) workshops.				

4.2.1.11. Opportunities ahead

Respondents were asked whether there was opportunity for them to move up in the organization with their current qualifications. Three of the 15 (20%) graduates/diplomates responded positively and provided the following explanations:

- Because of the experience that I am gaining in the department.
- Currently studying the B.Tech.: LIS qualification to acquire more skills and knowledge. I believe more librarians are needed and positions will be created.

The other 12 (80%) respondents indicated that there was no opportunity to move up in the organization with their current qualifications. One of these respondents did not provide a reason. The reasons of the others are summarized as follows:

*(Number of respondents that shared similar responses)

- The library is a unique department in the organization. As Principal/Senior Librarian there is no higher post. One cannot move to another position unless one studies another course unrelated to LIS. *(8)
- Where can any librarian in a special library move to/progress? It is a small library with only one Librarian. *(2)

- A science honours or masters degree would be preferred for promotion due to nature of work in the organization.

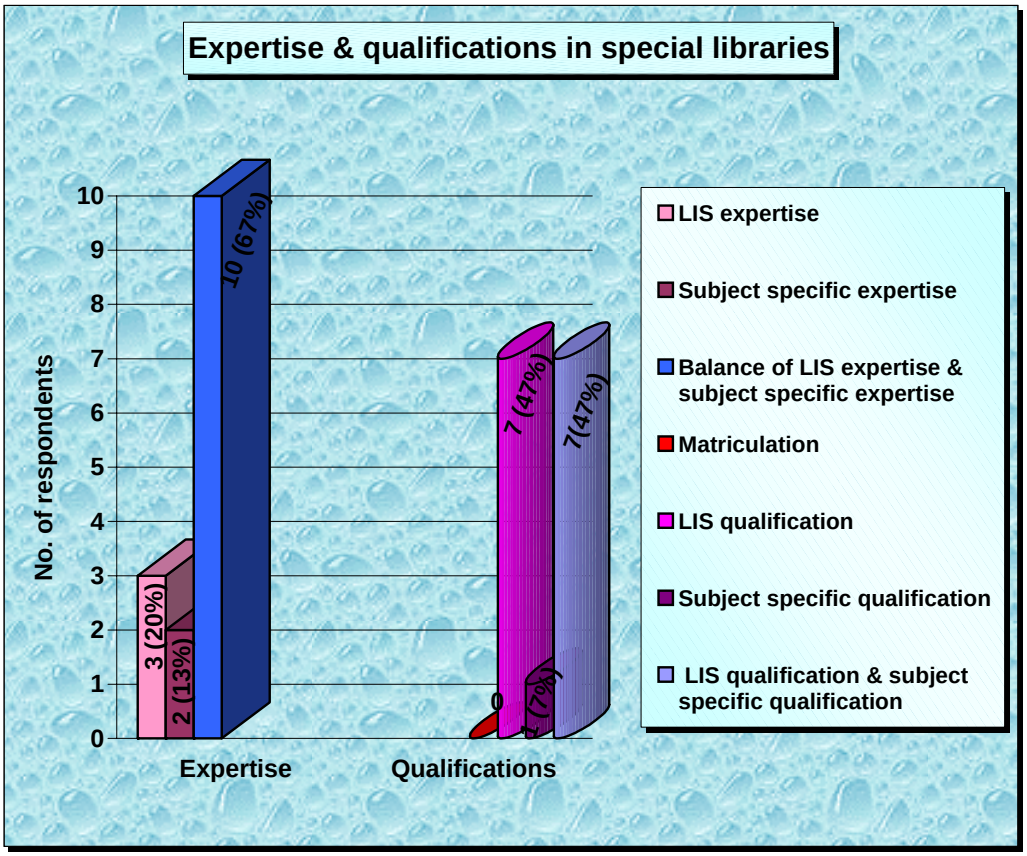
Special libraries by nature have small staff complements so it was not surprising that the majority of graduates and diplomates indicated that there was no opportunity to move up in the organization.

4.2.1.12. Expertise and academic qualifications

Special library respondents were asked what expertise and academic qualifications they believe are critical to the efficient running of special libraries. All 15 respondents responded to these items. Figure 4.3. illustrates the results. Interestingly, the B.Sc. Environmental Management graduate believed that LIS expertise and, LIS and subject specific qualifications are needed for a special library. Sixty-seven percent (67%) of respondents believe a balance of LIS and subject expertise is needed for a special library service. Further, there does seem to be strong indication that LIS qualifications are important in a special library service.

Figure 4.3.

[N=15]



4.2.1.13. Employment of graduates/diplomates with subject expertise or LIS qualifications

Respondents were asked to respond to the assertion that special libraries prefer to employ graduates/diplomates with subject expertise rather than with LIS qualifications. Two of the 15 (13%) graduates/diplomates did not respond to this item. The 13 (87%) respondents made the following comments:

*(Number of respondents that shared similar responses)

- LIS diplomates have no work experience and are not able to work independently.
- Special library should employ university LIS graduates. We employed technikon (UoT) graduates without success.
- LIS subject expertise enhances and supports service delivery. *(3)

- If you have a library qualification you meet the organization's requirements and would be considered for a job. *(3)
- Librarians are better equipped when educated in subject and LIS. *(4)
- Person with LIS qualification needs to adapt to the environment and needs to learn the jargon. Special library deals with special subject therefore it is advisable to add subject expertise for more skills and knowledge. *(3)

The strong sentiment seems to be that while LIS qualifications are required in a special library, subject expertise as well is needed for enhanced service delivery. It would be interesting to see what these respondents' employers believe in this regard (triangulated later).

4.2.1.14. Employing persons with matriculation

Graduates and diplomates were asked to comment on the assertion that special libraries prefer to employ persons with just a matriculation certificate. Four respondents left this question unanswered. Comments from 11 of the 15 (73%) were as follows:

*(Number of respondents that shared similar responses)

- Private organizations do not appreciate the value of employing qualified librarians. They believe anyone can run libraries. *(4)
- For financial reasons, organizations would not want to employ a person with a qualification because they need to pay a higher salary. *(3)
- In the past some special libraries hired persons with only a matric; now you must have library qualifications for special workloads. *(2)
- Matric is not a recognized qualification with which to work in special library.
- Some employers hire matriculants or a UoT graduate/diplomate if they are looking for someone to fill a junior position such as library assistant. *(2)
- With changes in technology matric is never enough to work in a specialized library. If organizations employ matriculants, it's to their disadvantage.

Most respondents seem to feel that employers do not appreciate the value of the LIS profession when employing special library staff.

4.2.1.15. Further comments

Respondents were asked to make any further comments regarding issues raised in the questionnaire. Nine (60%) of the respondents did not comment further. Six of the 15 (40%) respondents provided the following varied comments:

- Special librarians need to be familiar with electronic databases, therefore, the Diploma in LIS is no longer relevant. The B.Tech. is now needed.
- It is difficult to keep up with information trends. There is a need for LIS schools to provide short courses and training.
- UoT diplomates have been taken for granted for a while because they have been afraid to talk about employment related issues.
- Skills learnt at university are not utilized properly.
- A special librarian needs to be 'special' with advanced skills and experience. Hence a university qualification is essential.
- In most special libraries there is just one librarian who has to be skilled to do all library work. It would be advantageous to employ a librarian that has some knowledge of the subject of the library rather than a matriculant.

4.2.2. Special library employers survey

The *Survey questionnaire for employers* targeted employers of special libraries in KZN.

4.2.2.1. Distribution and return of questionnaires

The number of questionnaires distributed to special library employers were 42 (including two employer questionnaires sent to Jeffares & Green (Pty) Ltd. as employer questionnaires for both the engineering firm and the special library it incorporates). Of the 42 questionnaires distributed to employers, 13 questionnaires (31%) were completed and returned. Table 4.8. captures the distribution and return of these questionnaires.

Table 4.8.

Distribution to and return of questionnaires from participating special libraries (employers)

	Special Libraries	No. of employer questionnaires distributed	No. of questionnaires returned	%	Spoilt
1	Addington Hospital, Medical Library	1	1	100%	0
2	Allerton Provincial Veterinary Laboratory Library	2	0	0	0
3	Cedara Library KwaZulu-Natal Department of Agriculture & Environmental Affairs	2	0	0	0
4	Durban Museums Library	1	0	0	0
5	Edendale Hospital, Medical Library	2	0	0	0
6	Grey's Hospital, Medical Library	2	0	0	0
7	Hulett Aluminuim (Pty) Ltd. Library	1	1	100%	0
8	Inkosi Albert Luthuli Central Hospital Library	1	1	100%	0
9	Jeffares & Green Inc. Library	*2	*2	100%	0
10	King Edward VIII Hospital, Nursing College Library	1	0	100%	1
11	KwaZulu-Natal Department of Transport, Resource Centre	2	0	0	0
12	KwaZulu-Natal Education Department, Education Library	2	0	0	0
13	KZN Wildlife Library	2	0	0	0
14	Lever Ponds SA (Pty) Ltd., Knowledge Centre	1	0	0	0
15	Natal Sharks Board Library	1	1	100%	0
16	National Bioproducts Institute, E.K. Dunning Library	2	1	50%	0
17	Oceanographic Research Institute Library	2	1	50%	0
18	R.K. Khan Hospital Library	1	1	100%	0
19	Richards Bay Coal Terminal, Technical Library	2	1	50%	0
20	Richards Bay Minerals, Technical Library	Refused to participate			
21	SAPS Chatsworth, Basic Training Library	Could not contact the library			
22	SAPS KwaZulu-Natal, Provincial Library	2	0	0	0
23	Shepstone & Wiley Law Library	Refused to participate			
24	South African Sugarcane Research Institute (SASRI) Library	2	1	50%	0
25	Stewart Scott Inc. Library (SSI Library)	2	1	50%	0
26	Umgeni Water Library	1	0	0	0
27	Valley Trust Library	2	1	50%	0
28	Voortrekker Museum Library	2	0	0	0
29	Wentworth Hospital, Medical Library	1	0	0	0
30	Anonymous responses	-	-	-	1
	Total	**42**	**13**	**31%**	**2**

* Note that the same set of two employer questionnaires was used both in the survey of LIS and engineering employers as this company employs both LIS and engineering graduates and diplomates

4.2.2.2. Job titles/designations, qualifications and institutions qualifications obtained from

Employers were asked to provide their job titles, their highest academic qualifications and the institutions from which they obtained these qualifications. All 13 employers (100%) responded. Many of the employers graduated from traditional universities. Table 4.9. reflects these findings.

Table 4.9.

Job titles/designations, academic qualifications and institutions qualifications obtained from (special library employers)

Job title/ designation	No. of Respondents	Highest academic qualification	No. of Respondents	Institution qualification obtained from	No. of Respondents
Director	3 (23%)	M. Com.	1(8%)	Durban University of Technology (DUT)	1 (8%)
Deputy Director	0	B. Eng. Civil MBL (Masters in Business Law)	1(8%)	M.L. Sultan Technikon (now DUT)	1 (8%)
Divisional Manger: Engineering	0	M.Sc.	1(8%)	Mangosuthu Technikon (now Mangosuthu University of Technology (MUT))	0
Manager: Scientific Services	1 (8%)	Technical Management	1(8%)	Natal Technikon (now DUT)	1(8%)
Human Resources Manager	2 (15%)	Advanced Business Programme, National Higher Diploma	1(8%)	Technikon South Africa (TSA- now UNISA)	0
Other: • Business Manager • Department Head • Head: Information • Hospital CEO • Manager: Library Services • Senior Manager • Technical Manager	7 (54%)	M.Sc.: Zoology	1(8%)	University of Durban-Westville (UDW-now UKZN)	0
		National Diploma: Public Administration	1(8%)	University of Natal (now UKZN)	3 (23%)
		Master of Clinical Pharmacology	1(8%)	University of South Africa (UNISA)	1 (8%)
		MBChB /DHSM	1(8%)	University of Zululand (UniZulu)	0
		B.Tech.: Library & Information Studies	1(8%)	Other: University of Cape Town University of Pretoria Liverpool University-UK	3 (23%)
		PhD	1(8%)		
		B.Sc. Metallurgy (Hons.)	1(8%)		
Total	**13**	**Total**	**13**	**Total**	**13**

4.2.2.3. Employment of university and UoT graduates/diplomates

Employers were asked to indicate whether their organizations employed traditional university and UoT graduates and diplomates and if so in what positions. All 13 (100%) respondents indicated that they do employ traditional university graduates. Of

the 13 respondents, only one indicated that they do not employ UoT graduates and diplomates. His/Her explanation:

- No particular reason. Most of our graduates are scientists for whom we would insist on either a B.Sc. (Hons.) or M.Sc. There is otherwise no prejudice against technikon (now UoT) graduates/diplomates.

Table 4.10. shows the positions held by graduates and diplomates. Special library employers included in their responses all positions in their organizations and not specifically library positions. Nevertheless, a significant finding here is that there were a larger number of university graduates employed in Librarian positions whilst UoT graduates/diplomates were considered for Library Assistant positions.

Table 4.10.

Positions held by university and UoT graduates and diplomates (according to special library employers)

[N= 13]

Positions	No. of responses for university graduate/diplomate positions	No. of responses for UoT graduate/diplomate positions
Librarian	8 (62%)	4 (31%)
Library Assistant	3 (23%)	5 (38%)
Clerical positions	2 (15%)	3 (23%)
Managerial positions	10 (77%)	5 (38%)
Supervisory positions	7 (54%)	6 (46%)
Other positions for university graduates		**Other positions for UoT graduates and diplomates**
• Authorizations • Dieticians • Geohydrologists • Geologists • Information • Manufacturing • Marketing *(2) • Medical • Nursing • Occupational Therapists • Pharmacists *(2) • Planning & logistics • Quality systems • Regulatory affairs • Scientists *(2) • Social Workers • Technicians		• Analysts • Medical Technologists • Radiographers • Technicians

*(Number of respondents that shared the same response)

While the 'Other' categories show a real 'mixed bag' of positions for traditional university and UoT graduates and diplomates, the LIS related positions show a leaning towards university graduates for senior positions and LIS professional positions.

4.2.2.4. Expertise and qualifications

Special library employers were asked to rank in order of preference (where 1=1st choice, 2=2nd choice, 3=3rd choice, 4=4th choice – where applicable) the expertise and academic qualifications necessary for the efficient functioning of a special library in their organizations. Some respondents only provided rankings for some of the options provided. Two of the 13 (15%) employers did not respond at all. On the whole, there was a very high non-response rate to this aspect of the survey. Table 4.11. presents the responses received.

Table 4.11.

Expertise and academic qualifications in special libraries

EXPERTISE		**1st choice**	**2nd choice**	**3rd choice**	**4th choice**	**No response [N= 13]**
LIS expertise	**[N= 10]**	6 (60%)	2 (20%)	2 (20%)	-	3 (23%)
Subject expertise	**[N= 11]**	2 (15%)	6 (46%)	3 (23%)	-	2 (15%)
Balance of both	**[N= 10]**	3 (30%)	2 (20%)	5 (50%)	-	3 (23%)
ACADEMIC QUALIFICATION						
Matriculation	**[N= 8]**	2 (25%)	1 (13%)	0	5 (63%)	5 (38%)
LIS qualification	**[N= 8]**	3 (38%)	3 (38%)	2 (25%)	0	5 (38%)
Subject specific qualification	**[N= 7]**	1 (14%)	2 (29%)	4 (57%)	0	6 (46%)
LIS & subject specific qualification	**[N= 8]**	3 (38%)	4 (50%)	1 (13%)	0	5 (38%)

Further, employers were asked to provide reasons for their ranking. Nine of the 13 (69%) employers did so. Based on their first preference for expertise and academic qualifications, their reason/s were as follows:

*(Number of respondents that shared similar responses)

EXPERTISE

LIS expertise ranked as 1st choice:

- LIS expertise would ensure a systematic approach. Subject specific expertise would ensure a logical approach. A balance of both is required to perform the information management function of a special library.
- Library has technical information on Engineering Acts.
- This is a technical library that needs knowledge to develop and maintain library systems. Subject expertise is an advantage. *(3)

Subject expertise ranked as 1st choice:

- We are a hospital, so subject knowledge is most important. *(2)

Balance of both LIS expertise and subject expertise ranked as 1st choice:

- This reflects an ideal situation. We have found that LIS expertise does not necessarily enable a librarian to adequately assist users, and subject specific expertise does not necessarily guarantee a well-run library.
- Ideal to have a good balance of subject specific expertise and LIS knowledge. However in the absence of subject specific skills, LIS would be the critical one.

ACADEMIC QUALIFICATIONS

Matriculation ranked as 1st choice:

- Matriculation is a prerequisite. The LIS qualification ensures that the candidates understand the realm of knowledge management. A subject specific qualification contributes quality in terms of output and facilitates critical reasoning skills. A combination of LIS and subject specific qualification contributes to job enrichment and satisfaction.
- Our librarian can be trained in-house to handle the management of the library.

LIS qualification ranked as 1st choice:

- Background knowledge of filing in chronological order in a recognized library system as well as keyword recognition, are important.

- We do consider matriculants for junior positions e.g. Library Assistant, provided they have some library experience. Much better if the candidate has a LIS qualification.
- LIS qualifications are a requirement by our HR department.

Subject specific qualification ranked as 1st choice:

- Librarian would have subject knowledge of the library.

Combination of LIS qualification and subject specific qualification ranked as 1st choice:

- Someone with no 'special' qualification is running our library efficiently. She has learned 'on the job' and does well (just as well as librarians previously employed). Current reality is that matriculation is 1st choice.
- Both are needed in a special library.

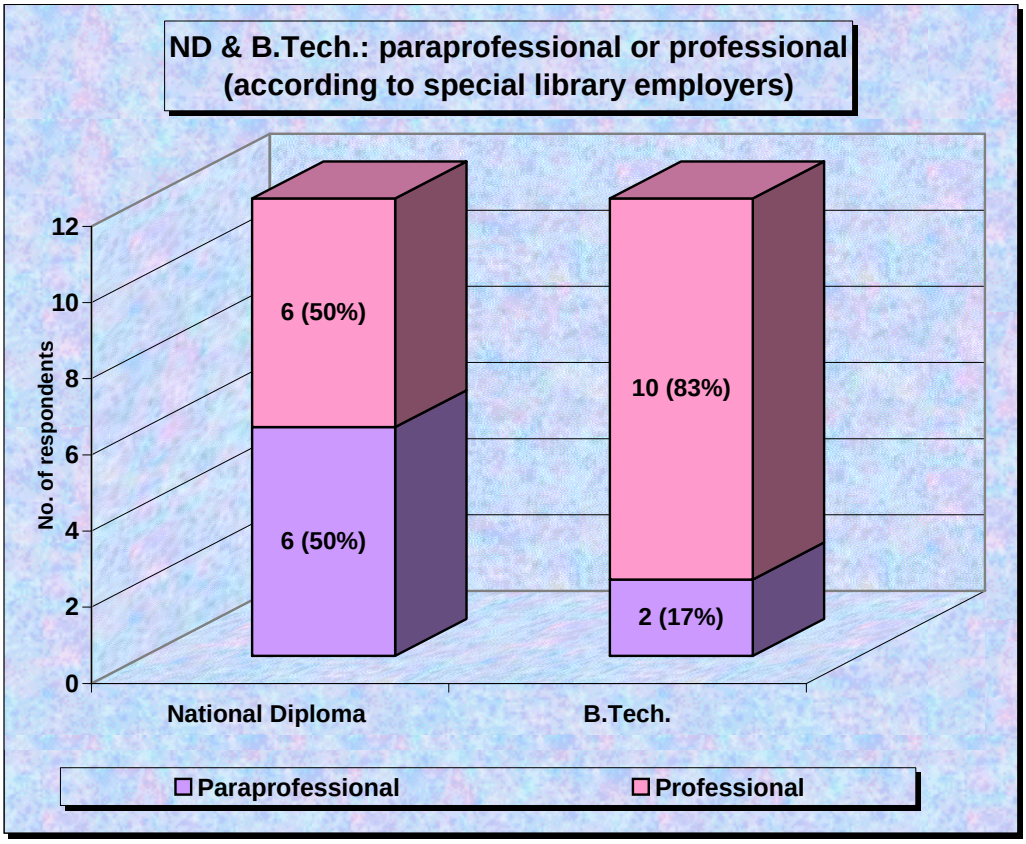
While some respondents reasons for the choice of ranking do not exactly correlate with their ranking what surfaces is: while special library work can be learnt 'on the floor' and financial realities often tempt hiring persons with minimal expertise and qualification, a value added special library service requires a balance of LIS and subject expertise and a combination of LIS and subject specific qualifications.

4.2.2.5. Paraprofessional and professional UoT qualifications

Employers were asked how their organizations categorized the university of technology's National Diploma (ND) and Bachelor of Technology (B.Tech.) qualifications in terms of being paraprofessional or professional qualifications. Twelve of the 13 (92%) employers responded. Ten of the 12 (83%) of employers viewed the B.Tech. as a professional qualification. Interestingly, the ND qualification was seen by six of the 12 (50%) as paraprofessional and the other six (50%) employers categorized it as professional. Figure 4.4. captures this graphically.

Figure 4.4.

[N= 12]



4.2.2.6. Skills and knowledge required from graduates and diplomates

Special library employers were required to indicate the skills and knowledge that their organizations seek from university and UoT graduates and diplomates. Many responses were received regarding skills and knowledge that were required from university and UoT graduates and diplomates. Table 4.12. captures these findings. The findings reveal that employers seek more or less the same skills and knowledge from both university and UoT graduates and diplomates. However, lateral thinking seems to be required more from university graduates. Practical experience is an aspect that employers seek more from UoT graduates and diplomates.

Table 4.12.

Skills and knowledge required from university and UoT graduates/diplomates (according to special library employers) [N= 13]

	No. of respondents			
Skills & knowledge required from…	**University graduates**	**%**	**University of technology graduates/diplomates**	**%**
Ability to apply acquired knowledge	13	100 %	13	100 %
Analytical skills	13	100 %	12	92 %
Computer literacy	13	100 %	13	100 %
Critical thinking	13	100 %	12	92 %
Interpersonal skills	13	100 %	13	100 %
Lateral thinking	10	77 %	9	69 %
Letter & report writing skills	13	100 %	13	100 %
Practical experience	10	77 %	12	92 %
Problem solving skills	13	100 %	13	100 %
Technical skills	13	100 %	13	100 %
Time management skills	13	100 %	12	92 %
Other:				
Ability to work with supervision	1	8 %	1	8 %
Library system skills	1	8 %	1	8 %
Organizational skills	1	8 %	1	8 %
Responsibility and dedication	1	8 %	1	8 %
Safety	1	8 %	1	8 %

4.2.2.7. Skills and knowledge adequacy of university and UoT graduates/diplomates

Special library employers were posed the question as to whether university and UoT graduates and diplomates possess adequate skills and knowledge to perform their job functions. All 13 (100%) employers responded to the university graduates aspect of the question. One employer did not respond to the question with regards to UoT graduates and diplomates possessing adequate skills and knowledge. If they responded **No**, employers were asked to provide reasons for their choice including what skills and knowledge were lacking. Table 4.13. captures these results. The majority of employers responded that university and UoT graduates and diplomates possess adequate skills and knowledge to perform their job functions. However, some employers seem to think that UoT graduates and diplomates are unable to apply their acquired knowledge.

Table 4.13.

Skills and knowledge adequacy of university and UoT gradautes/diplomates (according to special library employers)

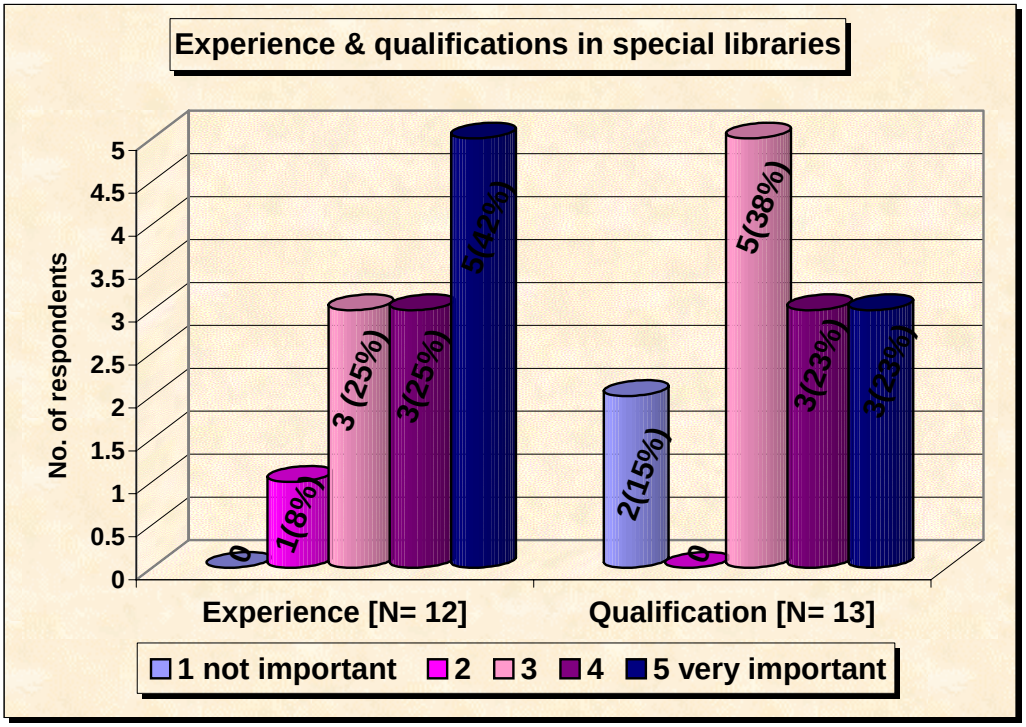
Adequate skills & knowledge of university & UoT graduates/ diplomates		
	University [N= 13]	**UoT [N= 12]**
Yes	10 (77%)	8 (67%)
No	3 (23%)	4 (33%)
What skills & knowledge are lacking?		
[N= 4]		
• Practical skills. Need to learn on the job. *(4)		• Basic technical mathematics • Computer skills • Lateral thinking • Poor report writing • Poor English language skills • Unable to apply acquired knowledge *(3)
Reasons for choice		
• From experience noticed some university graduates cannot generalize and generally lack practical insight		• Don't seem to think for themselves *(3) • Overall quality is declining which is not so with university graduates • Quick to copy & paste

*(Number of respondents that shared similar responses)

4.2.2.8. Experience and qualifications

Special library employers were asked to rate on a 5-point scale (where **1** is **not important** and **5** is **very important**) how important their organizations consider a candidate's work experience and qualifications for a particular position. One of the 13 participants did not respond to the experience aspect of the question. Figure 4.5. captures these results. It seems that experience is regarded as being very important.

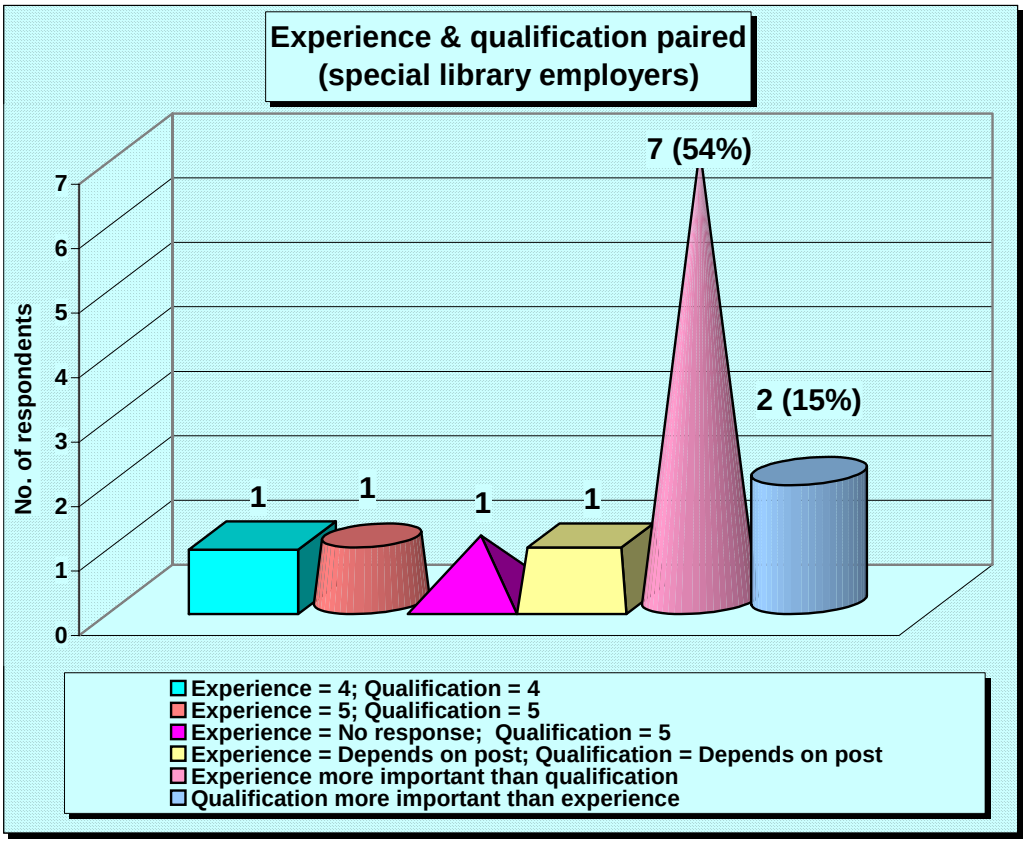
Figure 4.5.



Whilst this was the response to each of the ratings (1-5), the following Figure 4.6. summarizes the findings on experience and qualification paired for each of the 13 respondents. These results reveal that that experience in most cases was seen as more important compared to qualifications.

Figure 4.6.

[N= 13]



Further, respondents were asked to provide reasons for their choice of rating. One of the 13 respondents did not provide an experience rating but commented. Another respondent did not provide reason/s for his/her rating choice of qualification rating. The following tables (4.14. and 4.15.) highlight the reasons behind some respondents' choice of ratings. Special library employers, again, view experience as being very important.

Table 4.14.

Reasons for choice of experience ratings (special library employers)

Experience rating 1-5 and reasons for choice of rating				
1 Not important	**2**	**3**	**4**	**5 Very important**
0	It is important to have experience and possible skills.	Qualification comes before experience. It is easier to orientate someone with a qualification. The work experience that is of value is shown in their previous work experience. *(2) We provide considerable on-the-job training.	Need to combine practical experience with theory. Officials need to commence their duties immediately. Very little time available to train people. Experience is a verification of capacity.	Greater level of our work is skilled requiring insight. The more experience, the more productive. *(5)
No rating by one respondent		It depends on the position in the organization. Sometimes we want people with experience.		

* (Number of respondents that shared similar responses)

Table 4.15.

Reason for choice of qualification ratings (special library employers)

Qualification rating 1-5 and reasons for choice of rating				
1 Not important	**2**	**3**	**4**	**5 Very important**
Knowledge of subject discipline is important. Employee can then be shown how things are done. The minimum qualifications are usually associated with our positions.	0	Qualifications are important and knowledge can be built quickly but it is difficult to teach insight. Qualifications are viewed together with work experience in that the one can boost the other. Qualifications start the experience process. We are willing to train. The minimum requirements for administration posts is matric. But for clinical positions qualifications are imperative.	A lack of technical understanding will force internal training, which takes up valuable time. Candidates' qualifications indicates their ability to apply skills learnt at university or UoT.	Candidates must be suitably qualified for their positions. Need productive staff that need minimum training. Need staff that can register with a professional Council. *(2)

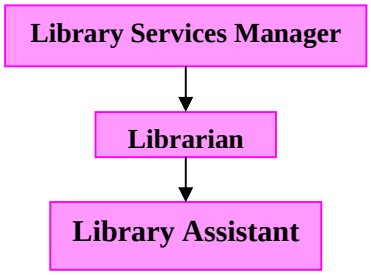
*(Number of respondents that shared similar responses)

4.2.2.9. Organizational structure

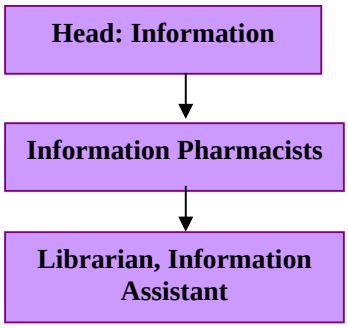
Respondents were asked to attach an organizational structure/organogram of their organizations showing how the various designations are accommodated. Eleven of the thirteen (85%) employers provided organograms either in the space provided in the questionnaire or attached it to the questionnaire. One respondent did not have an organogram because of restructuring and another left the question unanswered. Of those that provided organograms, very few showed the library service structure. Most provided information on other departments excluding the library. Perhaps, this was so because special libraries form part of the support structure of organizations often providing 'behind the scenes' functions. In some cases, the library service is in the

middle or at the bottom of the organizational structure. In one hospital structure, the library is at the same level with other departments reporting to the Hospital Manager. Below are some significant structures to report: the first one below is a familiar library service structure in special, academic or even public libraries. The second is one different to the traditional structure of library staff accommodations. It is one typical of a special library set-up.

(1)



(2)



4.2.2.10. General comments

Respondents were asked to make general comments on issues raised in the questionnaire. Only one significant comment was received.

- We employ less than ten people with tertiary qualifications. Hence it is difficult to make distinctions between university and UoT graduates and diplomates.

4.2.3. Engineering graduates/diplomates survey

The *Survey questionnaire for university and university of technology graduates/diplomates* was also used to target engineering graduates and diplomates in engineering firms in KZN.

4.2.3.1. Distribution and return of questionnaires

The number of questionnaires distributed to engineering graduates and diplomates was 515. One hundred of the 515 questionnaires (19%) distributed to graduates and diplomates in engineering firms were completed and returned. Table 4.16. captures this distribution and return.

Table 4.16.

Distribution to and return of questionnaires from participating engineering firms (graduates/diplomates)

	Engineering firms	No. of graduate/ diplomate questionnaires distributed	No. of questionnaires returned	%	Spoilt
1	Africon	37	12	32%	2
2	Anderson Vogt & Partners	1	0	0	0
3	Arcus Gibb (Pty) Ltd.	14	0	0	0
4	Artwicar Consulting (Pty) Ltd.	2	0	0	0
5	Arup (Pty) Ltd.	8	6	75 %	0
6	Asha Sunker (Pty) Ltd.	1	0	0	0
7	B & A Group (Pty) Ltd.	15	5	33 %	0
8	BCP Engineering (Pty) Ltd.	8	0	0	0
9	BFBA Consultants (Pty) Ltd.	3	0	0	0
10	Bigen Africa	8	0	0	0
11	BKS (Pty) Ltd.	5	0	0	0
12	BVI Consulting Engineers	9	4	44 %	0
13	C.A. Du Toit (EDMS) BPK	1	0	0	0
14	CBI Consulting Engineers (Pty) Ltd.	14	0	0	1
15	Charles Pein & Partners Inc	1	0	0	0
16	CSM Consulting Services (Pty) Ltd.	24	0	0	0
17	CVG Consulting Engineers CC	2	1	50 %	0
18	D.E. Consultants CC	1	1	100 %	0
19	D.P. Barnard & Associates CC	3	0	0	0
20	Davies Lynn & Partners (Pty) Ltd.	2	0	0	0

21	Delca Systems (prev. DE Leuw Cather Emtateni)	12	0	0	0
	Engineering firms	**No. of graduate/ diplomate questionnaires distributed**	**No. of questionnaires returned**	**%**	**Spoilt**
22	Dennis V. Cress & Associates	1	0	0	0
23	Dihlase Consulting Engineers (Pty) Ltd.	5	4	80 %	0
24	DMV Richards Bay	5	0	0	0
25	DPA Specialist Consulting Engineers (Pty) Ltd.	3	0	0	0
26	Drennan Maud & Partners	2	2	100 %	0
27	Duncan Hemingway & Partners	3	0	0	0
28	Elliot Breytenbach & Gray	3	0	0	0
29	Endecon KwaZulu-Natal (Pty) Ltd.	10	0	0	0
30	EVN Africa (Pty) Ltd.	3	2	67 %	0
31	Eyethu Engineers CC	8	3	38 %	0
	Gavin R. Brown & Associates CC	2	0	0	**0**
33	Goba (Pty) Ltd.	50	13	26 %	0
34	Henwood & Nxumalo Consulting Engineers CC	8	1	13 %	0
35	Igoda Projects (Pty) Ltd.	4	2	50 %	0
36	Iliso Consulting Engineers (Pty) Ltd.	22	5	23 %	0
37	Ingerop Africa (PtY) Ltd	8	0	0	0
38	Jeffares & Green (Pty) Ltd.	10	3	30 %	2
39	Kantey & Templer (Pty) Ltd.	3	1	33 %	0
40	Knight Piesold (Pty) Ltd.	6	0	0	0
41	Kwezi V3 Engineers (Pty) Ltd.	4	0	0	0
42	LSC Brunette CC	3	0	0	0
43	Lebone Engineering (Pty) Ltd.	6	0	0	0
44	Lekwa Consulting Engineers (Pty) Ltd.	3	0	0	0
45	Liebenberg Jenkins & Vennote Ing	3	0	0	0
46	Madan Singh & Associates CC	6	0	0	0
47	Mahesh Khoosal & Associates CC	2	1	50 %	0
48	MAP Africa Consulting Engineers (prev. MPA Africa…)	3	3	100 %	0
49	MBB Consulting Engineers Inc	10	0	0	0
50	MMC Engineers	2	0	0	0
51	Moore Spence Jones (Pty) Ltd.	15	0	0	0
52	Ndawonye Networks CC	2	0	0	0
53	Ninham Shand (Pty) Ltd.	6	0	0	0
54	Palace Engineering Services	1	0	0	1
55	P.D. Naidoo & Associates (Pty) Ltd.	1	0	0	0
56	Raws (prev. GFK Consulting	3	0	0	0

	Engineers CC)				
57	RCE Consulting Engineers	6	0	0	0
	Engineering firms	**No. of graduate/ diplomate questionnaires distributed**	**No. of questionnaires returned**	**%**	**Spoilt**
58	RPP Consulting Engineers	2	0	0	0
59	Saunders & Wium Trust	7	0	0	0
60	Sivest SA-(Pty) Ltd.	20	2	10 %	1
61	SKC Engineers Coastal Division	1	1	100 %	0
62	SKP Engineers CC	3	1	33 %	0
63	SMA Consultants CC	3	0	0	0
64	SNA Civil & Development Engineers (EDMS) BPK	8	2	25 %	0
65	Sookan & Associates CC	1	1	100 %	0
66	Spoormaker & Partners Incorporated	3	2	67 %	0
67	SRK Consulting	10	4	40 %	0
68	Stewart Scott Inc. (Pty) Ltd. (SSI (Pty) Ltd.)	4	0	0	0
69	Sukuma Consulting Engineers (Pty) Ltd.	3	1	33 %	0
70	Thekwini Geocivils CC	4	2	50 %	0
71	Tobbell Stretch & Associates	2	1	50 %	0
72	Ulungeni CC	3	0	0	0
73	UWP Consulting (Pty) Ltd.	4	0	0	0
74	Vawda Engineers CC	3	0	0	0
75	Vela VKE Engineers	1	1	100 %	0
76	Vigar and Associates Cc	5	2	40 %	0
77	Vishnu Ulassi & Associates CC	2	0	0	0
78	WSP Consulting Engineers SA (Pty) Ltd.	15	5	33 %	0
79	Young & Satharia	7	0	0	0
80	Zai Consultants CC	1	0	0	0
~	Anonymous responses		8		1
	Total	**515**	**100**	**19%**	**8**

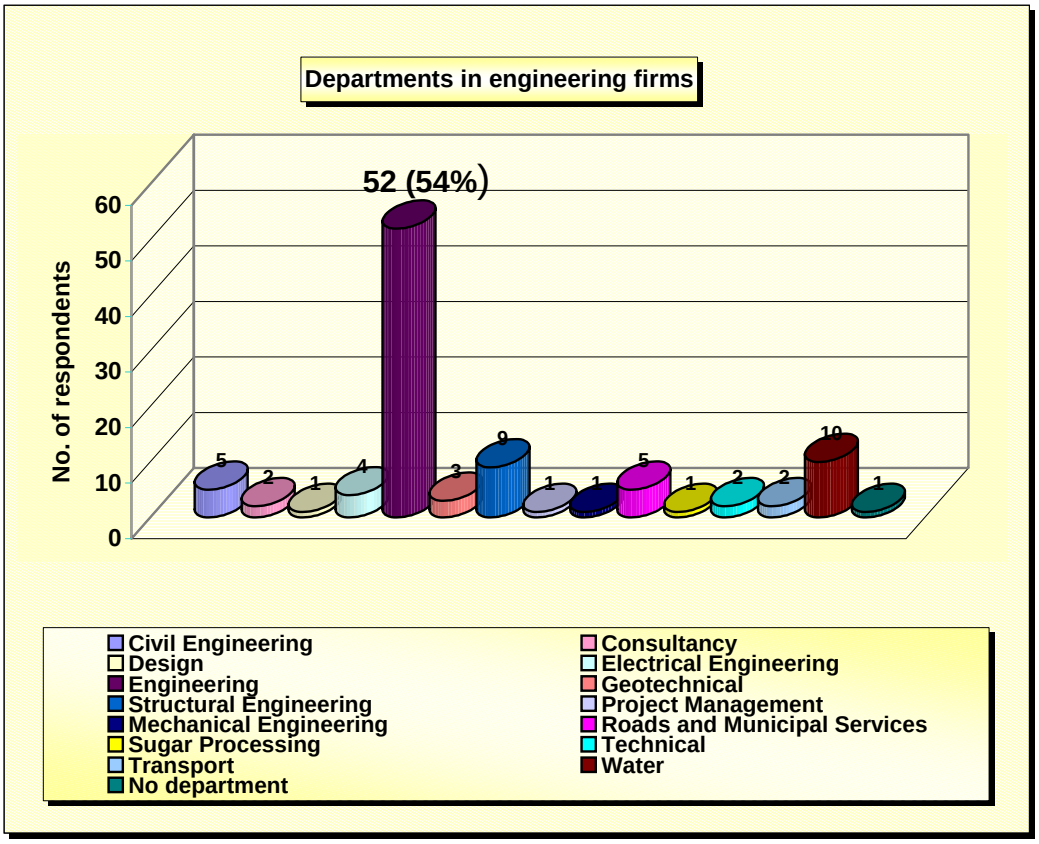
~ = Respondents did not specify the organizations that they were employed in

4.2.3.2. Departments

University and UoT engineering graduates and diplomates were asked to indicate the departments they are currently employed in. Ninety-nine of the 100 responded to this question. One respondent of the 99 responses indicated that “there is no department” in his/her organization. Figure 4.7. reflects the various responses. A little more than half of the respondents (54%) indicated their department to be Engineering with a scattering of responses selecting various specializations of Engineering, such as, Civil Engineering, Mechanical Engineering, etc.

Figure 4.7.

[N= 99]



4.2.3.3. Job titles/designations of and highest academic qualifications obtained by graduates/diplomates

Graduates and diplomates were asked to state their current job designations and their highest academic qualifications obtained. These findings are captured in Table 4.17. Thirty-seven of the 100 respondents (37%) indicated that they held the university B.Sc Engineering qualification. Thirty-two of the 37 respondents (86%) with the university B.Sc qualification held the position of Engineer. Thirty-one of the 100 respondents (31%) held the UoT National Diploma: Engineering qualification and the job title/designation of Engineering Technician. Twenty of the 100 respondents (20%) held a B.Tech.: Engineering qualification from the UoT. There was a significant number (14%) of these B.Tech.: Engineering graduates who held the job title Engineering Technologist. This consistency between qualification and job titles is notable.

Table 4.17.

Job titles/designations and qualifications of engineering graduates/diplomates

Job title/Job designation	Highest academic qualification						%
	National Diploma: Engineering	B.Tech.: Engineering	B.Sc. Engineering	T4: Engineering	Other	Total	[N= 100]
Engineering Manager	0	2 (40%)	3 (60%)	0	0	**5**	5%
Engineer	0	1 (3%)	32 (94%)	0	4 (12%)	**34**	34%
Engineering Technologist	0	14 (88%)	0	1 (6%)	1 (6%)	**16**	16%
Engineering Technician	31 (86%)	2 (6%)	0	2 (6%)	0	**35**	35%
Other	1 (10%)	1(10%)	2 (20%)	1 (10%)	2 (20%)	**10**	10%
Total	**32**	**20**	**37**	**4**	**7**	**100**	**100%**

The **'Other'** job titles/job designations indicated by respondents included:

* (Number of respondents that had the same job title)

- Candidate Engineer
- Engineering Geologist *(2)
- Graduate Engineer *(2)
- Project Manager *(3)
- Trainee Engineer

The **'Other'** qualifications indicated by respondents included:

* (Number of respondents that had the same qualifications)

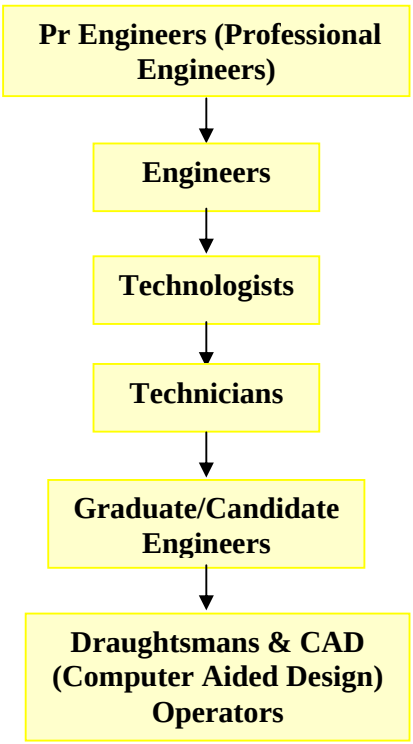
- M.Sc. Engineering *(2)
- Masters Diploma in Technology
- B.Sc. (Hons.) *(2)
- N. Eng.
- National Certificate for Engineers

4.2.3.4. Location of current positions in the organizational structures of the organizations

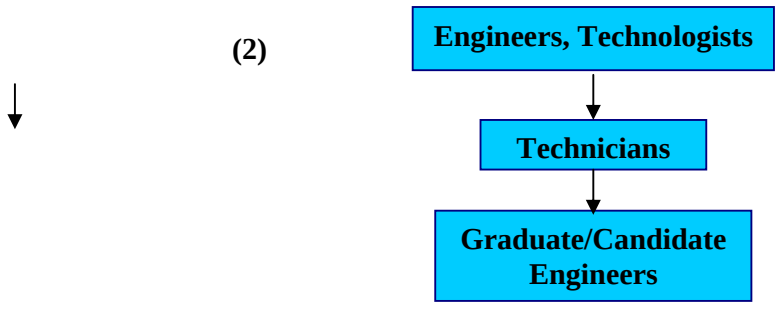
Respondents were asked to indicate where their current positions are located in terms of the organogram/organizational structure of the organizations they are employed in.

Seventy-two of the 100 respondents (72%) responded. Twenty-eight did not respond. Two (2%) of the seventy-two respondents indicated that their organizations do not currently have organograms. It is evident that senior management is generally made up of Engineers. UoT diplomates (generally Technicians) follow at the bottom of the organogram with other technical support staff below them. The B.Tech. graduates (generally Technologists) are on the same level as the Engineers with the B.Sc. Although organograms varied from organization to organization, typical organizational structures accommodating university and UoT engineering graduates and diplomates can be shown as follows:

(1)



(2)



4.2.3.5 Institutions highest academic qualifications obtained from

Engineering staff was asked from which higher education institution did they obtain their highest academic qualifications. Table 4.18. illustrates this together with current job titles. A significant number of the 100 graduates and diplomates (58%) came from the UoT and the technikon (now a UoT). Twenty UoT graduates/diplomates (20%) held the position of Engineering Technician. Fifteen university graduates (15%) occupied the position of Engineer. Hence it seems that university graduates tend to fill Engineer positions.

Table 4.18.

Institutions highest academic qualifications obtained from (engineering graduates/diplomates) [N= 100]

Institution	Job title/designation						
	Engineering Manager	Engineer	Engineering Technologist	Engineering Technician	Other	Total	%
Durban University of Technology (DUT)	0	1	10	20	1	**32**	**32 %**
M.L. Sultan Technikon (now DUT)	0	0	1	2	0	**3**	**3 %**
Mangosuthu Technikon (now Mangosuthu University of Technology (MUT))	0	0	0	6	1	**7**	**7 %**
Natal Technikon (now DUT)	2	0	4	4	0	**10**	**10 %**
Technikon South Africa (TSA- now UNISA)	0	0	0	0	0	**0**	**0**
University of Durban-Westville (UDW-now UKZN)	0	0	0	0	0	**0**	**0**
University of KwaZulu-Natal (UKZN)	0	7	0	0	2	**9**	**9 %**
University of Natal (now UKZN)	1	15	0	0	2	**18**	**18 %**
University of South Africa (UNISA)	0	0	0		0	**0**	**0**
University of Zululand (UniZulu)	0	0	0	0	0	**0**	**0**
Other	2	10	1	3	4	**20**	**20 %**
No response	0	1	0	0	0	**1**	**1 %**
Total	**5**	**34**	**16**	**35**	**10**	**100**	**100 %**

The **'Other'** institutions indicated by respondents were:

*(Number of respondents that indicated the same institution)

- NUST (National University of Science & Technology-Zimbabwe)
- Pretoria Technikon (now Tshwane University of Technology)
- Salisbury Polytechnic (Zimbabwe)
- University of Cape Town *(5)
- East London Campus of Rhodes University (now University of Fort Hare)
- University of North West (now North West University)
- University of Pretoria *(4)
- University of Stellenbosch *(2)
- Vaal University of Technology
- Wits Technikon *(3) (now University of Johannesburg)

4.2.3.6. Year highest qualifications obtained, time period in current positions and promotion details

Respondents were asked to indicate the year they obtained their highest academic qualifications, the time period they have occupied their current positions in the organization and whether they have gained promotion/s. One participant did not respond to these issues. Twenty-five of the 99 respondents (25%) secured promotions in their organizations. The remaining 75% (74) graduates and diplomates did not gain any promotions. Table 4.19. captures these findings. Engineering Technologists and Engineering Technicians with UoT qualifications seemed to have gained the most promotions in their organization. It is also evident that engineering firms seem to be appointing a lot of employees that have graduated from 2001 onwards. Some respondents have held their current positions for many years and have not secured promotions. Hence, promotions seem to be independent of the year qualifications are obtained or number of years in the position.

Table 4.19.

Year highest qualifications obtained, time period in current positions and promotion details (engineering graduates/diplomates)

University/UoT graduate/diplomate	Job title/Job designation	Year qualification obtained	Number of years in current position	Secured promotion/s
University *(3) **UoT *(2)**	Engineering Manager *(5)	1978 1988 *(2) 2000 2004	1-5 *(3) 6-10 16-20	Yes *(5) No (0)
University *(32) **UoT *(1)** **No response *(1)**	Engineers *(34)	1987 1990 1993 1994 1995 1998 *(2) 2000 2001 *(2) 2002 *(5) 2003 *(2) 2004 *(4) 2005 *(6) 2006 *(3) 2007 *(3) 2008	Under 12 months *(10) 1-5 *(19) 6-10 *(4) 16-20	Yes *(2) No *(8) Yes *(2) No *(16) No response (1) Yes *(0) No *(4) Yes (0) No (1)
University (0) **UoT *(16)**	Engineering Technologists *(16)	1988 1996 *(2) 1998 *(2) 1999 (1) 2005 *(3) 2006 *(3) 2007 *(4)	Under 12 months *(2) 1-5 *(10) 6-10 *(2) 11-15 *(1) 16-20	Yes (1) No (1) Yes *(6) No *(4) Yes (0) No *(2) Yes (0) No (1) Yes (0) No (1)
University *(0) **UoT *(35)**	Engineering Technician *(35)	1977 1986 1991 1996 1998 *(2) 2001 2002 *(2) 2003 *(2) 2004 *(2) 2005 *(5) 2006 *(4) 2007 *(9) 2008 *(4)	Under 12 months *(11) 1-5 *(17) 6-10 *(3) 11-15 *(2) 21-25 Other: 26 years	Yes (0) No *(11) Yes (4) No *(13) Yes (1) No *(2) Yes (0) No *(2) Yes (1) No (0) Yes (0) No (1)
University *(6) **UoT *(4)**	Other *(10)	1977 1984 1990 1996 2001 2006 *(2) 2007 *(2) 2008	Under 12 months *(2) 1-5 *(7) 11-15	Yes (0) No *(2) Yes *(2) No *(5) Yes (1) No (0)

*(Number of respondents that shared the same response)

Those graduates and diplomates who responded **No** to securing promotions were asked to list the core responsibilities/job functions of their current positions. If they answered **Yes**, they were asked to indicate their previous job designation/s and current job designation and the job functions of their previous and current job designations. The results of these two questions were compared. Respondents that responded **Yes** they did secure promotions, revealed changes in job titles such as from Trainee Technician to Technician or Technologist, Engineer to Manager, etc. An evident trend is that job functions of majority of the respondents seem to have not changed drastically. Rather they remained the same or there were a few added responsibilities attached with the new position. A significant change was only reflected in their status (change in job title).

4.2.3.7. Current job functions of university and UoT graduates/diplomates

Engineering graduates and diplomates were asked to list the core responsibilities/job functions of their current positions. Three of the 100 respondents (3%) did not provide details of their current job functions. The current job functions of respondents were compared in terms of them being university and UoT graduates/diplomates and further with regards to their respective qualifications. A summary of job functions among graduates and diplomates is provided in Table 4.20. Project management and design are common engineering functions performed by both types of higher education graduates and diplomates irrespective of their qualifications. While there are a significant number of graduates and diplomates performing project management and design tasks, other job functions too seem to be overlapping between university and UoT graduates and diplomates. There were only a handful of tasks performed either by university or UoT graduates and diplomates.

Table 4.20.

Common job functions between university and UoT engineering graduates and diplomates

Common job functions	University graduates	UoT graduates/diplomates	Total
Computer Aided Design (CAD) operation	1 (Other)	1 (ND)	2
Client liaison	7 (5 B.Sc., 1 Other)	7 (3 ND, 4 B.Tech.)	14
Contract administration	1 (B.Sc.)	8 (4 ND, 2 B.Tech, 1 T4, 1 Other)	9
Coordinator/Project leader	0	5 (1 ND, 3B.Tech, 1 Other))	5
Cost Management	5 (4 B.Sc., 1 Other)	5 (4 ND, 1 B.Tech.)	9
Data gathering & filing of information	2 (2 B.Sc)	0	2
Debtor management	0	1 (B.Tech)	1
Design	32 (27 B.Sc., 5 Other)	40 (18 ND, 15 B.Tech., 5 T4, 2 Other)	72
Detailing	2 (Other)	6 (4 ND, 2 B.Tech)	8
Documentation	2 (B.Sc.)	3 (B.Tech)	5
Draughting	1(B.Sc.)	8 (ND)	7
Equipment control	0	2 (1 ND, 1 T4)	2
IT management	1 (B.Sc.)	0	1
Mapping & analysis	2 (B.Sc.)	1 (ND)	3
Marketing	1 (B.Sc.)	2 (B.Tech.)	3
Mentorship	1 (B.Sc.)	0	1
Modeling	2(B.Sc.)	1 (ND)	3
Ordering payment	1 (B.Sc.)	0	1
Payment certificates	0	2 (1 ND, 1T4)	2
Project management	12 (10 B.Sc., 2 Other)	17 (9 B.Tech., 2 T4, 4 ND, 2 Other)	29
Project planning	1 (B.Sc.)	1 (B.Tech.)	2
Proposals	1 (Other)	2 (B.Tech.)	1
Quality control	0	5 (3 ND, 2 T4)	5
Report compilation	5 (4 B.Sc., 1 Other)	6 (3 ND, 3 B.Tech.)	11
Site supervision	7 (4 B.Sc., 3 Other)	11(6 ND, 4 B.Tech., 1 T4)	18
Staff supervision & delegation	2 (1B.Sc., 1Other)	5 (B.Tech.)	7
Staff training	0	2 (B.Tech.)	2
Visual assessment & reviewing	0	2 (B.Tech.)	2

Other = other qualifications as listed in 4.2.3.3.

4.2.3.8. Paraprofessional or professional

Paraprofessional or professional were terms given as options to engineering graduates/diplomates to describe the way their current positions are viewed by their organizations. Two respondents (2%) did not respond to this item. The other 98 out of the 100 (98%) responded. Majority of graduates and diplomates (76%) indicated that their organizations consider their qualifications obtained as professional. These results are presented in Table 4.21. Eighty-two percent (82%) of university B.Sc.

Engineering graduates responded that their qualifications are seen as professional by their organizations. Sixty-five percent (65%) of ND diplomates also responded that their qualifications are viewed as professional. A significant finding is that 80% of B. Tech.: Engineering graduates from the UoTs responded that their organizations view their qualifications as professional. It would be interesting to see if this is a view held by engineering firm employers as well (triangulated later).

Table 4.21.

Paraprofessional or professional (engineering graduates/diplomates)

[N= 98]

Academic qualification	Paraprofessional	Professional	Total
B.Sc. Engineering	6 (18%)	28 (82%)	34
B.Tech.: Engineering	4 (20%)	16 (80%)	20
T4: Engineering	1 (25%)	3 (75%)	4
ND: Engineering	11 (35%)	20 (65%)	31
Other	2 (22%)	7 (78%)	9
Total	**24 (24%)**	**74 (76%)**	**98**

4.2.3.9. Skills and knowledge

University and UoT graduates and diplomates were asked whether the skills and knowledge acquired via their highest academic qualifications were adequate in equipping them to perform their current job functions. One of the 100 respondents did not respond to this question. The other 99 (99%) responses are reflected in Table 4.22. The majority of the respondents (83%) felt their skills and knowledge acquired were adequate in equipping them to perform their current job functions.

Table 4.22.

Adequacy of skills and knowledge acquired (engineering graduates/diplomates)

[N=99]

Academic qualification	Yes	No	Total
B.Sc. Engineering	30 (88%)	4 (12%)	34
B.Tech.: Engineering	16 (84%)	3 (16%)	19
T4: Engineering	1 (25%)	3 (75%)	4
ND: Engineering	29 (91%)	3 (9%)	32
Other	6 (60%)	4 (40%)	10
Total	**82 (83%)**	**17 (17%)**	**99**

The 60% of graduates/diplomates with '**Other**' qualifications that responded **Yes** when asked whether their skills and knowledge acquired via their highest academic qualifications were adequate had the following qualifications:

*(Number of respondents that shared the same response)

- B. Eng. *(2)
- B.Sc. Engineering (Hons.)
- M.Sc. Engineering *(2)
- N. Eng.

The remaining 40% of graduates/diplomates with **'Other'** qualifications that responded **No** when asked whether their skills and knowledge acquired via their highest academic qualifications were adequate had the following qualifications:

- B. Eng.
- B.Sc. Engineering (Hons.)
- National Certificate for Engineers
- National Diploma of Technology

Respondents who answered that their skills and knowledge were not adequate in equipping them to perform their current job functions, were required to list the skills and knowledge that their qualifications did not equip them with. If they replied positively they were asked to explain their response but unfortunately many did not. The following were some of the significant responses captured:

*(Number of respondents that shared similar responses)

B.Sc. Engineering is adequate

- It needs to be supplemented with on-the-job experience.
- Provides problem-solving abilities. *(2)
- Application of analytical thinking. *(2)
- Application of principles learnt in tertiary institution. *(5)
- Equipped me to perform my job functions as they have improved my ability to develop more skills and to acquire new technology.
- Equips one to work under pressure.
- The working environment, however, is one that requires continuing professional development. *(3)
- Courses completed are adequate introduction to the working environment in terms of basic information required. *(2)

B.Sc. Engineering is inadequate

- No tertiary qualification can equip you for your profession. “Continuing professional development occurs till death.” *(2)
- Technological methods were lacking.
- Lack of practical experience during undergraduate studies. Previous experience was necessary for my current position. *(2)

B.Tech.: Engineering is adequate

- A large amount of in-depth skills developed is used in day-to-day applications. The background is relevant to my current work experience. *(4)
- My skills and knowledge require extreme professionalism.
- The system of alternate study/work periods greatly helps to gain good experience in short time intervals.

B.Tech.: Engineering is inadequate

- Advanced education after B.Tech. is incomplete. But courses done to date have been helpful. *(2)
- Management, financials, invoicing to clients, sub-consultant agreements were lacking.

T4: Engineering is adequate

- Provides communication and people skills necessary to manage project teams. *(2)
- Provides computer skills, design packages, control systems programming, project management, control systems design, engineering of control systems equipment, leadership, reporting skills.

T4: Engineering is inadequate

- Nil response.

ND: Engineering is adequate

- Cannot be taught everything by attending a tertiary institution. Qualification puts one in a position to undertake certain responsibilities.
- Experience is, however, vital. *(2)
- My qualification equipped me with adequate knowledge to perform my job functions. *(2)
- Skills and knowledge acquired that have been helpful include problem solving, communication, analytical skills, life skills, discipline, working hard to be innovative, design and theory.
- Skills and knowledge require extreme professionalism.

ND: Engineering is inadequate

- Falls short on designing. *(2)
- Needs more working on site, draughting skills and also to be able to analyze quickly without hesitation.

Other: (B. Eng., B.Sc. Engineering (Hons.), M.Sc. Engineering *(2), N. Eng., Adequate

- Skills and knowledge are sufficient but not for me to progress nor for the company to progress through me.
- University teaches one to think, gather information and apply it. This is imperative in real world engineering where every problem is unique.

- I have most of the technical knowledge I need. Experience helps but no learning institution can give you experience.

Other: (B. Eng., B.Sc. Engineering, National Diploma for Engineers, Masters Diploma in technology)

Inadequate

- Needs more practical report writing skills, management skills, contract administration.
- Qualification gave only basic knowledge in design and how to solve problems. *(2)
- This is a different discipline to that of my qualification. Experience is gained on the job.

4.2.3.10. Further training

Engineering respondents were asked whether they required further training in their current positions. If they did, they were also posed the question regarding what training they required and who provided the required training. One of the 100 respondents did not answer this question. There were 59 (60%) university and UoT graduates and diplomates that found they required training whilst in their current positions. The remaining 40 (40%) respondents did not. These results are captured in Table 4.23. Many university graduates needed training on designing, which is a major function in engineering firms. However, UoT graduates and diplomates were required to study further.

Table 4.23.

Further training (engineering graduates/diplomates)

[N= 99]

Graduates/ Diplomates	Did graduates/diplomates require further training			
	YES	**What Training?**	**NO**	**Total**
University	25 (25%)	• Acquire new skills & knowledge*(4) • Design *(7) • Draughting • Further studying*(2) • Internal organization training *(2) • Modeling • New technology *(2) • Plant operating • Project management *(3) • Road drainage • Software training*(3) • Structures	17 (17%)	42 (42%)
University of technology	34 (34%)	• Auto Computer Aided Design *(2) • Basic control tools • Company procedures • Contract administration • Contract law management • Control systems programming • Design *(3) • Design ducts, seminars & courses *(2) • Drawing packages • Electrification • Fault calculations and level • Further studying*(6) • Informal job training • Latest technology *(2) • Load calculations • Management • Microstation • Model maker training *(5) • Office software packages *(2) • Project management *(5) • Proposal work • Report writing *(3) • Software and equipment selection *(2) • Using programmes and packages *(2)	23 (23%)	57 (57%)
Total	**59 (59%)**	**Who provided the training?**	**40 (40%)**	**99 (99%)**
Majority of the training was done in-house by managers, supervisors, directors and colleagues. External training was done by: • Graphical Engineering System Solutions (GESS) • South African Association for Civil Engineers (SAACE) • South African Institute for Civil Engineers (SAICE) • Magnet (Consultants) • Lukanji Technology (Consultants)				

*(Number of respondents that required similar training)

4.2.3.11. Opportunities ahead

Respondents were asked whether with their current qualifications there were opportunities for them to move up in their organizations. Two of the 100 respondents (2%) did not respond to this question. Almost three quarters of the 98 respondents, (73 - 74%) saw job opportunities ahead in their current organizations. Twenty-five (26%) of the graduates/diplomates responded **No** to this item. Those that indicated opportunities ahead explained as follows:

*(Number of respondents that shared similar responses)

- With more work experience. *(24)
- With further qualification. *(8)
- Register for professional status (through registering with ECSA-professional engineering body). *(12)
- Promotion would be based on job performance. *(11)
- Senior management may be a possibility. Potentially senior management/partner/director. *(17)
- Although there is a lot of competition but definitely B.E.E. (Black Economic Empowerment) will really help to crack to the top. *(2)
- Can certainly move from Engineer/Technician to Project Leader. *(2)
- It has nothing to do with my qualification but rather with the structure of the company.

There seems to be much scope for upward mobility in the engineering discipline. A significant number of respondents indicated that with either experience, further studies and professional registration or a combination of the above, they can move up in the organization.

Those that indicated **No** when asked whether with their current qualifications there were opportunities for them to move up in the organization, provided the following responses:

*(Number of respondents that shared similar responses)

- Already in charge of structural department. I only have to answer to the Engineer.
- Limited advancement in a small firm. There is no middle management implemented. All employees fall under the Directors. *(6)

- Just cannot see a way to move up. *(2)
- Believe that I need more knowledge, education and experience in order to grow in the organization. *(2)
- Maybe in another organization.
- Would have to acquire my B.Tech. degree to be able to gain promotion to manager's position. *(3)
- Need to register with ECSA (Engineering Council of South Africa) before I will be considered. *(5)
- Partnerships are reserved for graduates.
- There still exists a stigma against qualifications obtained at technikons (now UoTs).
- Too many Senior Engineers above me.

Some of these graduates and diplomates seems to indicate that the make-up of the firm limits their upward movement in the organization. Some engineering firms are consultancy firms, which are very small. Hence, the very nature of these firms do not allow for promotions.

4.2.3.12. Further comments

Respondents were asked to make any further comments regarding the issues raised in the questionnaires. Seven of the 100 respondents (7%) commented. Their comments included:

*(Number of respondents that shared similar responses)

- Bridge the gap between theory and practice in industry. *(2)
- Curriculum offered by technikons should be reviewed. There could be courses to elevate B.Tech. to B.Sc. qualification. *(2)
- I am not sure what challenges the LIS profession faces but something that assists in engineering is to develop and implement quality systems.
- Believe that the Mechanical Engineering diploma should be more rigorous in providing knowledge to students so that they can branch off into any mechanical engineering field with confidence.
- Qualification only gives basic knowledge but most knowledge comes from experience. There is not enough done to teach management skills or contract administration.

4.2.4. Engineering employers survey

The *Survey questionnaire for employers* was also used to target engineering employers in engineering firms in KZN.

4.2.4.1. Distribution and return of questionnaires

The number of questionnaires distributed to engineering employers was 140. Of this set of questionnaires distributed, 40 questionnaires (29%) were completed and returned. Table 4.24. captures this distribution and return of questionnaires

.

Table 4.24.

Distribution to and return of questionnaires from participating engineering firms (employers)

	Engineering firms	No. of employer questionnaires distributed	No. of questionnaires returned	%	Spoilt
1	Africon	2	1	50 %	0
2	Anderson Vogt & Partners	2	0	0	0
3	Arcus Gibb (Pty) Ltd.	2	0	0	0
4	Artwicar Consulting (Pty) Ltd.	1	0	0	0
5	Arup (Pty) Ltd.	1	1	100 %	0
6	Asha Sunker (Pty) Ltd.	1	0	0	0
7	B & A Group (Pty) Ltd.	2	2	100 %	0
8	BCP Engineering (Pty) Ltd.	2	1	50 %	0
9	BFBA Consultants (Pty) Ltd.	2	0	0	0
10	Bigen Africa	1	0	0	0
11	BKS (Pty) Ltd.	2	0	0	0
12	BVI Consulting Engineers	1	0	0	0
13	CA Du Toit (EDMS) BPK	1	0	0	0
14	CBI Consulting Engineers (Pty) Ltd.	2	1	50 %	0
15	Charles Pein & Partners Inc	2	0	0	0
16	CSM Consulting Services (Pty) Ltd.	2	0	0	0
17	CVG Consulting Engineers CC	1	1	100 %	0
18	D.E. Consultants CC	2	1	50 %	0
19	D.P. Barnard & Associates CC	2	0	0	0
20	Davies Lynn & Partners (Pty) Ltd.	1	0	0	0
21	Delca Systems (prev. DE Leuw Cather Emtateni)	1	0	0	0
22	Dennis V. Cress & Associates	1	0	0	0
23	Dihlase Consulting Engineers (Pty) Ltd.	1	1	100 %	0
24	DMV Richards Bay	1	0	0	0
25	DPA Specialist Consulting Engineers (Pty) Ltd.	2	0	0	0
26	Drennan Maud & Partners	3	1	33 %	0

	Engineering firms	No. of employer questionnaires distributed	No. of questionnaires returned	%	Spoilt
27	Duncan Hemingway & Partners	1	1	100 %	0
28	Elliot Breytenbach & Gray	1	0	0	0
29	Endecon KwaZulu-Natal (Pty) Ltd.	3	1	33 %	0
30	EVN Africa (Pty) Ltd.	2	0	0	0
31	Eyethu Engineers CC	2	1	50 %	0
32	Gavin R. Brown & Associates CC	2	1	50 %	0
33	Goba (Pty) Ltd.	2	2	100 %	0
34	Henwood & Nxumalo Consulting Engineers CC	2	0	0	0
35	Igoda Projects (Pty) Ltd.	2	2	100 %	0
36	Iliso Consulting Engineers (Pty) Ltd.	2	0	0	0
37	Ingerop Africa (PtY) Ltd	1	0	0	0
38	Jeffares & Green (Pty) Ltd.	2	2	100 %	0
39	Kantey & Templer (Pty) Ltd.	1	0	0	0
40	Knight Piesold (Pty) Ltd.	1	0	0	0
41	Kwezi V3 Engineers (Pty) Ltd.	3	0	0	0
42	LSC Brunette CC	2	2	100 %	0
43	Lebone Engineering (Pty) Ltd.	2	0	0	0
44	Lekwa Consulting Engineers (Pty) Ltd.	2	0	0	0
45	Liebenberg Jenkins & Vennote Ing	1	0	0	0
46	Madan Singh & Associates CC	3	0	0	0
47	Mahesh Khoosal & Associates CC	1	1	100 %	0
48	MAP Africa Consulting Engineers (prev. MPA Africa…)	3	1	33 %	2
49	MBB Consulting Engineers Inc	2	0	0	0
50	MMC Engineers	3	0	0	0
51	Moore Spence Jones (Pty) Ltd.	2	0	0	0
52	Ndawonye Networks CC	1	0	0	0
53	Ninham Shand (Pty) Ltd.	2	0	0	0
54	Palace Engineering Services	2	2	100 %	0
55	P.D. Naidoo & Associates (Pty) Ltd.	1	0	0	0
56	Raws (prev. GFK Consulting Engineers CC)	2	0	0	0
57	RCE Consulting Engineers	2	0	0	0
58	RPP Consulting Engineers	1	1	100 %	0
59	Saunders & Wium Trust	2	0	0	0
60	Sivest SA-(Pty) Ltd.	1	1	100 %	0
61	SKC Engineers Coastal Division	1	1	100 %	0
62	SKP Engineers CC	1	1	100 %	0
63	SMA Consultants CC	1	0	0	0
64	SNA Civil & Development Engineers (EDMS) BPK	2	1	50 %	0
65	Sookan & Associates CC	1	1	100 %	0
66	Spoormaker & Partners Incorporated	1	1	100 %	0
67	SRK Consulting	2	0	0	0
68	Stewart Scott Inc. (Pty) Ltd. (SSI (Pty) Ltd.)	1	0	0	0

	Engineering firms	No. of employer questionnaires distributed	No. of questionnaires returned	%	Spoilt
69	Sukuma Consulting Engineers (Pty) Ltd.	2	1	50 %	0
70	Thekwini Geocivils CC	3	3	100 %	0
71	Tobbell Stretch & Associates	1	1	100 %	0
72	Ulungeni CC	2	0	0	0
73	UWP Consulting (Pty) Ltd.	8	1	13 %	0
74	Vawda Engineers CC	1	0	0	0
75	Vela VKE Engineers	1	0	0	0
76	Vigar and Associates Cc	1	1	100 %	0
77	Vishnu Ulassi & Associates CC	2	0	0	0
78	WSP Consulting Engineers SA (Pty) Ltd.	2	0	0	0
79	Young & Satharia	3	0	0	0
80	Zai Consultants CC	1	0	0	0
	Total	**140**	**40**	**29 %**	**2**

4.2.4.2. Job titles/designations, highest academic qualifications and institutions qualifications obtained from

Employers were asked to provide their job titles/designations, their highest academic qualifications and the institutions from which they obtained these qualifications. Two of the 40 respondents (5%) left certain items blank (one did not provide his/her job title whilst the other did not name the institution from which he/she obtained the qualification). Table 4.25. shows these findings. More than half of the employers held the position of Director. A significant number of employers held the B.Sc. Engineering qualification. Many employers come from traditional universities.

Table 4.25.

Job titles/designations, academic qualifications and institutions qualifications obtained from (engineering employers)

Job title/ designation	No. of Respondents	Academic qualification	No. of Respondents	Institution qualification obtained from	No. of Respondents
Director	26	Advanced Business Programme, National Higher Diploma	1	Durban University of Technology (DUT)	2
Deputy Director	1	B. Eng.	4	M.L.Sultan technikon (now DUT)	1
Divisional Manger: Engineering	4	B. Eng. B.Com.	1	Mangosuthu Technikon (now Mangosuthu University of Technology (MUT))	1
Manager: Scientific Services	0	B. Eng. MBL (Masters in Business Law)	1	Natal Technikon (now DUT)	3
Human Resources Manager	2	B.Sc. Engineering	12	Technikon South Africa (TSA- now UNISA)	0
Other	6	B.Sc. Engineering B.Com.	1	University of Durban-Westville (UDW-now UKZN)	4
No response	1	B.Sc. (Hons.)	3	University of KwaZulu-Natal (UKZN)	2
		B.Tech.	2	University of Natal (now UKZN)	14
		B.Com. (Hons.)	1	University of South Africa (UNISA)	2
		Masters Diploma in Technology	1	University of Zululand (UniZulu)	0
		MBL (Masters in Business Law)	2	Other	10
		M.Sc.	2	No response	1
		National Diploma Eng.	1		
		National Higher Diploma Engineering	1		
		*PrEng.	4		
		*PrTechEng.	3		
Total	**40**	**Total**	**40**	**Total**	**40**

* These individuals are registered with ECSA (Engineering Council of South Africa) as Professional Engineers and as Professional Engineering Technologists

The '**Other**' job titles/designations included:

*(The number of respondents that shared the same response)

- Managing Trustee
- Member of Closed Corporation (Managing) *(2)
- Office Manager/Associate *(3)

The '**Other**' institutions included:

- RAU (Rand Afrikaans University, now University of Johannesburg)
- Stellenbosch University
- Sunderland Polytechnic (England)
- University of Cape Town
- University of Illinois (USA)
- University of Pretoria *(3)
- Vaal Triangle Technikon (now Vaal University of Technology)
- Wits University (now University of Johannesburg)

4.2.4.3. Employment of university and UoT graduates/diplomates

Employers were asked whether their organizations employed university and UoT graduates. If **Yes**, they were asked to indicate in what positions these graduates/diplomates were employed. If **No**, respondents were asked to provide reasons why this was so. All 40 (100%) employers indicated that they employ university graduates. One (3%) employer responded that they do not employ UoT graduates and diplomates. The respondent reasoned this as: "so that more responsibility can be given to graduates". Table 4.26. shows the positions these graduates and diplomates are employed in. Ninety percent (90% - 36 of the 40) employers indicated that university graduates are hired for Engineer positions. Engineering Technician and Engineering Technologist seem to be drawn from among the UoT graduates/diplomates.

Table 4.26.

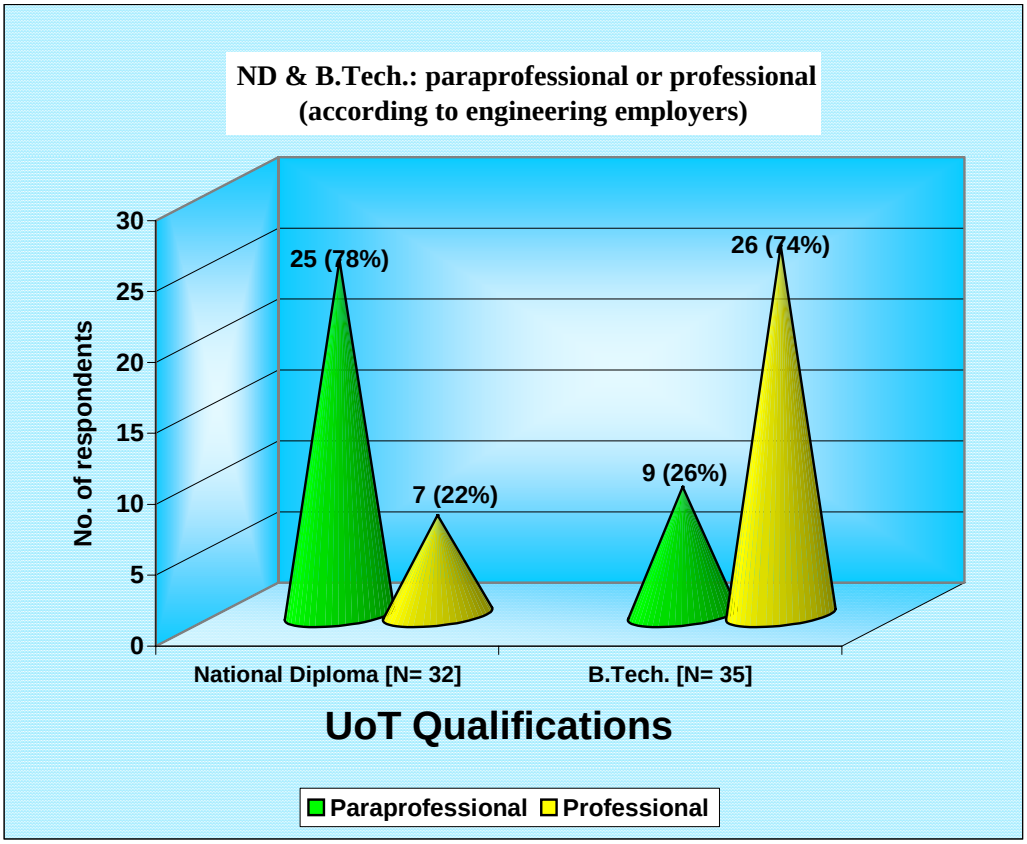
Positions university and UoT graduates and diplomates are employed in (according to engineering employers)

Position	No. of responses for university graduate/diplomate positions	No. of responses for UoT graduate/diplomate positions
	[N= 40]	**[N=39]**
Engineer	36 (90%)	9 (23%)
Engineering Technician	18 (45%)	34 (85%)
Engineering Technologists	13 (33%)	30 (75%)
Clerical positions	2 (5%)	2 (5%)
Managerial positions	7 (18%)	5 (13%)
Supervisory positions	3 (8%)	4 (10%)
Other positions for university graduates		
Marketing, quality systems, trainees, geologists, geohydrologists, accountants, directors		
Other position for UoT graduates and diplomates		
IT technicians, trainees (in service training)		

4.2.4.4. Paraprofessional and professional UoT qualifications

Employers were asked how their organizations categorized the university of technology's National Diploma (ND) and Bachelor of Technology (B.Tech.) qualifications in terms of being paraprofessional or professional qualifications. Two of the 40 respondents (5%) who indicated that the B.Tech. is seen as paraprofessional included in their choice that "this is so until professional registration is obtained". There was a high 'no response' to this question, which is perhaps significant in showing that in the engineering discipline too, like in LIS, this is a problematic and unresolved issue. Eight (20%) and five (13%) of the 40 respondents did not respond to this issue relating to the ND and B.Tech. qualifications, respectively. Figure 4.8. presents these significant findings. Seventy eight percent (78%) of the 32 employers considered the ND to be a paraprofessional qualification. Seventy four percent (74%) of the 35 respondents viewed the B.Tech. as a professional qualification. Despite the high non-response rate to this question, this is still a significant finding.

Figure 4.8.



4.2.4.5. Skills and knowledge required from graduates and diplomates

Engineering employers were required to indicate the skills and knowledge that their organizations seek from university and UoT graduates and diplomates. One of the 40 respondents (3%) did not respond to this question. Table 4.27. presents these findings. Critical and analytical skills and knowledge seem to be sought more from university graduates than from UoT graduates and diplomates. However, practical experience is required mostly from UoT graduates and diplomates.

Table 4.27.

Skills and knowledge required from university and UoT graduates/diplomates (according to engineering employers) [N= 39]

	No. of respondents			
Skills & knowledge required from…	**University graduates**	**%**	**University of technology graduates/diplomates**	**%**
Ability to apply acquired knowledge	38	95%	37	93%
Analytical skills	38	95%	28	70%
Computer literacy	37	93%	37	93%
Critical thinking	35	88%	20	50%
Interpersonal skills	36	90%	31	78%
Lateral thinking	36	90%	22	55%
Letter & report writing skills	35	88%	25	63%
Practical experience	26	65%	32	80%
Problem solving skills	38	95%	30	75%
Technical skills	37	93%	39	98%
Time management skills	38	95%	35	88%
Other:				
Communication skills	1	3%	1	3%
Cost management skills	1	3%	1	3%
Knowledge of ethical codes	1	3%	2	5%
Pioneering of new services	1	3%	0	0%
Safety	1	3%	1	3%

4.2.4.6. Skills and knowledge adequacy of university and UoT graduates/diplomates

Engineering employers were posed the question as to whether university and UoT graduates and diplomates possess adequate skills to perform their job functions. If not, respondents were asked to provide reasons for their choice, including what skills and knowledge were lacking. Table 4.28. captures these results. Only a little more than half (56%) of the 39 employers that responded indicated that UoT graduates and diplomates possess adequate skills and knowledge to perform their job functions. Significantly, 77% of the 39 employers believe university graduates possess adequate skills and knowledge to perform their job functions. Employers seem to believe that UoT graduates and diplomates lack many skills including critical and analytical skills, computer skills, practical skills and application of their acquired knowledge, among others.

Table 4.28.

Skills and knowledge adequacy of university and UoT graduates/diplomates (according to engineering employers)
[N= 39]

Adequate skills & knowledge of university & UoT graduates/ diplomates		
	University	**UoT**
Yes	30 (77%)	22 (56%)
No	9 (23%)	17 (44%)
What skills & knowledge are lacking?		
• Analytical skills • Experience *(5) • Knowledge of business & their responsibility to the firm • Practical skills • Technical skills		• 3 Dimensional skills • Application of acquired knowledge *(5) • Basic mathematics skills*(2) • Codes of practice • Critical & analytical skills *(4) • Computer skills *(3) • Design skills & theory *(3) • Engineering principles *(3) • Independence *(3) • Interpersonal skills • Lateral thinking*(2) • Low academic skills • Poor English language skills*(2) • Practical experience *(2) • Practical skills • Problem solving *(2) • Report writing • Technical skills *(2) • Time management skills *(2) • Understanding of industry

*(Number of respondents that shared similar responses)

Those respondents that replied in the negative when asked if university graduates possess adequate skills and knowledge, provided the following reasons to their choice:

*(The number of respondents that shared similar responses)

- University graduates often do not have practical skills but only have basic knowledge. *(3)
- Lack of experience limits effective performance. Graduates require 3/4 years in industry to have skills and knowledge to perform. *(2)
- No university can equip you for your profession. Continuing professional development occurs throughout your career. It is up to the individual to develop and progress. *(2)

- University graduates are more independent than technikon (now UoT) graduates.

Those respondents that replied in the negative when asked if university of technology (UoT) graduates/diplomates possess adequate skills and knowledge explained as follows:

*(Number of respondents that shared similar responses)

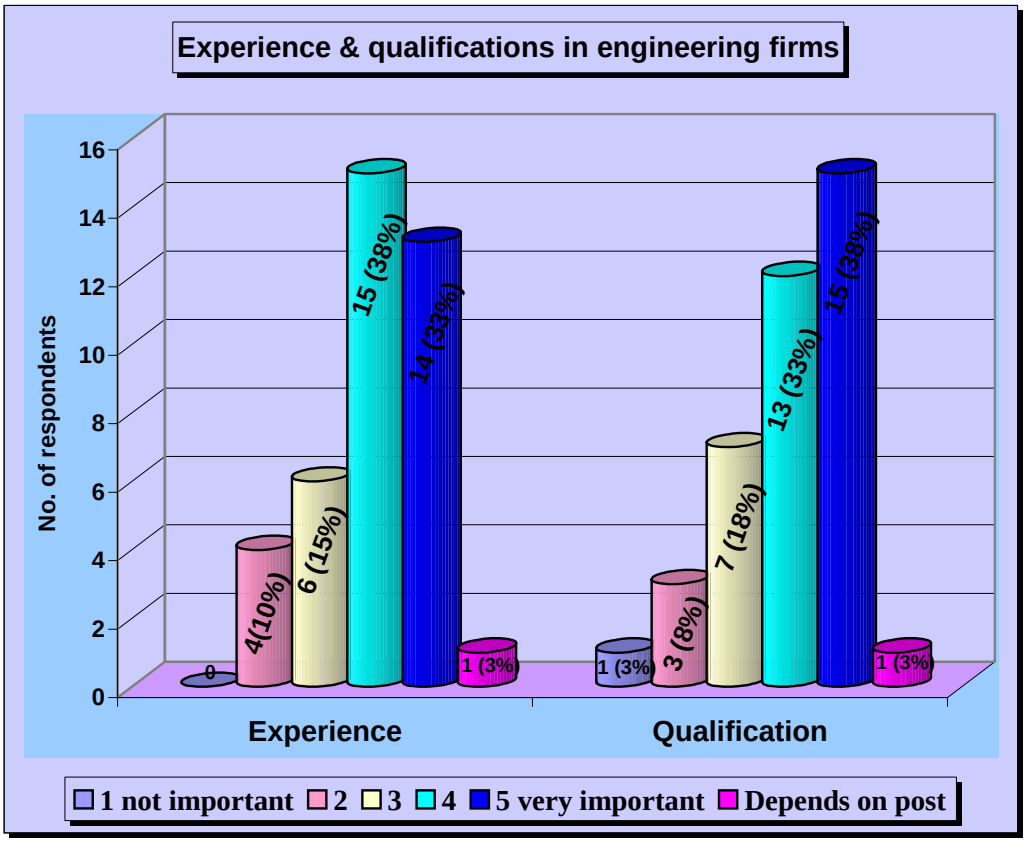
- No graduate possesses all the required skills. They have adequate skills to perform their jobs, however, there are limitations. They need substantial guidance but suppose that comes with experience, in service training and assistance in further training. *(2)
- Do not want to generalize but the general quality of technikon (now UoT) graduates is dismal.
- Depends on which technikon (now UoT) they graduate from. We no longer interview candidates from certain technikons because the skills and knowledge shown by diplomates who joined in last four years has diminished. It seems that they can pass by attending only and not by ability. We have to teach them from scratch.
- Varies from individual to individual. Tertiary institutions play an important role in education and training.

4.2.4.7. Experience and qualifications

Engineering employers were asked to rate on a 5-point scale (where **1** is **not important** and **5** is **very important**) how important their organizations consider a candidate's work experience and qualifications for a particular position. The findings of the 40 (100%) respondents are captured in Figure 4.9. Findings indicate that qualifications are very important in the engineering environment. Thirty eight percent (38%) of the 40 respondents indicated that qualifications were very important. However, 33% of employers believe that experience is very important.

Figure 4.9.

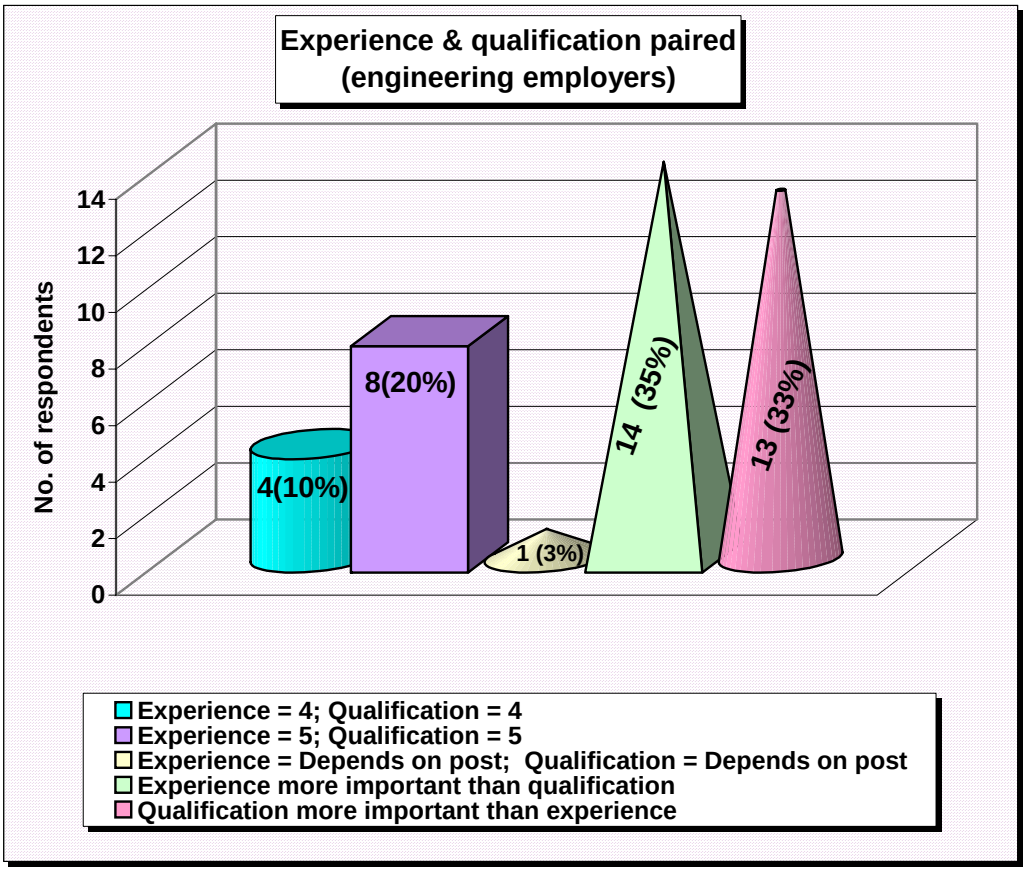
[N= 40]



Whilst this was the response to each of the ratings (1-5), the following Figure 4.10. summarizes the findings on experience and qualification paired for each of the 40 respondents. It is interesting that there was an almost equal distribution among employers regarding these two aspects. Thirty-three percent of employers (33%) indicated that experience was more important than qualifications and 35% regarded qualification as being more important than experience. This correlates well with the 'unpaired' findings on experience and qualification reflected in Figure 4.9., that is, both experience and qualification are regarded as being very important by engineering employers.

Figure 4.10.

[N= 40]



The employer with the "depends on post" response made the following useful comment for the experience and qualification ratings, respectively:

- Depends on position we are trying to fill - Senior Specialist Designer - 5 (very important) rating; Graduate Junior Engineer - 1 (not important) rating.
- Depends on position we are going to fill. For a senior post experience is more important than a degree - 1 (not important) rating; for graduate the basic entry requirement is sufficient - 5 (very important) rating.

Employers were also asked to provide reasons for their choice of ratings. Five of the 40 (13%) respondents did not respond to this for the experience and qualification aspects. The following Tables (4.29. and 4.30.) highlight the reasons behind some respondents' choice of ratings.

Table 4.29.

Reasons for choice of experience ratings (engineering employers)

Experience rating 1-5 and reasons for choice of rating				
1 Not important	**2**	**3**	**4**	**5 Very important**
0	Candidates assigned work for a level that corresponds with their knowledge. Our company will give training and experience so tasks can be performed as per requirements of the firm. *(3)	Experience to be gained in organization. *(3) Need to have basic knowledge of the job. *(2)	If the candidate has technikon (UoT) background, we can provide opportunities to gain ongoing experience. *(2) Have limited staff and time to train new staff. Previous experience eliminates tedious ongoing basic training. *(5) Without work experience, knowledge cannot be effectively applied. *(3) Senior positions require experienced staff. Junior staff can have less experience as they will be trained. Very little scope in company for inexperienced staff. We have very limited scope for training. Personal opinion.	Candidate with experience requires less training. *(2) Our field of activities requires experienced staff. *(6) Must be able to work under pressure. There are no resources to train people. It takes time to implement theory into practice. *(2)

*(Number of respondents that shared similar responses)

Table 4.30.

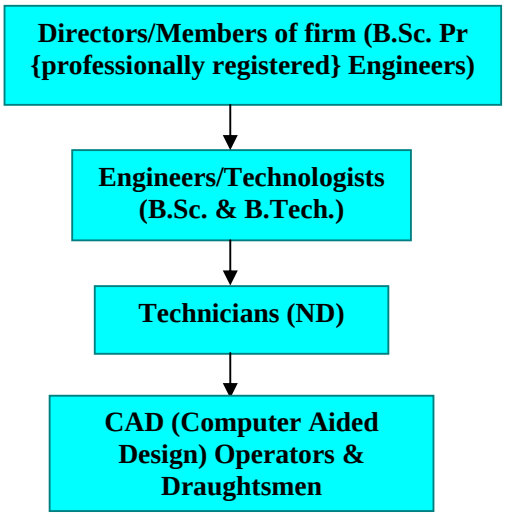
Reason for choice of qualification ratings (engineering employers)

Qualification rating 1-5 and reasons for choice of rating				
1 Not important	**2**	**3**	**4**	**5 Very important**
We employ technical people.	Candidates' competence is more relevant. Without experience, qualification means nothing.	Qualification generally indicates candidates' potential ability to apply themselves. *(3) Candidate with higher qualifications are preferred due to the additional credibility - useful for marketing. Personal opinion. Qualification can be obtained from an institution with the candidate having only gained a 40% pass but then the candidate is 60% ignorant.	Ability is more important than a piece of paper. Must be qualified to perform functions required. *(5) The ultimate goal is to register professionally. *(2) Good qualification means hard/competent worker. Want to see graduates final marks to check strengths and weaknesses. Must have entry-level qualifications. We encourage our employees to study.	Our field of activities requires technically and practically qualified staff. *(3) Engineering is qualification and experience specific. The choice of candidate is rated along these lines. Need productive staff that needs minimum training. Need engineers who can register with ECSA (professional engineering body). This is a legal requirement. *(2) Individual expected to take responsibility in accordance with qualifications. *(3) Qualification shows that the candidate has the necessary ability in the process of applying theory to practice. *(3)

*(Number of respondents that shared similar responses)

4.2.4.8. Organizational structure

Engineering employers were asked to provide an organogram/organizational structure for their organizations showing how the different designations are accommodated. Twenty-four of the 40 respondents (60%) did so. It appears that senior management is generally persons with a B.Sc. or B.Tech. A significant finding is these persons are registered with the engineering professional body. UoT diplomates (generally Technicians) are at the bottom of the organogram though Draughtsmen and Computer Aided Design (CAD) operators (likely those with technical college or UoT qualifications) are below them. It is interesting to note that B.Tech. graduates (usually Technologists) are generally on par with Engineers with the B.Sc. university qualification. In some cases the Technologists and Technicians are located at the same level in the organogram. These trends show a picture of how the organizational structure in engineering firms accommodates university and UoT graduates and diplomates:



4.2.4.9. General comments

Respondents were asked to make general comments on issues raised in the questionnaire. Only five (13%) of the 40 employers did so. Their comments may be summarized as follows:

*(Number of respondent that shared similar responses)

- Both experience and knowledge are required for engineering. Often individuals do not have both. Both university and UoT graduates are treated parallel with same opportunities in the firm. *(3)
- UoT diplomates are not the same as those who completed the ‘N’ (national certificate) courses from technical colleges. The ‘S’ (ND & B.Tech.) courses from UoTs seem to be fast tracked, covers the basics only and seem easier to qualify with.
- There is a shortage of professional engineers and project managers. Experience to date shows university graduates make better engineers and managers in the long run.

4.2.5. Comparative findings among university and UoT graduates and diplomates in special libraries and engineering firms in KwaZulu-Natal

The previous sections (4.2.1.; 4.2.2.; 4.2.3.; 4.2.4.) presented findings of the study in terms of the first two research questions, that is:

- What are the job functions of university and UoT graduates and diplomates in special libraries in KZN?
- What are the job functions of university and UoT graduates and diplomates in engineering firms in KZN?

This section (4.2.5.) presents findings in terms of the third research question that seeks to identify any trends and best practices in staff structures in the engineering work environment that can be adapted or adopted for the LIS workplace. These findings were elicited by comparing and cross tabulating (where possible) useful findings from Sections 4.2.1.; 4.2.2.; 4.2.3. and 4.2.4. Please note that in this comparative section the percentages in figures and tables would not always total to 100% because only salient figures were extracted from the findings presented earlier to show interesting trends.

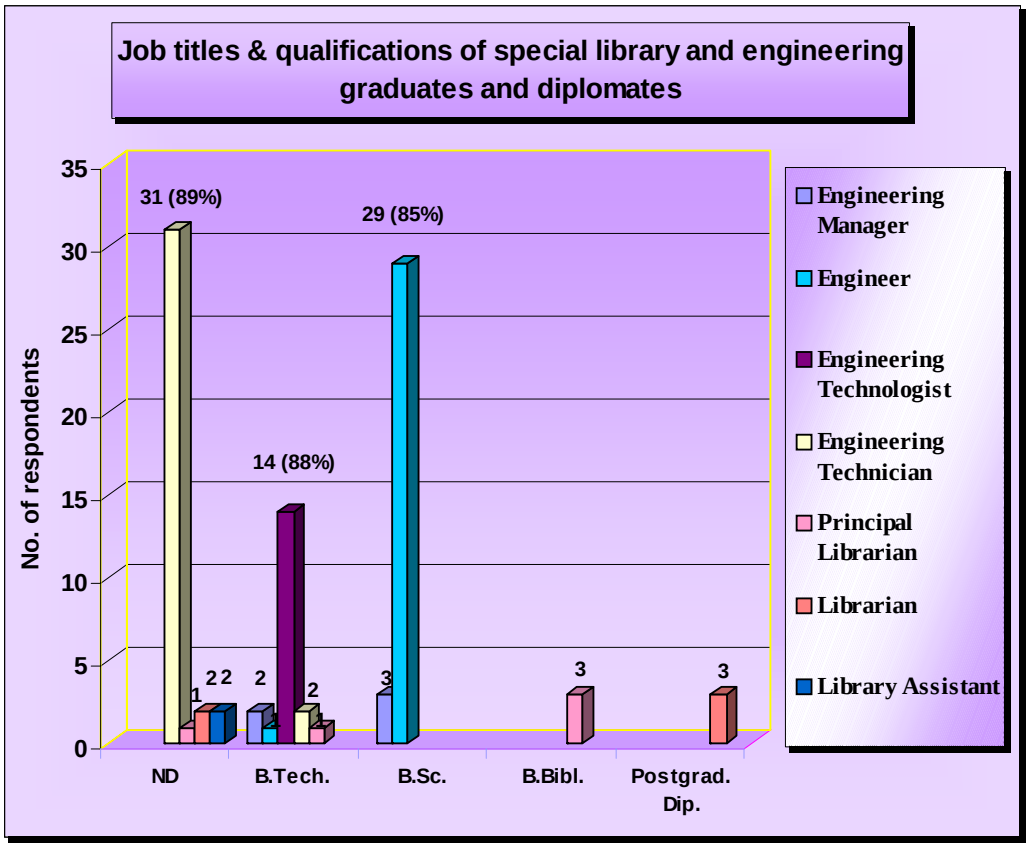
4.2.5.1. Job titles and qualifications

Special library and engineering graduates and diplomates indicated the job titles and qualifications they held. Figure 4.11. captures the joint findings. It was interesting to find that the majority of engineering graduates and diplomates held positions according to their highest academic qualifications. Majority of Engineering Technicians and Engineering Technologists hold UoT qualifications whilst the Engineer is generally a university B.Sc. Engineering graduate. This was not so with the special library graduates/diplomates. The ND diplomates among special library graduates and diplomates seem to hold job titles irrespective of their qualifications.

A trend among engineering firms is that those graduates/diplomates who obtained their qualifications as recently as 2007 are employed as Candidate or Graduate Engineers. This may be defined as "the newest, lowest and youngest" (according to one of the engineering participants in the study) employee in an engineering firm. This person works his/her way up in terms of status or change in job title, which then

correlates with the type of qualification received. The correlation between qualifications and job titles/designations in engineering firms is noteworthy.

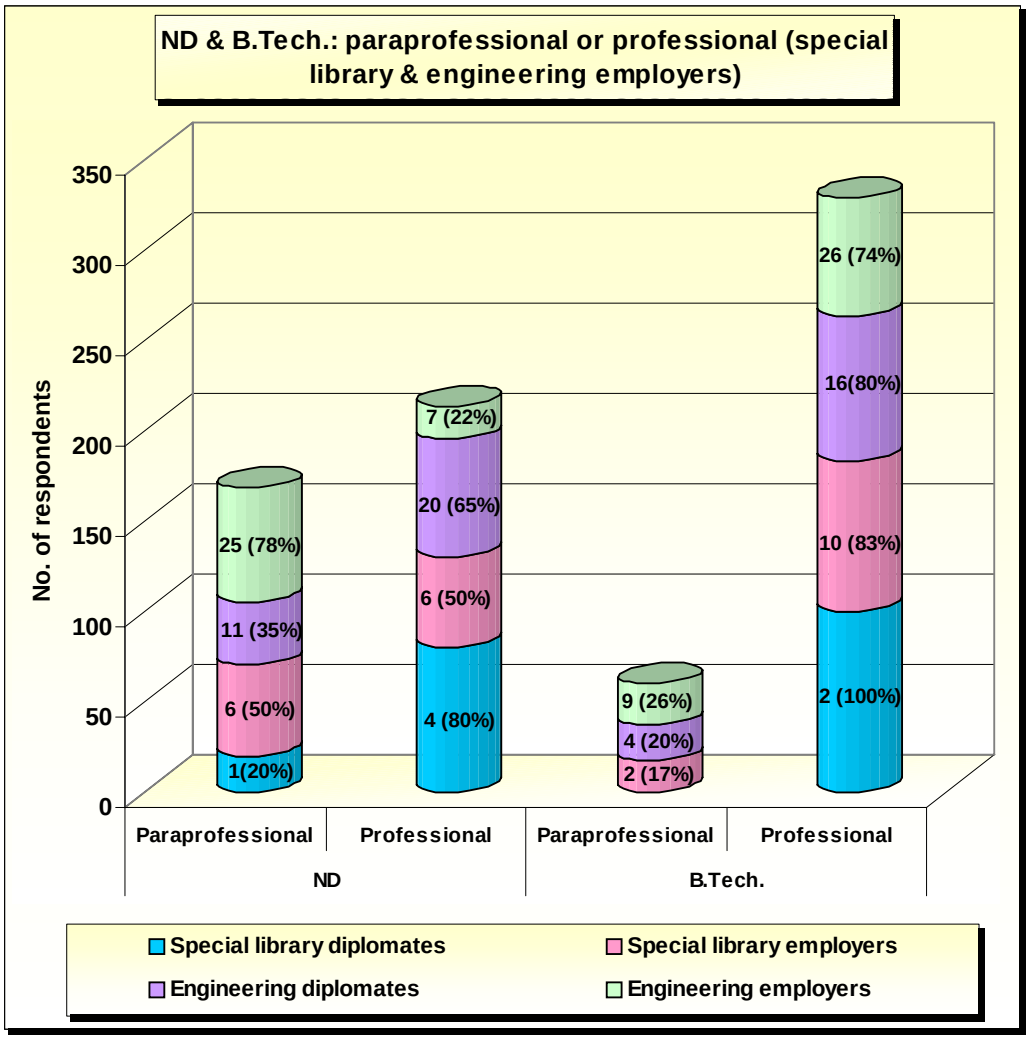
Figure 4.11.



UoT graduates and diplomates from special libraries and engineering firms were asked which term best describes the way their positions are viewed by their organizations. There were five ND diplomates and two B.Tech. graduates from special libraries. Of the 32 engineering diplomates 31 responded to the question as to whether their positions were viewed as paraprofessional or professional by their organizations. As a result percentages here were worked out of the 31 participants. There were twenty engineering graduates with a B.Tech. qualification. To triangulate this data collected from graduates and diplomates, employers were posed the question as to whether they viewed the ND and B.Tech. qualifications from UoTs as paraprofessional or professional. Figure 4.12. reveals the results of this triangulation. It seems that special library and engineering graduates and diplomates generally believe the ND and B.Tech. UoT qualifications should be viewed as professional.

However special library and engineering employers seem to view the B.Tech. only as professional. The ND was seen only by 50% of special library employers as paraprofessional and 50% of employers as professional. This seems to correspond with the employment trends of LIS workers as seen in Figure 4.11. above.

Figure 4.12.

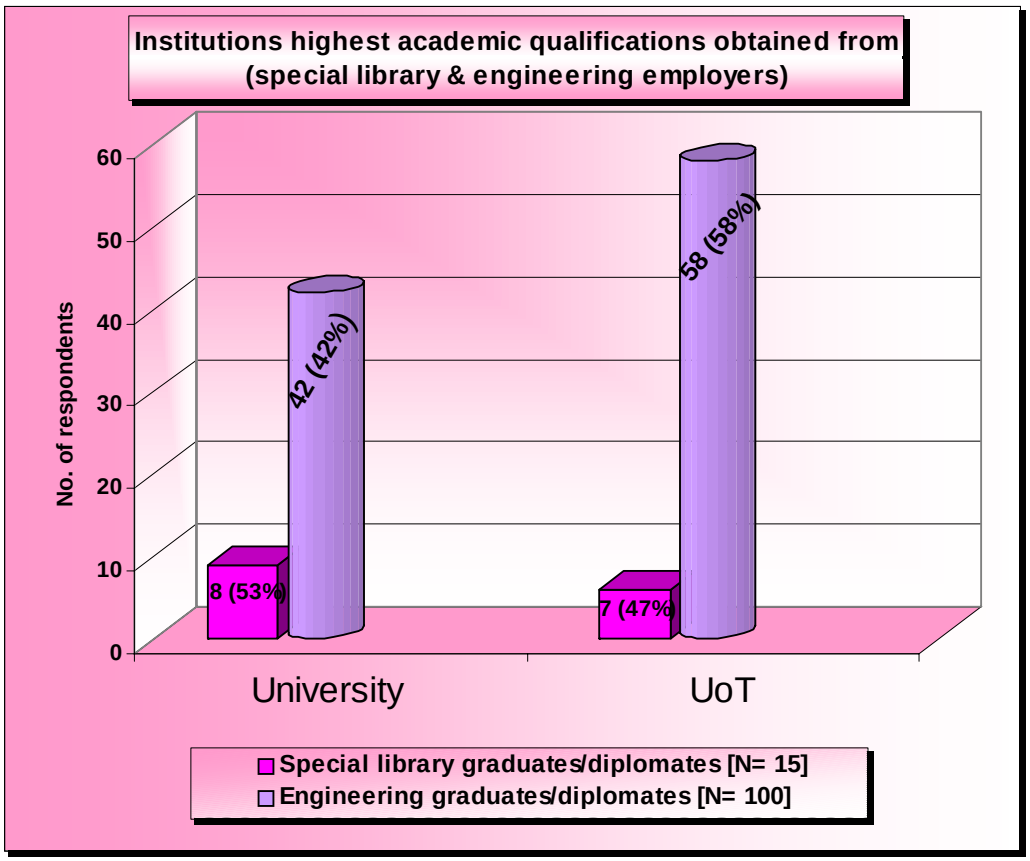


4.2.5.2. Employment trends among university and UoT graduates and diplomates in special libraries and engineering firms

When graduates and diplomates were asked which organization they obtained their highest academic qualifications from, KZN and national (and in the odd case international) universities and UoTs were indicated. Figure 4.13. presents joint findings from special libraries and engineering firms. The majority of engineering

personnel (58%) were from the UoTs and the erstwhile technikons. A little more than half of the special library employees (57% - 8 of the 15) were from traditional universities. This may be inconsequential to generalize considering the low return rate from both sets of respondents. Nevertheless, this is an interesting trend to report. Engineering, being a very technically orientated profession seems to be drawing their staff largely from UoTs.

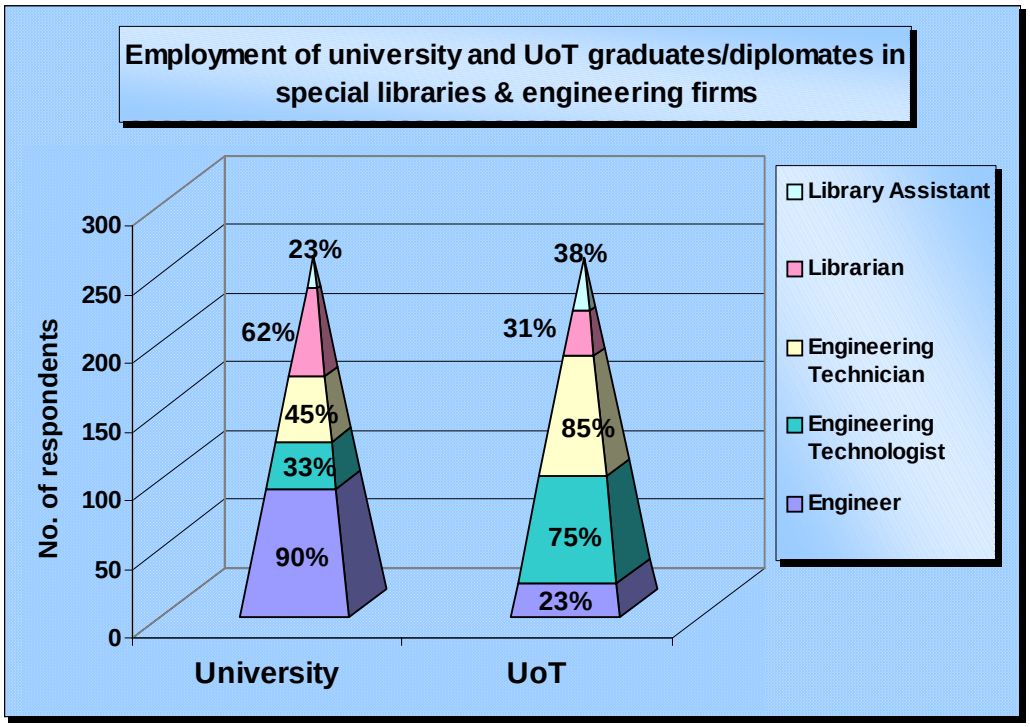
Figure 4.13.



Special library and engineering employers were posed the question regarding whether they employed university and UoT gradautes and diplomates and if so in what positions. The significant responses were extracted from Table 4.10. and Table 4.26. and are presented collectively in Figure 4.14. Sixty two percent (62%) of special library employers indicated that university graduates were employed to fill Librarian posts. Ninety percent of engineering employers indicated that university graduates were hired for Engineer positions whilst 85% of employers indicated UoT graduates and diplomates filling Engineering Technician posts. It seems that in both special

libraries and engineering firms university graduates are being hired for the more senior positions.

Figure 4.14.

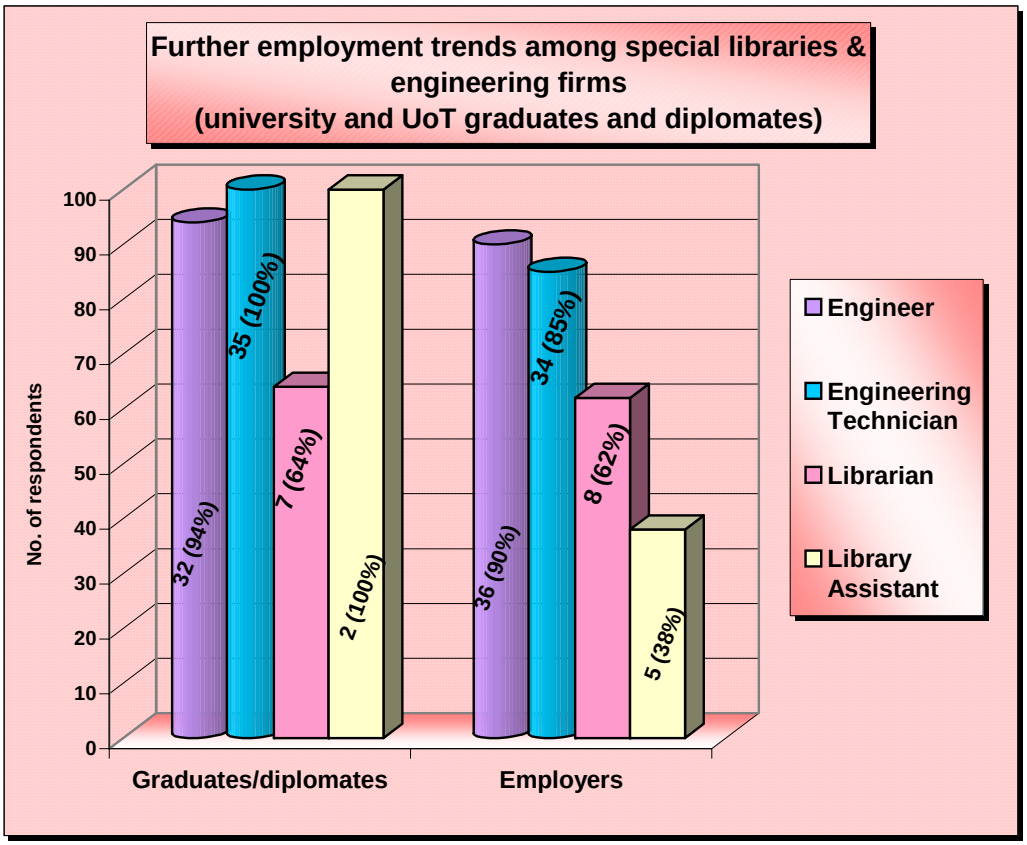


The larger percentage responses from employers in terms of the employment of special library and engineering university and UoT graduates and diplomates were then taken from Figure 4.14. and placed against relevant job titles and qualifications of special library and engineering gradutes/diplomates (Senior Librarian/Librarian, Senior Library Assistant/Library Assistant, Engineer and Engineering Technician) from Table 4.2. and Table 4.17. This juxtaposition is presented in Figure 4.15.

A significant number (7 of the 11 special library respondents holding a Senior Librarian/Librarian post - 64%) were university graduates. There was a 90% employer response to university graduates being hired for Engineer posts. These findings (Figure 4.15.) seem to indicate that special library and engineering firm employers tend to correlate job title to the qualification held by university and UoT graduates and diplomates. However, the findings in the study indicate that special libraries are not as disciplined in this regard as the engineering environment is. There were three

of the 11 respondents with the job title Senior Librarian/Librarian that held ND and B.Tech.: LIS qualifications. In view of the smallness of the number of special library respondents compared to the number of engineering firm respondents, this is a significant number to comment on.

Figure 4.15.



4.2.5.3. Job titles, qualifications, year highest academic qualifications obtained, job functions and promotion

The job functions of graduates and diplomates in special libraries and engineering firms seem to follow similar trends. Both graduates and diplomates tend to perform more or less the same job functions, irrespective of their job titles or qualifications. Respondents that secured promotions did not always see a change to their previous job functions. Of the 33% (5 of 15) of special library respondents that gained promotions, only one respondent saw significant changes in his/her job functions. A Librarian was promoted but his/her job title did not change although additional tasks were added to his/her previous job functions. Twenty-five percent (25%) of the 100

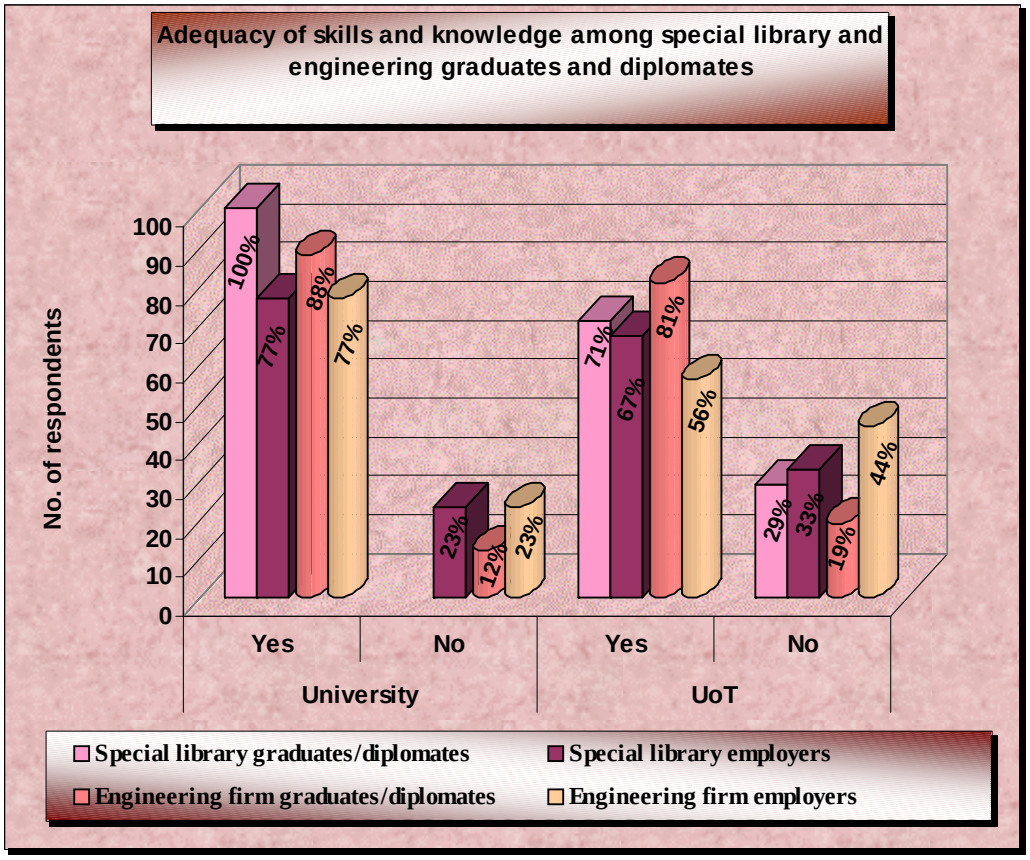
engineering respondents that gained promotions said that their job functions, like with the special library respondents, did not change much other than a few additional functions or did not change at all. However, a significant trend is that there was always a change in job title, which was not the case with special library respondents.

Respondents from special libraries and engineering firms indicated the year they obtained their qualifications and whether they secured promotions. Special library respondents may have obtained their qualifications many years ago, suggesting, years of experience but this did not guarantee a promotion. Some respondents gained promotion whilst others did not. Similarly, engineering staff secured promotions but this was independent of how long ago they had qualified. Some respondents that obtained their qualification almost twenty years ago did not secure promotions. Other respondents that obtained their qualifications very recently, on the other hand, had gained promotions. It seems that engineering personnel, like with the LIS environment, are not guaranteed promotions in their organization in terms of the year they obtained their qualifications and the number of years they have spent in the engineering field. Perhaps, other factors such as job performance (which are outside the scope of this study) determine promotions.

4.2.5.4. Adequacy of skills and knowledge

Graduates and diplomates were asked if their skills and knowledge acquired via their highest academic qualifications were adequate in equipping them to perform their current job functions. If not they indicated those skills that were lacking. Employers were also asked whether university and UoT graduates and diplomates' skills were adequate in performing their job functions. Although employers generally feel university and UoT graduates and diplomates have adequate skills and knowledge to perform their job functions, there was a higher response to university graduates possessing adequate skills and knowledge in both special libraries and engineering firms compared to the response for UoT graduates and diplomates in special libraries and engineering firms. There was also a higher percentage (67%) of special library employers who claim that UoT special library graduates and diplomates possess adequate skills and knowledge compared to the engineering employers (56%) with regards to UoT engineering graduates and diplomates. Figure 4.16. captures these findings.

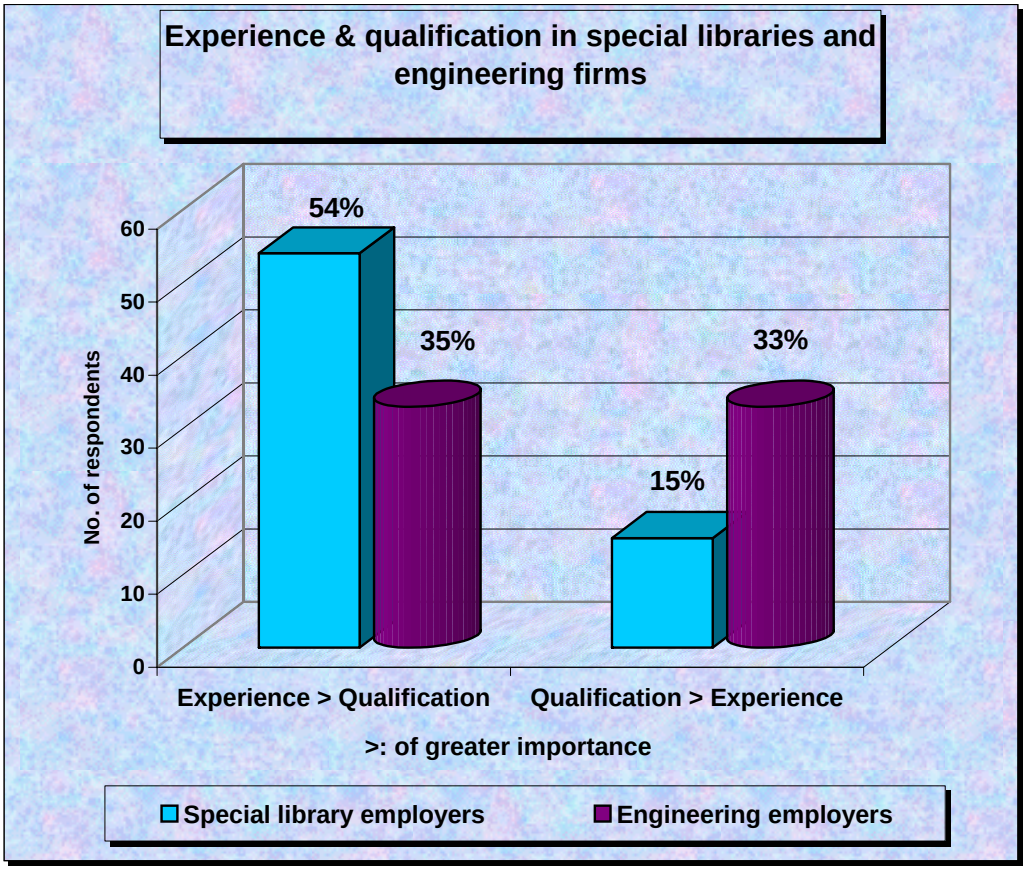
Figure 4.16.



4.2.5.5. Experience and qualifications

Special library and engineering firm employers rated experience and qualifications in terms of importance for a particular position where **1** was **not important** and **5** was **very important**. A significant number of special library and engineering employers rated experience as being of greater importance than qualification. Figure 4.17. illustrates this.

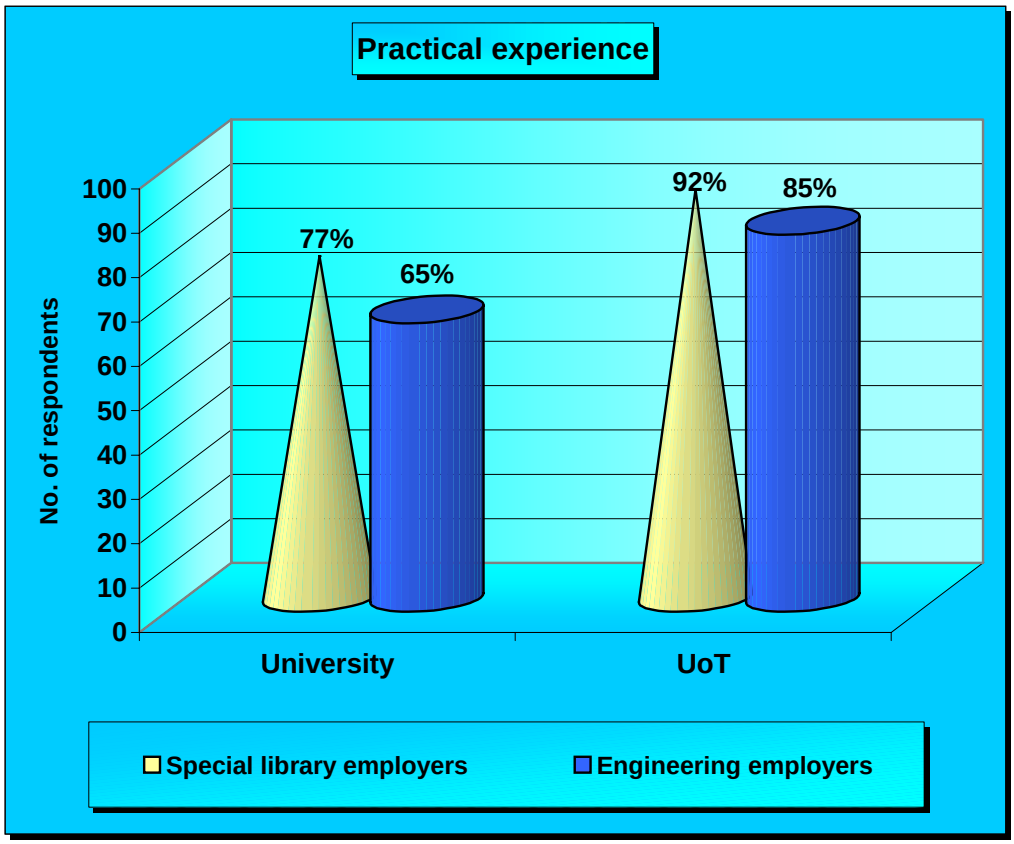
Figure 4.17.



Employers from special libraries and engineering firms were asked what skills and knowledge they seek from university and UoT graduates and diplomates. An interesting finding was that practical experience was an aspect that both special library and engineering employers required mostly from UoT graduates and diplomates as illustrated in Figure 4.18. Engineering firms, being very technically orientated, seem to largely employ from the UoTs. Fifty-eight (58%) of the engineering graduate and diplomate respondents were from UoTs. Engineering employers indicated a 20% greater response to requiring experience from UoT graduates and diplomates than from university graduates. There were 42 university graduates among the engineering respondents. This represents a 16% difference between university (42) and UoT (58) graduates and diplomates employed in engineering firms. Although UoTs are often regarded as being synonymous with practical experience and also seeing that special library employers tend to believe experience is more important compared to qualifications in the special library

environment, there were more (albeit only slightly) university graduates employed in special libraries.

Figure 4.18.



4.2.5.6. Expertise and qualifications in special libraries

Special library employees were provided with expertise and qualification options and were asked to select those that are critical to the efficient running of a special library. To triangulate data collected here, special library employers were provided with choices (1= 1st choice, 2= 2nd choice, 3= 3rd choice and 4= 4th choice (where applicable)) for them to rank, in order of preference, expertise and qualification options necessary for the efficient functioning of special libraries. Figure 4.3. and Table 4.11. revealed the ranking positions of these aspects. These findings are now presented collectively in Table 4.31. There seems to be no significant correlation between graduates/diplomates and employers regarding expertise. However, both graduates/diplomates and employers believe that LIS qualifications are important for the efficient running of a special library. But there was a tie in the rating of LIS

qualifications and LIS & subject specific qualifications among the graduates and diplomates whilst employers ranked LIS & subject related qualifications second. This may suggest that there is competition between LIS graduates/diplomates and those from other disciplines to work in special libraries. However, on the whole it does seem that LIS qualifications are viewed as necessary by both graduates/diplomates and employers.

Table 4.31.

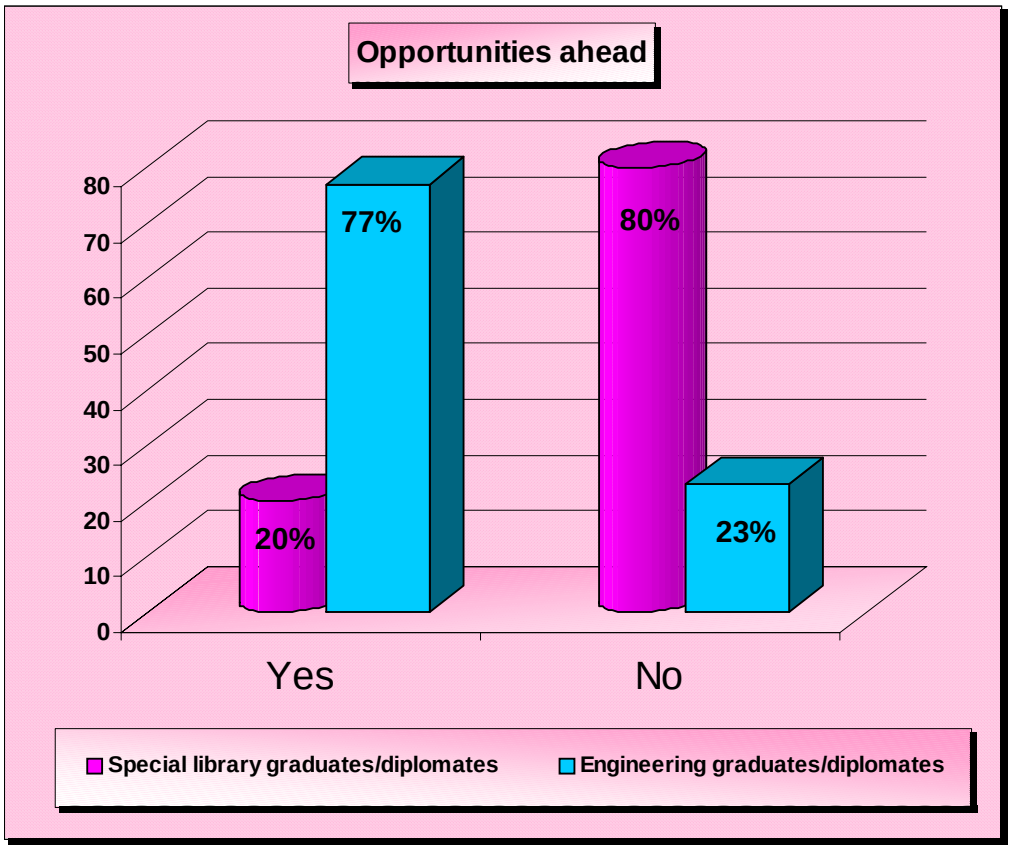
Experience & academic qualifications in special libraries: joint findings from graduates/diplomates and employers

	Graduates/Diplomates' order of preference	Employers' order of preference
EXPERTISE		
LIS expertise	1. Balance of both	1. LIS expertise
Subject expertise	2. LIS expertise	2. Subject expertise
Balance of both	3. Subject expertise	3. Balance of both
ACADEMIC QUALIFICATION		
Matriculation	1. LIS qualification; LIS & subject specific qualification (both rated 1.)	1. LIS qualification
LIS qualification		2. LIS & subject specific qualification
Subject specific qualification	2. Subject specific qualification	3. Subject specific qualification
LIS & subject specific qualification	3. Matricualtion	4. Matricualtion

4.2.5.7. Prospects ahead in the organization

Graduates and diplomates indicated the prospects for upward mobility in their organizations. The joint presentation of findings for special library and engineering graduates and diplomates are captured in Figure 4.20. Seventy-seven percent (77%) of engineering respondents foresaw opportunities for them to move up in the organization. A larger percentage of special library respondents (80%) responded in the negative to this. It seems that the dynamic nature of engineering allows for this growth. Special libraries, on the other hand, are a totally different scenario due to their inherent smallness and lack of career paths for upward mobility (special libraries being closed entities within larger organizations).

Figure 4.19.



Nevertheless, common requirements between special library and engineering respondents for upward mobility include:

- Need to gain more experience.
- Need to study further.

A trend seen in engineering firms was that many respondents indicated that they need to register with ECSA (Engineering Council of South Africa) to obtain professional status. This professional registration requires a candidate to have a minimum engineering qualification for Engineer, Engineering Technologist or Engineering Technician, and a certain number of years of experience as stipulated by the Council. During this time the candidate is assessed after which professionals status is achieved. This is a legal requirement in the engineering discipline, but this is not so in the LIS profession. Perhaps this is a best practice LIS needs to pick up on.

4.3. Summary

This chapter presented findings of the study resulting from analysis of data collected via two self-administered questionnaires (for university and UoT graduates and diplomates and for employers of graduates/diplomates in special libraries and engineering firms). The next and final chapter provides a summary of the main findings and discussion of these findings in terms of the objective of the study and the literature reviewed. Based on these discussions, conclusions are drawn and recommendations are made.

CHAPTER 5: DISCUSSSION OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS OF THE STUDY

5.1. Introduction

The previous chapter presented the findings resulting from the *Survey questionnaire for university and university of technology graduates/diplomates* and the *Survey questionnaire for employers* administered to special libraries and engineering firms in KwaZulu-Natal (KZN). The focus of this chapter is on discussion of the main findings of the study in terms of the objective of the study and in the context of the literature reviewed for the study.

The objective of this study was to investigate the job functions of university and university of technology graduates and diplomates in the special library and engineering environments with the intention of drawing on possible trends and best practices from the engineering environment for the LIS workplace. In working toward this objective the following research questions were formulated:

- What are the job functions of university and university of technology graduates and diplomates in special library services in KwaZulu-Natal?
- What are the job functions of university and university of technology graduates and diplomates in engineering firms in KwaZulu-Natal?
- Are there any trends and best practices in staff structures in the engineering work environment that can be adapted or adopted for the LIS workplace?

As mentioned in Chapter One, this study contributes to a larger study involving comparisons between LIS and various other disciplines to draw best practices for the LIS workplace with a view to embracing paraprofessional and professional staff in a non-conflicting and productive manner. Engineering, the discipline chosen for comparison in this study, like LIS draws its personnel from both traditional universities and universities of technology.

5.2. Discussion of findings in terms of research questions of the study

The following section discusses the main findings of the study in terms of the above research questions.

5.2.1. Job functions of university and university of technology graduates and diplomates in special libraries in KwaZulu-Natal

Findings relating to this research question may be discussed under certain broad themes.

5.2.1.1. University and UoT qualifications in special libraries

Raju's (2004a: 18) study "confirms that the university Postgraduate Diploma in Library and Information Studies and the B.Bibl. (or four-year equivalent university degree) are established professional qualifications in South Africa". Of the 15 special library graduate and diplomate respondents, three held the B.Bibl. qualification and three were holders of the Postgraduate Diploma in LIS. These respondents appropriately held professional positions of Senior/Principal Librarian and Librarian. On the other hand, Raju's (2004a: 18) study found that employers are utilizing the National Diploma: Library and Information Studies (ND: LIS) qualification as a requirement for support functions in libraries. According to Oberg (1992: 111), "the term paraprofessional designates library positions with entrance level requirements that are distinctively different from those of librarians". Howath (1998) defines a paraprofessional in the LIS context as a term used for library assistants with qualifications in LIS on a lower level than that of fully qualified librarians. Any library employee with such job titles as Library Assistant and Library Technician would be a paraprofessional (Montana Library Association (MLA) Paraprofessionals' Interest Group 2000: para. 1). The current study, however, revealed conflicting views on this issue.

Five of the 15 special library respondents (33%) indicated that they were a holding a ND: LIS qualification. But only two of the five ND diplomates (40%) held the job title of Library Assistant. Whilst Raju's study found that the ND: LIS is generally viewed as a paraprofessional qualification, the remaining three (60%) diplomates were holding professional positions such as that of Senior/Principal Librarian and

Librarian. It is evident that special libraries are happy to attach the designation of Librarian to an incumbent with a ND: LIS. A possible reason for this inconsistency could be that 50% of special library employers surveyed view the ND: LIS as paraprofessional whilst the other 50% categorize the qualification as professional. The UoT B.Tech., however, is seen by 83% of employers as professional. Hence, the only respondent holding a B.Tech.: LIS qualification was assigned the professional position of Senior/ Principal Librarian.

5.2.1.2. LIS qualifications versus subject specific qualifications

Andrews & Ellis's (2005) study found that qualifications in other disciplines were requested much more for information related posts (non-traditional librarian posts) than LIS qualifications in special libraries. However, the same study also revealed that LIS qualifications were requested more frequently for traditional library posts in special libraries. However, according to St. Clair (2006: para. 6) all "branches" of information work are a "piece" of the information industry. Hence general traditional librarianship as well as modern specialist information work (for example, the recently emerged knowledge management) are all part of the larger information industry. It is not surprising then that this study revealed that an individual with an M.Phil. Knowledge Management qualification is employed as a Principal Librarian in a medical library. In fact, Muller (2007: 109) highlights that special library employers tend to seek people with 'applicable knowledge' (in other words, subject expertise) whom these employers claim would add more value to the performance of their businesses.

Related to this debate Owen & Rollerson (1997: para. 38) assert that librarians and LIS paraprofessionals have qualifications and/or experience in the specific field of the special library. This leads one to Freeman's (1993: 13) issue of the 'generalist' versus the 'specialist'. He queries whether LIS schools should produce specialist librarians (law librarians, music librarians) or should they concentrate on producing generalist 'basic model' practitioners who can add in later life the specialization appropriate to the professional posts they then occupy, for example, knowledge management in a special library. Further, Jenkins (2005: 2) points out that in the ancient world, libraries were staffed by persons whose training was often in a different field. She

purports that the modern definition of a librarian is “someone who possesses the proper training”. Although the staffers in the ancient library world were called “librarians”, they were not holders of LIS qualifications. The current study revealed this to be a practice even today in special libraries. A B.Sc. Environmental Management graduate was employed in a special library and had functions that were typical of those of a Librarian but was given the job title Research Assistant. Neal (2006: para. 6) describes such individuals as “feral professionals” who work in jobs that do not require them to have a background of library education. Hence, they bring to the library a “feral” set of values, outlooks, styles and expectations. These individuals manage their tasks in the library using their own methods, which are not necessarily the traditional library methods learnt at LIS schools.

Andrew (2007: para. 3) argues that the job function of a librarian is not “rocket science”. Likewise in the current study a special library employer commented: “Someone with no ‘special’ qualification is running our library efficiently. She has learned ‘on-the-job’ and does well (just as well as librarians previously employed)”. These discussions indicate that employers look for librarians or individuals with subject expertise skills, a sentiment supported by Kennan, Willard & Wilson (2006: 34). With regards to whether subject specific graduates would be able to provide a better service than the traditional librarian, Andrew (2007: para. 3) points out that anyone with a “decent brain” can follow collection development, concluding that it helps to be a librarian but it is not mandatory. In this study 67% (10 of the 15) special library graduates and diplomates indicated that a balance of both LIS and subject specific expertise are needed for the efficient functioning of a special library. On the other hand, 47% of special library graduates and diplomates felt that LIS qualifications were required in a special library whilst another 47% believed that a combination of LIS and subject specific qualifications are needed. An American, Hook (2003: para. 1), shared his views on holding an undergraduate degree in engineering and a masters in LIS. He explains that communicating with his engineering library users in the special library is easier as both can speak the same “language”. Similarly, there were a significant number of graduates/diplomates that commented to the effect that a, “person with LIS qualifications needs to adapt to the [special library] environment and needs to learn the jargon”. However, other employees commented: “Librarians are better equipped when educated in subject and

LIS". There was a 60% response from employers of special library personnel regarding LIS expertise and a 38% response (the highest response) to LIS qualifications needed for a special library service. It was interesting that the B.Sc. Environmental Management graduate responded that LIS expertise as well as LIS and subject specific qualifications are necessary for efficient running of a special library. These findings place much value on the need for LIS expertise and qualifications in a special library setting. This runs counter to Andrew's thoughts mentioned above. It seems that it adds value to possess subject expertise and qualifications but being a formally trained librarian is still essential in special libraries.

5.2.1.3. Job functions of special library graduates/diplomates

Owen & Rollerson (1997: para. 6) and Larson (1983: 475) explain that special libraries vary not only in physical size but also in the number of staff members they employ. Howath (1998) mentions that depending on the size and type of library, tasks are assigned either to paraprofessional or professional librarians. According to Abels et al. (2003: para. 14-18) librarians manage the full cycle of information from its creation and acquisition to organizing, categorizing, cataloguing, classifying, disseminating, indexing information and doing analysis and synthesis, demonstrating expert knowledge of the content and format of information resources and building a dynamic information collection based on deep understanding of their users' needs. It is evident that special libraries have small staff complements, generally just one person but can go up to three or four persons. This individual who would be termed the 'librarian' would have to perform all functions within the library, be it paraprofessional or professional duties, as evident in this study. In looking at the job functions of university and UoT graduates and diplomates in special libraries (Table 4.6.), there appears to be a task overlap between both types of tertiary graduates and diplomates. The bulk of library functions such as administrative duties, budget maintenance, cataloguing, collection development, filing, indexing, literature searching, library liaison, document management, inter-library loans, to name a few, are performed both by university and UoT graduates and diplomates, irrespective of their qualifications. However some specific duties such as circulation, classification, database management, library marketing and photocopying were assigned generally to UoT graduates and diplomates while report coordinating, information provision and

information accessing were some tasks performed mostly by university graduates. Hence Oberg (1995: para. 4) was quite right when he argued that "paraprofessionals are assigned complex duties that once characterized the work of librarians". Moving of tasks once performed by librarians to support staff (as evident in the above findings) has thus become a trend (Neal 2006: para. 16). Likewise, in this study university and UoT graduates and diplomates employed in special libraries seem to be performing more or less the same job functions.

5.2.1.4. Distinguishing university and UoT education

Major differences between university and UoT education are discussed by Raju (2004c: 3). D'Almaine, Manhire & Atteh (1997: para. 14) clarify that universities and technikons (now UoTs) are intended to be complementary sectors. As a result they have equal status but different missions. In Raju's (2004c) study she highlighted that the difference between university and university of technology education is that the former has an academic focus and the latter a technological focus. Marketing the value of the qualification for industry would allow employers to recognize that these qualifications are meant to be different and perhaps they would correlate accordingly in terms of job titles and functions. Hence this distinction that universities have a role in general formative and professional education as well as in basic and applied research whilst the UoT's role is in vocational and career education and on 'product related' research and development. This study found that there were more (albeit slightly only) university graduates employed in special libraries. There were 53% (8 of 15) respondents from universities whilst 47% (7 of 15) were UoT graduates and diplomates. This amounts to almost a 'balancing' of university and UoT graduates/diplomates employed in special libraries surveyed. Sixty-two percent (62%) of employers responded that university graduates were hired for Librarian posts while 38% of employers responded to UoT graduates and diplomates filling Library Technician positions. An interesting find is that professional Librarian posts are posts that are generally given to university graduates. Further, there were 46% (7 of the 15) graduates hired for Principal Librarian/Librarian posts from the traditional universities. It is apparent that special libraries tend to hire university graduates for senior positions whilst UoT graduates and diplomates are employed in senior as well as in support positions.

5.2.1.5. Experience versus qualification in special libraries

The literature (Andrews & Ellis 2005: 63; Kennan, Willard & Wilson 2006; 26; Ocholla 2006: 8; Prospects.ac.uk 2006: para. 4; Maatta 2007: para. 5) emphasize that employers are looking for LIS graduates and diplomates with experience. Fifty-four percent (54%) of special library employers in this study indicated that experience was more important than qualifications in the special library setting. Kraak (2006: 136) emphasizes that employers and learners view UoTs as institutions guaranteeing greater employment prospects than the universities because of their focus on application in learning and their greater interaction with industry in delivering their programmes. Raju (2004c: 6) reiterated by Winberg (2005: 192) pointed out that the UoT qualifications are often the result of interaction between the technikon (now universities of technology) and industry. The system of Work Integrated Learning (WiL) relies on contributions made by potential employers and the UoT towards the training of students for specific careers (Library and Information Studies Programme (DUT) 2008: 11). WiL attempts to integrate classroom instruction with practical training and experience in the workplace. Hence, one would assume that UoT graduates and diplomates would make up the larger part of special library employees. However, this was not so in this study. There may be a negligible difference of one more university graduate, but, in view of experience being seen as being of greater importance than qualifications by special library employers and that sometimes there is only one employee in a special library service who performs all library functions, this leaning towards university graduates in the special libraries surveyed is a notable finding.

5.2.1.6. Adequacy of skills and knowledge of graduates and diplomates in special libraries

Ocholla (2000: para. 23) conducted a tracer study of past LIS graduates in the workplace to ascertain whether their skills and knowledge gained from the university's curriculum were adequate for their current job functions. His study revealed that graduates found that skills and knowledge lacking included, among others, practical skills. Nevertheless, the employers in Ocholla's study were generally pleased to retain these graduates. Hallam (2006: 48) pointed out that skills such as problem solving, critical thinking, effective oral and written communication,

teamwork and ethical thinking form the core set of workplace skills and abilities in graduating new students that are desirable to employers. However, in this current study, employers indicated that university graduates lack mainly practical skills whilst employers highlighted English language skills (including written and oral skills) and lateral thinking as lacking in UoT graduates and diplomates (refer to Table 4.13.). University graduates (100%) and UoT graduates and diplomates (71%) are content with the skills and knowledge that they have acquired via their highest academic qualifications. Likewise, employers seem to believe that university and UoT graduates and diplomates possess adequate skills. But special library employers' responses indicate that they are more satisfied with the skills and knowledge possessed by university graduates (Figure 4.16). Hildebrandt (2007: 9) makes reference to the rapid changes in technology and that the way library users access information is changing and evolving. The Department for Professional Employees (2001: para. 1) highlights that library services have been gravely affected by new technologies and changing job content. Melchionda (2007: para. 2) emphasizes that technology has become fundamental in every library operation and service. Hence, these changes adversely affect the library staff. It was not surprising then that though 87% (13 of the 15) of special library graduates and diplomates felt their skills and knowledge gained via their highest academic qualifications were adequate, some felt that they were lacking in IT knowledge. Whilst Ocholla & Bothma (2006: para. 9) mention that there is evidence of an increased integration of information technology in LIS curricula, it seems that the content of the IT integration in curricula may not be covering all aspects needed in the workplace.

In summary for the first research question, it seems traditional university LIS graduates are occupying professional positions in special libraries whilst both professional and support positions are occupied by UoT diplomates. There was only one B.Tech.: LIS participant in this study and this incumbent held a professional position in the special library. There is inconsistency with the ND qualification where holders of this qualification are assigned paraprofessional as well as professional positions. Further, there do not seem to be any definitive distinctions between the job functions of university and UoT graduates and diplomates.

5.2.2. Job functions of university and university of technology graduates and diplomates in engineering firms in KwaZulu- Natal

Through investigating the job functions of university and university of technology graduates and diplomates in the engineering environment, this study searched for trends and best practices from the engineering environment for the LIS workplace. Main findings here too are discussed under broad themes.

5.2.2.1. University and UoT qualifications in engineering firms

Thirty-seven of the 100 respondents (37%) indicated that they held the university B.Sc. Engineering qualification. Thirty-two of the 37 university B.Sc. qualification respondents (86%) held the position of Engineer. Thirty-one of the 100 respondents (31%) held the UoT National Diploma: Engineering qualification and the job title/designation of Engineering Technician. Twenty of the 100 respondents (20%) held a B.Tech.: Engineering qualification from the UoT. There was a significant number (14%) of these B.Tech.: Engineering graduates who held the job title Engineering Technologist. D'Almaine, Manhire & Atteh (1997: para. 15) purport that in South Africa, both the university's Bachelor of Science (B.Sc.), a four-year degree, and the UoT's Bachelor of Technology (B.Tech.) in Engineering (also four years in duration) receive the same credentials. In keeping with this, the study found B.Tech. graduates holding job titles of Engineering Manager and Engineer as well. Rajagopaul's (2006: 37) study revealed that majority of engineering firm employers give the B.Tech.: Engineering and the B.Sc.: Engineering qualifications professional status while the ND: Engineering is seen as paraprofessional. The difference between the two qualifications seem to lie with the emphasis in the B.Tech. being on practical orientation, compared to the university B.Sc., due to the B.Tech.'s experiential training now referred to as Work Integrated Learning (WiL). The engineering work environment, seems to assign professional positions to university B.Sc. and UoT B.Tech. graduates while UoT diplomates are assigned Technician posts.

Eighty-two percent (82%) of university B.Sc. Engineering graduates responded that their positions are seen as professional by their organizations. Sixty-five percent (65%) of ND diplomates also responded that their qualifications are viewed as professional. However, 78% of their employers (25 of 32) categorize the ND as paraprofessional. A significant finding is that 80% of B. Tech.: Engineering graduates

from the UoTs responded that their organizations view their positions as professional. This has validity as 74% of engineering employers surveyed view the B.Tech as professional. Hence, it seems that the UoT ND and B.Tech . graduates and diplomates generally occupy positions that they have been trained for. It seems that in the engineering work environment both university and UoT four-year qualifications are accepted as professional qualifications.

5.2.2.2. Job functions of engineering graduates/diplomates

A professional engineer is assigned responsibility for providing engineering expertise, guidance and technical assistance (Okladot.state.ok.us 1999: para. 1). This study found job functions such as staff supervision and delegation assigned to B.Sc. and B.Tech. holders possibly because, as D'Almaine, Manhire & Atteh (1997: para. 15) highlighted, these qualifications receive the same credentials. On the other hand, the engineering assistant is said to perform complex paraprofessional technical duties and support work (City of Woodland.org 2007: para. 1; Ci.Woodland.ca.us 2008: para. 1). World Wide Learn (2005: para 16) explains that engineering technicians usually begin with routine duties under the close supervision of an experienced technician, technologist, engineer or scientist. As experience is gained more difficult tasks are assigned to them with only general supervision. This study found this to be a practice not only with engineering technicians (UoT graduates/diplomates) but also with university graduates. Those graduates/diplomates who obtained their qualifications as recently as 2007 were employed as a Candidate or Graduate Engineers. This individual works his/her way up in terms of status or change in job title, which then correlates, with the type of education received.

There does, however, seem to be task overlapping in job functions among university and UoT graduates and diplomates who perform more or less the same functions. Computer Aided Design (CAD) operation, client liaison, contract administration, cost management, documentation, draughting, mapping and analysis, marketing, modeling, project planning, proposals, report compilation, site supervision and two popular tasks amongst engineering graduates and diplomates, namely, design and project management are shared by engineering employees, be they university or UoT graduates/diplomates. Project leadership, debtor management, equipment control,

payment certificates, quality control, staff training and visual assessment are tasks generally performed by UoT graduates and diplomates. University graduates are generally assigned functions such as ordering payments, IT management, mentorship and data gathering. Like with LIS graduates and diplomates, it seems tasks that previously were performed by professional staff such as cost management and project leadership are now assigned to persons with paraprofessional qualifications. Notwithstanding all of this, in engineering too there is an overlap of job functions between university and UoT engineering graduates and diplomates. Perhaps here too, as with special libraries, this may be attributed to the 'smallness' of many of the engineering firms participating in the study; or perhaps despite the overlap in job functions there are differences in levels of authority among the university and UoT graduates and diplomates.

5.2.2.3. Experience versus qualification in engineering firms

Like Maatta (2007), Elliott & Kennedy (2005: para. 1) emphasize that the "tried-and-true tactic of increasing marketability through real-world work experience remains a winner". Thirty-five percent of employers (35%) of employers indicated that experience was more important than qualification while an almost equal number (33%) responded that qualification was more important than experience. The literature too reflects this 'tussle': Elliott & Kennedy (2005: para. 1) believe that the degree just demonstrates the technical skills and fundamental understanding. Yet, King (2006: 25) emphasizes that engineers should hold qualifications that focus on technical skills. Engineering which is a very technically orientated profession seems to be drawing its personnel from the UoT. This study found fifty-eight percent (58%) of engineering respondents were UoT graduates and diplomates while the balance of 42% were form the traditional universities.

5.2.2.4. Adequacy of skills and knowledge of graduates and diplomates in engineering firms

According to engineering employers university graduates and UoT graduates and diplomates generally possess adequate skills to perform their job functions. Likewise, more than three-quarters of engineering graduates and diplomates felt their skills and knowledge were adequate (Figure 4.28.). However, their employer's response was a 56% positive response that UoT graduates and diplomates possess adequate skills

while 77% of employers responded positively with regards to university graduates' adequacy of skills and knowledge. The Engineering Council of South Africa (2006: para. 39) (ECSA) claims that employers require engineering higher education graduates and diplomates to have developed a strong focus on the outcomes of education such as problem solving, communication, teamwork and the ability to continue learning based on a fundamental knowledge base. Although Hallam (2006: 48) wrote in the LIS context pointing out that skills such as problem solving, critical thinking, effective oral and written communication, teamwork and ethical thinking form the core set of workplace skills and abilities in graduating new students that are desirable to employers, these also seem to apply to the engineering discipline.

According to the engineering employers surveyed, university graduates lack practical skills, technical skills and experience. On the other hand, UoT graduates seem to lack much more skills and knowledge as indicated by their employers. Technical skills, time management skills, problem-solving skills, English writing skills, lateral thinking, independence, computer skills are just some of the skills and knowledge engineering employers believe UoT graduates and diplomates lack. King (2006: 26) points out that information technology has also impacted on job opportunities for engineers. As technology becomes more sophisticated, employers continue to search for technicians who are skilled in new technology and require a minimum of additional training for the job (World Wide Learn 2005: para. 30). Thirty-five percent of the 100 engineering graduates/diplomates held Technician posts of which 89% (31 of the 35) held the ND: engineering UoT qualification. While a large number of the engineering workforce are being drawn from UoTs, it was interesting to note that among the skills and knowledge lacking in UoT graduates and diplomates, engineering employers indicated lack of practical experience and topping the list was the lack of application of acquired knowledge (refer to Table 4.28.). Although UoTs are often regarded as being synonymous with practical experience, the lack of practical experience and application of acquired knowledge on the part of UoT engineering graduates and diplomates, as indicated by their employers, is a notable finding.

In summary for the second research question, it seems traditional university LIS graduates are occupying professional positions in engineering firms whilst

paraprofessional positions are occupied by UoT diplomates. UoT B.Tech.: Engineering graduates generally occupy Technologist posts but are also hired for senior professional positions. Like with the LIS graduates and diplomates, there do not seem to be any definitive distinctions between the job functions of university and UoT graduates and diplomates.

5.2.3. Trends and best practices in staff structures in the engineering work environment that can be adapted or adopted for the LIS workplace

In view of discussions relating the first two research questions, this final research question sought to identify any trends and best practices in staff structures in the engineering work environment that can be adapted or adopted for the LIS workplace. Here too findings may be discussed under broad themes.

5.2.3.1. Paraprofessional/Professional university and UoT qualifications

This study found that engineering university and UoT graduates and diplomates occupy positions for which they have been trained. Studies conducted by Mhlongo (1998) and Raju (2004a) revealed that LIS university of technology graduates and diplomates generally do not occupy positions for which they have been trained. This was also evident in Rajagopaul's (2006) limited study. This current study found that the inconsistencies seem to lie with the ND: LIS qualification where paraprofessional as well as professional positions are assigned to holders of this qualification. Fifty percent of special library employers indicated that the National Diploma is paraprofessional whilst the other 50% categorized the qualification as professional. As a result, there is no discrimination in assigning tasks to UoT diplomates in special libraries. Hence professional positions are obtainable without the established professional qualifications.

The engineering discipline, on the other hand, is very disciplined in correlating qualifications and job titles. Engineering employers strongly believe the ND is a paraprofessional qualification where 65% indicated so. However, both special library employers (83%) and engineering employers (80%) tend to give the B.Tech. professional status. However, both special libraries and engineering firms indicated that university graduates were employed for professional positions. Such positions

include Engineer and Librarian positions. This claim by both special library and engineering employers was found to be valid. Amongst the special library and engineering graduates and diplomates, university graduates were always assigned professional positions. The consistent correlation of qualifications and job titles in the engineering discipline is a practice that special library employers need to adopt for the LIS environment. Universities of technology LIS programmes should be more rigorous in marketing their qualifications. This would allow employers to understand the purpose and functions of the UoT ND: LIS and B.Tech.: LIS qualifications, as well as the difference in focus between the B.Tech.: LIS and the four-year traditional university LIS qualifications. This perhaps would assist employers to more adequately correlate qualifications and job titles and functions for the benefit of the workplace.

5.2.3.2. Experience versus qualification

Both special library and engineering employers indicated that experience was of more importance than qualifications when considering a candidate for a position. Thirty-five percent (35%) of engineering employers indicated that experience was more important than qualifications while 33% responded that qualification was of greater importance. However, the difference here was marginal compared to that of special libraries, where more than half the employers (54%) indicated experience was more important than qualification. Both special library and engineering employers also sought more practical experience from UoT graduates and diplomates (refer to Figure 4.18.). Engineering organizations seem to employ largely from the UoT, seeing that they are a technical profession. There seems to be a balance of university and UoT graduates and diplomates in special library services but with a negligible difference leaning towards university graduates being employed. Although UoTs are often regarded as being synonymous with practical experience and also seeing that special library employers tend to believe experience is more important compared to qualifications in the special library environment, there were more (albeit only slightly) university graduates employed in special libraries. Again, universities of technology should be more proactive in marketing their qualifications to allow employers to appreciate the value of WiL in the UoT LIS curricula and its benefits for the workplace.

5.2.3.3. Skills and knowledge of university and UoT graduates/diplomates in special libraries and engineering firms

Although employers generally feel university and UoT graduates and diplomates have adequate skills to perform their job functions it seems university graduates possess more adequate skills in both special libraries and engineering firms compared to their counterparts from UoTs. However special library employers seem more confident in the adequacy of the skills and knowledge from UoT graduates and diplomates than the engineering employers with regard to UoT engineering graduates and diplomates. On the whole it seems the education and training of UoT graduates and diplomates especially for special libraries needs strengthening in areas such as English language skills (including written and oral communication); lateral, critical and analytical thinking; and application of acquired knowledge. Traditional university graduates, on the other hand, need more practical skills training. Both categories of graduates and diplomates, however, need to keep abreast with IT skills in view of rapidly changing technology in the workplace.

5.2.3.4. Opportunities ahead for special library and engineering graduates/diplomates

It seems that the engineering environment has much opportunity to allow their employees to progress. Seventy-seven percent (77%) of engineering graduates/diplomates indicated that there was room for upward mobility in their organizations. However special library graduates and diplomates indicated the opposite where 80% of respondents responded in the negative. Engineering, a dynamic and multi-faceted profession with many opportunities for growth in society, has the capacity to allow for the upward progression of their employees. With special libraries, upward mobility is at most times limited. This is due to the very nature of special libraries, which are very much ‘behind the scenes support units’ in organizations. More than half (53%) of special library graduates and diplomates that indicated there was no room for them to move up in the organization provided explanations such as: “The library is a unique department in the organization. As Principal/Senior Librarian there is no higher post. One cannot move to another position unless one studies another course unrelated to LIS.” Notwithstanding this, the small percentage (20%) of special library graduates and diplomates shared some common reasons with engineering staff as to why they believed there was room for

them to move up from their current positions: gaining more experience and studying further. In view of this, perhaps special library employers should, despite the small number of staff and limited positions available, build promotional prospects within these positions based on experience and qualifications acquired to keep staff encouraged and motivated to promote a value-added service to the organization.

5.2.3.5. Professional registration

A valuable best practice from the engineering discipline and perhaps the single most important aspect that this comparative study has revealed for the LIS profession is that of professional registration. Professional registration allows engineering graduates and diplomates opportunities for upward mobility in their careers. Joint & Wallis (2005: 213) highlight that professional associations, such as ECSA in the case of engineering and LIASA in the case of LIS, can promote employment opportunities for LIS workers. Khomo (2007: 91) recommended that the Library and Information Association of South Africa (LIASA) consider involving itself with industry concerns of LIS workers such as the role of paraprofessional qualifications in the LIS workplace and traditional university LIS degrees versus UoT LIS degrees. It is commonly known that in the engineering profession (as well as in many other professions), graduates and diplomates practising in the profession must belong to a professional body such as the Engineering Council of South African (ECSA) in order to advance their career prospects. Khomo (2007: 86) revealed that 69% of special library respondents in this study were not members of LIASA, of which 51% that were non-members hold professional posts. ECSA seems to be very active in the engineering environment and those in the engineering field recognize the value of a professional body. Professional registration is a statutory requirement in the engineering workplace. Engineering employers highlighted that “the ultimate goal is to register professionally” and that “we need engineers who can register with ECSA. This is a legal requirement”.

Akin to this, Raju (2005: 151) stresses that library associations play an important role in professional development of their members especially in view of rapidly evolving academic libraries (largely technology induced) where there is re-distribution of ‘professional’ tasks. This re-distribution of tasks is also prevalent in special libraries as seen in this study. Sentoo (2008) too highlighted the need for the professional body

to specify job specifications of different categories of LIS staff. Raju (2005: 148) put forward the question: “Is there a place for all library workers in a professional association?” It is significant that the engineering professional association accommodates all level of ‘engineers’. This professional registration requires a candidate to have a minimum engineering qualification for Engineer, Engineering Technologist or Engineering Technician, and a certain number of years of experience as stipulated by the Council in terms of the candidate’s qualification. During this time the candidate is assessed after which professionals status is achieved. As Hallam & Partridge (2005: 23) point out: “If our profession is to thrive and progress, there needs to be strong interplay between educators and employers, between research and practice and between individual professionals and the professional associations”. Hence LIS, as a profession and specifically its professional body, LIASA, need to seriously investigate adopting for the profession, the statutory requirement of professional registration of practising librarians and information workers. Interestingly, as this study was being completed (December 2008), The Library and Information Services Transformation Charter commissioned by South Africa’s Department of Arts and Culture and The National Council of Library and Information Services (NCLIS) made exactly this recommendation: “LIASA should…undertake to establish a mechanism to accredit professional librarians” (The Library and Information Services Transformation Charter 2008: 81).

5.3. Conclusions of the study

The objective of this study was to investigate the job functions of university and university of technology graduates and diplomates in the special library and engineering environments with the intention of drawing on possible trends and best practices from the engineering environment for the LIS workplace. Based on the above discussions the study draws the following conclusions:

- University and UoT B.Tech. graduates in both special libraries and engineering firms occupy senior and professional positions as most employers surveyed view the UoT B.Tech. qualification together with the four-year university qualifications as professional;

- Special library employers categorize the ND: LIS qualification as both paraprofessional and professional and hence both paraprofessional and professional positions are assigned to these diplomates. Engineering employers, on the other hand, view the ND: Engineering qualification as paraprofessional only. As a result only paraprofessional positions are assigned to holders of the ND: Engineering qualification;
- In both the special library as well as engineering environments there is much task overlap between and downshifting of job functions of professionals and paraprofessionals/university graduates and UoT graduates and diplomates. This seems to be a common trend in most work environments largely because of rapidly evolving technology, but is particularly marked in the special library environment perhaps because of its inherent 'smallness'.
- While both special library and engineering employers are generally satisfied with the skills and knowledge of their university and UoT graduates and diplomates, traditional university graduates could do with more practical training and the curricula of UoT graduates and diplomates need strengthening in areas such as English language skills (including oral and written communication); lateral, critical and analytical thinking; and application of acquired knowledge. Both types of tertiary education graduates and diplomates also need to keep abreast with IT skills required in a rapidly evolving technological environment;
- Both special library and engineering employers tend to value experience more than qualifications. Hence, engineering firms are largely drawing their personnel from UoTs which favour practice. Special libraries seem to be employing equally from both traditional universities and UoTs but with a leaning towards traditional university graduates;
- The engineering environment offers much more opportunities for promotion of its employees both from the universities and UoTs. Special libraries on the other hand offer very few, if any, opportunities for upward mobility because of their inherent small and 'closed' nature within an organization with no career paths for upward movement unless an individual does a career switch;
- Both special library employees and employers believe that while subject expertise and subject specific qualifications enhance service delivery in a

special library setting, LIS expertise and LIS qualifications are still essential for efficient functioning of special libraries; and

- The statutory requirement in the engineering profession for professional registration of engineering staff with ECSA (the professional engineering body) allows for the growth and development of 'engineers' in the profession. Such professional registration for librarians and information workers does currently not exist.

5.4. Recommendations of the study

Based on the above discussions and conclusions, the study makes the following recommendations:

- While the engineering environment tends to correlate more consistently qualifications and job titles, special libraries tend to be rather erratic with regard to this, with some employers viewing the ND: LIS as paraprofessional and others as professional and thus some assigning to these incumbents paraprofessional positions and others professional positions. It is therefore recommended that UoTs more rigorously market their qualifications so that employers may understand the purpose and functions of the ND: LIS, the B.Tech.: LIS as well as the difference between the UoT B.Tech. and the traditional university four-year LIS qualifications. This would assist employers to more adequately correlate qualifications and job titles and functions (here too there is much blurring of tasks and responsibilities) for the benefit of service delivery;
- While it is accepted that unlike in engineering firms, promotional opportunities are limited in special libraries because of their inherent small and closed nature, it is recommended that special library employers build promotional mechanisms within the few available positions (for example, Librarian level 1, Librarian level 2, etc.) based on experience and qualifications acquired, to keep staff encouraged and motivated to continue to provide a value-added support service to the organization;
- To allow library and information workers to grow and develop not just in special libraries but in the LIS profession as a whole, it is recommended that the profession, and LIASA specifically, investigate, as suggested recently by

The Library and Information Services Transformation Charter, a mechanism for professional registration of library and information workers; and

- Despite the small returns from some of the populations targeted in this study which makes generalization of results difficult, this study nevertheless has brought to light important issues relating to, for example, expertise and qualifications required in special libraries, experience versus qualifications in special libraries and skills and knowledge adequacy for special libraries. In view of this it is recommended that other similar studies be undertaken in other provinces to ascertain if trends revealed in this study based on limited sample sizes, are more widely applicable in special libraries in South Africa. Perhaps comparisons may be effected with other disciplines as well to draw more best practices for the LIS profession.

5.5. Summary and conclusion

This chapter discussed the main findings of the study in terms of the objective of the study and its three research questions in the context of the literature reviewed for the study. Based on these discussions, conclusions were drawn and recommendations were made.

The researcher feels confident that the objective of the study has been adequately addressed via the three research questions generated to meet the objective which was: To investigate the job functions of university and university of technology graduates and diplomates in special library and engineering environments with the intention of drawing on possible trends and best practices for the LIS workplace. In meeting this objective the researcher is satisfied that this study has made some contribution to the wider study mentioned in Chapter One that seeks to draw, through comparative studies with other disciplines, best practices for the LIS workplace with a view to embracing paraprofessional and professional staff in a non-conflicting and productive manner.

Despite the limited sample sizes arising form the low return rates of questionnaires distributed, which makes generalization of the findings to the various populations investigated problematic, the researcher is nevertheless satisfied that the

methodological basis on which the study rests is sound and has been thoroughly executed. The researcher is also confident that the study has revealed issues and trends that have been worth reporting and may be used as a basis on which to embark on other related studies.

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APPENDIX A

Covering letter and *Survey questionnaire for university and university of technology graduates/diplomates*

Department of Library and
Information Studies
M.L. Sultan Campus
P O Box 1334
Durban 4000

Dear Respondent

SURVEY QUESTIONNAIRE FOR UNIVERSITY AND UNIVERSITY OF TECHNOLOGY GRADUATES/DIPLOMATE**S**

This survey is being undertaken in fulfilment of the Master of Technology qualification in Library and Information Studies at the Durban University of Technology. The study, which is being supervised by Professor J. Raju is entitled: A comparative study of the job functions of university and university of technology graduates/diplomates in special libraries and engineering firms. Like engineering firms, LIS services to draw their graduates/diplomates from both traditional universities and universities of technology (previously technikons). The intention is to uncover any innovations, lessons and best practices from the engineering environment that the LIS profession can adapt/adopt in terms of staff structures, job functions of graduates, and qualification requirements.

This study is part of a wider research project looking into other disciplines for purposes of addressing challenges currently facing the LIS profession. Your valuable responses would assist in addressing these challenges. Hence questionnaires are being sent to special libraries and engineering firms in KwaZulu-Natal. Your cooperation in completing this questionnaire would be greatly appreciated. You may be assured that your responses to the questions would be treated with utmost confidentiality and would be used strictly for research purposes.

I would be grateful if you could complete and return the questionnaire at your earliest convenience but before the _____.

Yours sincerely

Athena Rajagopaul (Miss)
Tel.: (031) 5394336
Cell No.: 072 938 1619 -mail:
athenarajagopaul@gmail.com

A comparative study of the job functions of university and university of technology graduates/diplomates in special libraries and engineering firms

SURVEY QUESTIONNAIRE FOR GRADUATES/DIPLOMATES

IMPORTANT:
Please ensure that you are completing the correct questionnaire as indicated at the top right hand corner of this questionnaire. The **SURVEY QUESTIONNAIRE FOR UNIVERSITY AND UNIVERSITY OF TECHNOLOGY GRADUATES/DIPLOMATES** is to be completed by **LIS** and **Engineering graduates/diplomates** (who are not in senior management positions). The **SURVEY QUESTIONNAIRE FOR EMPLOYERS** is to be completed by **special library** and **engineering firm employers** (e.g. managers, directors).

Please answer all questions. Where necessary, tick (✓) the relevant option. Confidentiality is assured.

1. Please indicate which organization are you currently employed at?

   _____
   _____
   _____

2. Please indicate which department in your organization are you currently employed in e.g. Engineering, Packaging, Waste Water Design, Technical Support - Pollution & Environment, Water & Sanitation, Recreation, Library, Resource Centre, etc.?

   _____
   _____
   _____

3. What is your current job title/designation?

	Job title/Designation	**Select one**
1	Engineering Manager	
2	Engineer	
3	Engineering Technologist	
4	Engineering Technician	
5	Senior Librarian/Principal Librarian	
6	Librarian	
7	Senior Library Assistant/Principal Library Assistant	
8	Library Assistant	
9	Other (Please specify)	

4. Please indicate where your current position is located in terms of the organogram/organizational structure of the organization that you are currently employed in. Alternatively attach an organogram/organizational structure.

_____
_____
_____
_____
_____
_____
_____

5. Please specify your highest academic qualification.

	Qualification	**Select one**
1	B.Sc. Engineering	
2	B.Tech.: Engineering	
3	T4: Engineering	
4	National Diploma: Engineering	
5	B.Bibl. (Bachelor of Library and Information Science) or equivalent	
6	Postgraduate Diploma in Library and Information Science	
7	B.Tech.: Library and Information Studies	
8	National Diploma: Library and Information Studies	
9	Other (Please specify)	

6. In which year did you obtain this qualification?

	Year qualification obtained	
1	200___	
2	199___	
3	198___	
4	Other (Please specify)	___ ___ ___ ___

7. From which higher education institution did you obtain this qualification?

	Institution	**Select one**
1	Durban University of Technology (DUT)	
2	M.L. Sultan Technikon (now DUT)	
3	Mangosuthu Technikon (now Mangosuthu University of Technology (MUT))	
4	Natal Technikon (now DUT)	
5	Technikon South Africa (TSA- now UNISA)	
6	University of Durban-Westville (UDW- now UKZN)	
7	University of KwaZulu-Natal (UKZN)	
8	University of Natal (now UKZN)	
9	University of South Africa (UNISA)	

10	University of Zululand (UniZulu)	
11	Other (Please specify)	

8. Please indicate the time period you have occupied your current position.

	Number of years	**Select one**
1	Under 12 months	
2	1-5	
3	6-10	
4	11-15	
5	16-20	
6	21-25	
7	Other (Please specify)	

9.1. Have you secured a promotion/s in your current organization?

	Yes/No	**Select one**
1	Yes	
2	No	

9.2. If you have responded **No** to **9.1**, please list the core responsibilities/job functions of your current position.

_____
_____
_____
_____
_____
_____
_____
_____

9.3. If you have responded **Yes** to **9.1**, please indicate your previous job designation/s and current job designation.

(a) Previous job designation/s:

_____
_____

(b) Current job designation:

_____
_____

9.4. If you responded to **9.3**, please list your core responsibilities/job functions of:

(a) Your previous job designation/s:

_____
_____
_____
_____

(b) Your current job designation:

_____
_____
_____
_____
_____
_____

10. Which term describes the way your current position is viewed by your organization?

	Paraprofessional/Professional	**Select one**
1	Paraprofessional	
2	Professional	

11. Are the skills and knowledge acquired via your highest academic qualification adequate in equipping you to perform your current job functions?

	Yes/No	**Select one**
1	Yes	
2	No	

Please explain your response:
(If you selected **No**, please list skills and knowledge that your qualification did not equip you with.)

_____
_____
_____
_____
_____

12. Did you require further training while in your current position?

	Yes/No	**Select one**
1	Yes	
2	No	

If **Yes**, please mention:

(a) What training did you require:

_____
_____
_____

(b) Who provided the required training:

_____
_____
_____

13. With your current qualifications do you think there is opportunity for you to move up in the department/organization you are currently working at?

	Yes/No	**Select one**
1	Yes	
2	No	

Please explain your response:

_____
_____
_____
_____
_____
_____

Questions 14, 15 and 16 are to be answered by graduates/diplomates in special libraries only.

14.1. What expertise do you believe is critical to the efficient functioning of special libraries?

	Expertise	**Select one**
1	LIS expertise	
2	Subject specific expertise e.g. law for law libraries	
3	Balance of both	

14.2. Which academic qualification, do you believe is critical to the efficient functioning of special libraries?

	Academic qualification	**Select one**
1	Matriculation	
2	LIS qualification e.g. B.Bibl., B. INF., B.Tech., ND:LIS, Postgraduate Diploma in LIS	
3	Subject specific qualification e.g. Science Degree for a Science Library	
4	Combination of **2** and **3** above	

15. Please comment on the assertion that special libraries prefer to employ graduates/diplomates with subject expertise rather than LIS graduates/diplomates?

_____
_____
_____
_____
_____
_____
_____

16. Please comment on the assertion that special libraries prefer to employ persons with just a matriculation certificate.

_____
_____
_____
_____
_____
_____

17. Please feel free to make any further comments regarding the issues raised in this questionnaire.

_____
_____
_____
_____
_____
_____

Thank you for your time and effort in completing this questionnaire. Please have the completed questionnaire ready for collection by_____.

OR

Post to the address below (an addressed and postage paid envelope is enclosed for your convenience).

_____

Athena Rajagopaul
Tel: (031) 5394336
Cell: 072 938 1619
Email: athenarajagopaul@gmail.com
Durban University of Technology
Department of Library and Information Studies
M.L. Sultan Campus
P O Box 1334
Durban
4000

_____

APPENDIX B

Covering letter and *Survey questionnaire for employers*

Department of Library and
Information Studies
M.L. Sultan Campus
P O Box 1334
Durban
4000

Dear Respondent

SURVEY QUESTIONNAIRE FOR EMPLOYERS

This survey is being undertaken in fulfilment of the Master of Technology qualification in Library and Information Studies at the Durban University of Technology. The study, which is being supervised by Professor J. Raju is entitled: A comparative study of the job functions of university and university of technology graduate/diplomates in special libraries and engineering firms. Like engineering firms, LIS services too draw their graduates/diplomates from both traditional universities and universities of technology (previously technikons). The intention is to uncover any innovations, lessons and best practices from the engineering environment that the LIS profession can adapt/adopt in terms of staff structures, job functions of graduates, and qualification requirements.

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I would be grateful if you could complete and return the questionnaire at your earliest convenience but before the _____.

Yours sincerely

_____

Athena Rajagopaul (Miss)
Tel.: (031) 5394336
Cell No.: 072 938 1619
E-mail: athenarajagopaul@gmail.com

A comparative study of the job functions of university and university of technology graduates/diplomates in special libraries and engineering firms

SURVEY QUESTIONNAIRE FOR EMPLOYERS

IMPORTANT:
Please ensure that you are completing the correct questionnaire as indicated at the top right hand corner of this questionnaire. The **SURVEY QUESTIONNAIRE FOR UNIVERSITY AND UNIVERSITY OF TECHNOLOGY GRADUATES/DIPLOMATES** is to be completed by **LIS** and **Engineering graduates/diplomates** (who are not in senior management positions). The **SURVEY QUESTIONNAIRE FOR EMPLOYERS** is to be completed by **special library** and **engineering firm employers** (e.g. managers, directors).

Please answer all questions. Where necessary, tick (✓) the relevant option. Confidentiality is assured.

1. Please indicate which organization are you currently employed at?

_____
_____

2. What is your designation in this organization?

	Designation/Job title	Select one
1	Director	
2	Deputy Director	
3	Divisional Manager- Engineering	
4	Manager-Planning (Engineering)	
4	Manager-Scientific Services	
5	Human Resources Manager	
6	Other (Please specify)	

3. What is your highest academic qualification? e.g. B.Tech.: Human Resource Management, B.Sc.: Engineering, etc.

_____
_____
_____

4. From which institution did you obtain your highest academic qualification?

	Institution	Select one
1	Durban University of Technology (DUT)	
2	M.L. Sultan Technikon (now DUT)	
3	Mangosuthu Technikon (now Mangosuthu University of	

	Technology (MUT))	
4	Natal Technikon (now DUT)	
5	Technikon South Africa (TSA- now UNISA)	
6	University of Durban-Westville (UDW-now UKZN)	
7	University of KwaZulu-Natal (UKZN)	
8	University of Natal (now UKZN)	
9	University of South Africa (UNISA)	
10	University of Zululand (UniZulu)	
11	Other (Please specify)	

5. Please indicate whether your organization employs university graduates.

	Yes/No	**Select one**
1	Yes	
2	No	

6. If you responded **Yes** to **5** above, please indicate in what positions these graduates are generally employed.

	Positions	**Select as appropriate**
1	Librarian	
2	Library Assistant	
3	Engineer	
4	Engineering Technician	
5	Engineering Technologist	
6	Clerical positions	
7	Managerial positions	
8	Supervisory positions	

Other (Please specify):

_____
_____
_____
_____
_____

7. If you responded **No** to **5** above, please provide reasons why this is so.

_____
_____
_____
_____
_____

8. Does your organization employ university of technology (previously technikon) graduates/diplomates (diplomates refer to those with a National Diploma qualification)?

	Yes/No	**Select one**
1	Yes	
2	No	

9. If you responded **Yes** to **8** above, please indicate in what positions these graduates/diplomates are generally employed?

	Positions	**Select as appropriate**
1	Librarian	
2	Library Assistant	
3	Engineer	
4	Engineering Technician	
5	Engineering Technologist	
6	Clerical positions	
7	Managerial positions	
8	Supervisory positions	

Other (Please specify):

_____
_____
_____
_____
_____
_____

10. If you responded **No** to **8** above, please provide reasons why this is so.

_____
_____
_____
_____
_____
_____

Question 11 and 12 are to be answered by special library employers only.

11.1. Rank in order of preference (where **1** = 1st choice, **2** = 2nd choice, **3** = 3rd choice) the expertise necessary for the efficient functioning of the special library in your organization.

	Expertise	**Order of preference**
1	LIS expertise	
2	Subject specific expertise e.g. law for law libraries	
3	Balance of both	

11.2. Please provide reasons for this order of preference.

_____
_____
_____
_____
_____
_____

12.1. Rank in order of preference (where **1** = 1st choice, **2** = 2nd choice, **3** = 3rd choice and **4**= 4th choice) the academic qualification necessary for the efficient functioning of the special library in your organization.

	Academic qualification	**Select one**
1	Matriculation	
2	LIS qualification e.g. B.Bibl., B. INF., B.Tech., ND:LIS, Postgraduate Diploma in LIS	
3	Subject specific qualification e.g. Science Degree for a Science Library	
4	Combination of **2** and **3** above	

12.2. Please provide reasons for this order of preference.

_____
_____
_____
_____
_____
_____

13. Are the university of technology **National Diploma** and **Bachelor of Technology (B. Tech.) qualifications** categorized as paraprofessional or professional qualifications in your organization? Tick (✓) the appropriate option.

	Qualification	**Paraprofessional**	**Professional**
1	National Diploma		
2	Bachelor of Technology (B.Tech.)		

14. Please specify what skills and knowledge your organization seeks in a **traditional university graduate** and in a **university of technology** (previously technikon) **graduate/diplomate**. Please tick (✓) as applicable.

	Skills & knowledge	**University graduate**	**University of technology graduate/diplomate**
1	Ability to apply acquired knowledge		
2	Analytical skills		
3	Computer literacy		
4	Critical thinking		
5	Interpersonal skills		
6	Lateral thinking		
7	Letter & report writing skills		
8	Practical experience		
9	Problem solving skills		
10	Technical skills		
11	Time management skills		

Other (Please fill in skills & knowledge below the appropriate heading)

University graduate	**University of technology graduate/diplomate**

15.1. Does your organization believe that **university of technology** (previously technikon) **graduates/diplomates** possess adequate skills and knowledge to perform their job functions?

	Yes/No	**Select one**
1	Yes	
2	No	

15.2. If you responded **No** in Question **15.1**, please provide reasons for your choice, including what skills and knowledge are lacking?

_____
_____
_____
_____
_____
_____
_____

16.1. Does your organization believe that traditional **university graduates** possess adequate skills and knowledge to perform their job functions?

	Yes/No	**Select one**
1	Yes	
2	No	

16.2. If you responded **No** in Question **16.1**, please provide reasons for your choice, including what skills and knowledge are lacking?

_____
_____
_____
_____
_____
_____
_____

17. On a 5-point scale where **1** is **not important** and **5** is **very important** rate how important your organization considers a candidate's work experience for a particular position.

		Rate from 1 to 5
1	Experience	

Please provide reason/s for your choice of rating:

_____
_____
_____
_____
_____

18. On a 5-point scale where **1** is **not important** and **5** is **very important** rate how important your organization considers a candidate's qualifications for a particular position.

		Rate from 1 to 5
1	Qualifications	

Please provide reason/s for your choice of rating:

_____
_____
_____
_____
_____

19. Please attach an organogram/organizational structure for your organization showing how various designations are accommodated.

_____
_____
_____
_____
_____
_____
_____

20. If there are any general comments that you wish to make relating to the issues raised, please do not hesitate to do so in the space provided.

_____
_____
_____
_____
_____
_____
_____

Thank you for your time and effort in completing this questionnaire. Please have the completed questionnaire ready for collection by_____.

OR

Post to the address below (an addressed and postage paid envelope is enclosed for your convenience).

_____

Athena Rajagopaul
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_____