The impact of the digital divide on information literacy training of Extended Curriculum Programme students at the Durban University of Technology

Segarani Naidoo

Supervisor: Professor Jayarani Raju

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

2011

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.

S. Naidoo Date

_____ _____

Dedicated to my late father, beloved mother, husband and two children

Acknowledgements

I thank GOD for making everything possible in my life. I am grateful for all that has been bestowed on me.

I thank my parents for building a firm foundation and creating a loving environment in which I could thrive. I thank my mother for her undying love, support and assistance throughout my life. She has always been my backbone. I feel blessed to have had parents like you.

Pravesh, you have been more than a husband to me. You have been a pillar of strength from the very beginning. Thank you for the encouragement and support.

Professor J. Raju, I could not have wished for a better supervisor. You have been an encouraging, patient and dedicated supervisor. When times were dark you always overshadowed the darkness with light that made me want to continue.

To my two lovely children, thank you for all the support and assistance. You both made a lot possible in my life. I extend special gratitude to you, Nivana, for all your assistance, even during your examinations.

To Sagren, your willingness to help and sacrificing your personal time to assist me would always be appreciated. I am hoping that I can reciprocate this gesture when you need assistance from me.

To my friends, Pam, Reshmee, David, Sarah, Mousin, Athena and Jerry, thank you for all the assistance, support and for being there to lighten my load.

Thank you to the DUT Subject Librarians, 2010 ECP students and the ECP Coordinator who participated in this study - a special thank you to those who went the extra mile; Molly and Vinesh from the Steve Biko campus library, and Vuyani, a very big thank you. I would not have completed this research without your assistance.

Thank you to Deepak Singh, my statistician for all your assistance, understanding and support.

Thank you, Dennis for assisting with my workload whilst I was on leave and Lutchmee, for being ever ready to lend me the dictaphone when I needed one.

I also thank my sister-in-law, brother and mother-in-law for their assistance, support and encouragement. A special thank you to my sister-in-law Sermeshni for proof-reading this dissertation.

To Nicky Muller and Lucille Webster - your support and enquiries regarding my studies meant a lot to me.

To the many friends and relatives (too many to mention) your concern and encouragement meant the world to me.

I would also like to thank the Library Management (DUT) for allowing me the time and study leave to complete this research.

Abstract

This study investigated the impact of the digital divide on information literacy (IL) training of Extended Curriculum Programme (ECP) students at the Durban University of Technology (DUT). There are students entering the tertiary education environment in South Africa who have never used the Internet or have little or no knowledge of technology. Hence South African higher education institutions have a heterogeneous mix of both digitally advantaged students and digitally disadvantaged students. The objective of this study was to investigate the impact of the digital divide on IL training of ECP students at the DUT and to recommend guidelines for teaching and learning of IL that would accommodate both digitally advantaged and digitally disadvantaged students. The sub-objectives of the study were: to identify in what ways the digital divide impacts on the IL training of ECP students; to identify innovative teaching and learning methods to accommodate the diversity of students in the IL classroom; and to recommend guidelines for teaching and learning of IL in the ECP that accommodates the digital divide among participating students. Hence, the three population sets for the study were: DUT ECP students of 2010, Subject Librarians teaching IL to ECP students and the DUT ECP Coordinator. The study employed a mixed method approach in its research design. Data was collected from ECP students by means of a questionnaire, an interview schedule was used to collect data from Subject Librarians involved in teaching of the IL module to ECP students and lastly, a separate interview schedule was used to collect data from the ECP Coordinator. Qualitative data that was collected from the survey questionnaire was analysed using *SPSS* (Version 18.0) whilst qualitative data collected from the interviews and from the questionnaires was analysed thematically using content analysis. The findings of this study reveal that the digital divide does impact on IL training in ways such as, slowing down the progress of IL lessons; basic computer skills need to be taught in the IL classroom and that disadvantaged students find it difficult to follow online lessons while advantaged students already have the expertise to access online information. Based on these findings the study recommends that computer literacy training precede IL training; that various creative teaching and learning methods, such as, group work, games, online tutorials and interactive

websites be incorporated into IL training to accommodate both digitally advantaged and digitally disadvantaged students in the IL classroom.

Table of contents

List of Tables

List of Figures

List of abbreviations

A levels	Advanced levels
ASU	Academic Support Unit
BGCSE	Botswana General Certificate of Secondary Education
CELT	Centre for Excellence in Learning and Teaching
CHE	Council on Higher Education
CHED	Centre for Higher Education Development
CIM	Chartered Institute of Marketing
CPP	Career Preparation Programme
DIT	Durban Institute of Technology
DoE	Department of Education
DUT	Durban University of Technology
ECP	Extended Curriculum Programme
ELAP	English Language for Academic Purposes
FTE	Full time equivalent
GCE	General Certificate of Education
GIS	Global information society
ICT	Information and communication technologies
IELTS	International English Language Testing System
IL	Information literacy
ITS	Integrated Tertiary Software
MIT	Manipal Institute of Technology

MUT	Mangosuthu University of Technology
ND	National Diploma
NMMU	Nelson Mandela Metropolitan University
OPAC	Online Public Access Catalogue
SMIT	Sikkim Manipal Institute of Technology
UCT	University of Cape Town
UFP	University Foundation Programme
UK	United Kingdom
UKZN	University of KwaZulu-Natal
USA	United States of America

Chapter 1: Introduction and background to the study

1.1 Introduction

Digital divide, according to Mutula (2005: 122) is a "multi-dimensional phenomenon". The scope of the digital divide could be classified into various sections, namely, divergence of Internet access by developed and developing societies; the gap that exists between the information rich and the information poor; and, the divide that dictates who uses or does not use technology. In post-apartheid South Africa there are students entering the tertiary education environment who have never used the Internet and students from rural areas who have little or no knowledge of technology.

Salinas (2003: 134-135) argues that access to technology alone is not enough to bridge the digital divide and thus training plays an important role in addressing this problem. Students at the Durban University of Technology (DUT) have access to technology but many have little or no prior knowledge or experience of how to use the information tools to retrieve information that is needed. Thus while training in the use of these tools is important, training in the use of the technology must be addressed first, as basic skills in the use of the mouse, keyboard and other information and communication technologies is often lacking.

Cullen (2001: 311) defines the digital divide as the gap or divide that exists between those with ready access to ICT tools and those without such access or skills. The experience of the researcher is that in South African tertiary education institutions there are students who fall into both these categories; some students have no such access or skills and yet there are also those who have had access and are skilled in the use of and have vast experience with ICTs. Today, learning environments are designed to include web-based technologies and thus the ease of use of these technologies is essential (Brown 2002: 3). However, the South African scenario is such that a majority of tertiary education learners have only just been introduced to computers and Internet technology and thus grapple with basic computer skills.

Interest in information literacy (IL) began in the early 1990s and has grown rapidly. Ojedokun (2007: xiii) emphasises that the emergence of the 'information age' brought about an interest in 'information literacy'. IL is commonly defined as the ability to: identify the need for information; know the importance of accurate and authentic information; develop search strategies to assist in finding information; source information; evaluate information; use and organise information effectively (Andretta 2005: 15). An investigation into the impact of technology on students who have been disadvantaged or advantaged in terms of achieving the above mentioned skills in the current IL classroom was necessary, as information literacy lessons in the tertiary education environment are usually presented in a generic manner to students participating in the IL module.

In a single IL classroom one could find a student who has grown up with technology or one who has never used technology before and thus grapples with the use of the mouse, keyboard and other information technology tools or resources that need to be mastered in the IL classroom. One could find a "digital immigrant", who is described as a student who was not born into the digital world but who has adopted, or is adapting to the digital world (Prensky 2001: 3). Prensky (2001: 1) describes the "digital native", on the other hand, as a student who has grown up with technology and is thus accustomed to the digital world. The latter term, sadly, does not adequately describe the current South African situation as many current tertiary education students were born in the digital era but not all of them have prior experience or exposure to technologies of today.

In recent years there has been an extremely high "failure, repeater and dropout rate" at higher education institutions in South Africa and thus the Department of Education (DoE) has provided special funding for the Extended Curriculum Programme (ECP) at South African universities (Cape Peninsula University of Technology 2008a). Rambharos (2010) of DUT's CHED (Centre for Higher Education Development), now known as the Centre for Excellence in Learning and Teaching (CELT), disclosed that the ECP has been offered at the DUT since 2005, initially as a pilot study. In 2006 the ECP at DUT was formalised. The purpose of introducing the ECP at higher education institutions was to aid struggling students in developing independent learning skills and gaining conceptual knowledge of subjects that they are enrolled for (Cape Peninsula University of Technology 2008b). ECP subjects are not

new subjects but are extensions to the existing curriculum. The Extended Curriculum Programme at the DUT (formally DIT – Durban Institute of Technology) includes various modules or interventions. Some of the interventions include English Communication, End-User Computing, Academic Literacy and Information Literacy (Hlengwa 2005). These modules are not add-on modules but are integrated modules that supplement the skills which students require to complete assignments, projects, etc. in their core courses. All teaching and learning are well integrated into the mainstream assessments. The current study focuses on the information literacy module of the DUT's Extended Curriculum Programme.

1.2 Research problem

South African society was subjected to the policy of apartheid prior to 1994. Educational practices were based along the lines of segregation, according to racial groups. Thus, during the apartheid era students attended tertiary education institutions according to race and with the result an institution's student body was a homogenous group. Patterns of segregation and unequal provisions along racial lines resulted in inequalities between white and black students (Pavlich and Orkin 1993: 1-2). Between 1960 and 1984 legislation was passed that had impacted on the education of the different racial groups (Behr 1984: 241). Pavlich and Orkin (1993: 1-3) reveal that educational institutions were funded unequally along racial grounds. Swartz and Foley (1996: 38) highlight the scenario where the majority of students entered tertiary education institutions having been exposed to apartheid designed educational institutions in which they lacked exposure to technology or digital information as these schools were under-resourced. Singh (2004: 4) confirms that apartheid education promoted separate development, providing inferior education to 'non-whites'.

Since 1994, however, the demographics of tertiary institution enrolment in South Africa has changed. Today institutions have a heterogeneous group of students, by race, economic background, digital background, etc. and consequently with different levels of literacy, information and otherwise. The problem that this study addressed was the impact of having both digitally advantaged and digitally disadvantaged students in the same information literacy classroom, expecting them to reach the teaching and learning

outcomes without frustrating students from either group. This scenario has most certainly contributed to the digital divide that we experience today.

1.3 Objective of the study

The broad objective of this study was to investigate what impact the digital divide has on the information literacy training of ECP students at the DUT and to recommend guidelines for teaching and learning of information literacy that would accommodate both the digitally advantaged and the digitally disadvantaged.

1.4 Sub-objectives of the study

The sub-objectives of the study were as follows:

- to identify in what ways the digital divide impacts on the IL training of ECP students;
- to identify innovative teaching and learning methods to accommodate the diversity of students in the IL classroom; and
- to recommend guidelines for teaching and learning of IL in the Extended Curriculum Programme that accommodates the digital divide among participating students.

1.5 Motivation for the study

This study, it is hoped, would benefit future ECP students as universities would be made aware that information literacy training must cater for diverse groups of students. Librarians, who generally teach the IL module of the ECP, would be encouraged to approach information literacy differently. For example, delivery methods such as online tutorials could be used for the digitally advantaged students and other teaching and learning methods such as peer teaching could be adopted for the digitally disadvantaged students. Many tertiary education institutions have embarked on offering the ECP to redress the historical legacy of poor education in South Africa and this study hopes to contribute to improving the information literacy module of the Extended Curriculum Programme offered at tertiary institutions in South Africa. The study also hopes to recommend guidelines for teaching and learning of IL

in the Extended Curriculum Programme that accommodates the digital divide among participating students.

1.6 Definition of relevant terms

The terms that are relevant to this study are explained in this section.

1.6.1 Digital divide

There is wide disagreement on exactly what the 'digital divide' is resulting in various definitions of the digital divide (Salinas 2003: 131). These definitions of the digital divide take into account the lack of access to information and communication technologies by different groups of people, the gap that exists between those who access and make effective use of information technology and those who cannot (Aqili 2008: 226). While some may argue that when looking at the digital divide one should look at the availability of computers, technology and the infrastructure needed, others may argue that one should look at the ability to access and effectively use the available technology as well. Aqili (2008: 228) point outs that accessing information and resources seems to be an important aspect in defining the digital divide. The researcher agrees with Salinas (2003: 132) that "the digital divide is about people and not computers". The digital divide, it seems, has various aspects to it, none of which is less important than the other. For the purposes of this study, the researcher is concerned with the student's ability to access digital information that is available.

1.6.2 Information literacy

The emergence of the 'information age' highlighted the importance of 'information literacy' (Ojedokun 2007: xiii). As explained earlier, IL has been commonly defined as the ability to identify the need for information; to know the importance of accurate and authentic information; to develop search strategies to assist in finding information; to source information; to evaluate information; and, to use and organize information effectively (Andretta 2005: 15). Rippey and Ryan (2007) describe information literacy as the process of retrieving and evaluating information and not just the process of acquiring knowledge and doing research in a particular field. They further highlight the impact of technology on

libraries due to various formats that information is now available in and this, in the view of the researcher, in turn impacts on IL skills. The DUT, which is the research site for this study, has embraced Andretta's (2005: 15) definition of information literacy, that is, the ability to identify the need for information; to know the importance of accurate and authentic information; to develop search strategies to assist in finding information; to source information; to evaluate information; and, to use and organize information effectively. Hence this study also subscribes to this definition of information literacy.

1.6.3 Foundation or Bridging or Augmented programme

Reynolds (2008: 81) explains that unequal primary and secondary education also impacts on students gaining entrance into higher education institutions in South Africa. Reynolds (2008: 81) further elaborates that the introduction of Foundation Programmes was one method used to address this problem.

Scott, Yeld and Hendry (2007: 2) disclose that black students have performed worse than white students in higher education institutions. Strategies thus needed to be developed to address this problem. The absence of strategies to address the under-preparedness of students to succeed in higher education led the DoE to introduce the Foundation, Bridging and, more recently, the Extended Curriculum Programmes. There were intensive policy changes in the higher education sector in the post-apartheid era in order to change teaching and learning practices (De Jager and Nassimbeni 2005: 31). Wood and Lithauer (2005: 1002) claim that Foundation Programmes allow alternate routes to access higher education institutions. The aim was to widen access to higher education for disadvantaged students through Foundation or Bridging courses.

The Augmented Programme was introduced to assist under-prepared students gain access to and succeed at South African higher education institutions. With the introduction of the Augmented Programme there was a significant shift from a separate Foundation Programme to a semi-integrated programme (Reynolds 2008: 83).The Augmented Programme was supplemented by academic development courses, which could include, like the ECP

programme, academic literacy, computer literacy and information literacy. This programme assisted students to prepare for the employment world.

1.6.4 Extended Curriculum Programme

As explained in Section 1.6.3 the ECP is the more recent Foundation type programme addressing the under-preparedness of students to succeed in higher education in South Africa. The high "failure, repeater and dropout rate" at higher education institutions in South Africa prompted the Department of Education (DoE) to provide special funding for the Extended Curriculum Programme (ECP) at South African higher education institutions (Cape Peninsula University of Technology 2008a). In 2004 higher education institutions applied for funding from the DoE (Department of Education 2004) to offer the Extended Curriculum Programme. The ECP is offered as an extended integrated course, which could be extended by one or two years. The structure and the curricula of the Extended Curriculum Programmes lack standardisation. The duration of the programme may also differ from one institution to another and within institutions as well (Reynolds 2008: 81).

According to the DoE the focus of these Foundation Programmes can either be such that the Foundation courses are core subjects or the courses may be extended but must be an integrated curricula incorporating the Foundation provision (Department of Education 2004). The current emphasis is thus on an integrated approach to support modules that are offered and not stand-alone programmes.

1.6.5 Information and communication technologies (ICTs)

Society was forced to evolve over the years in terms of the information overload and a rapidly changing information environment. Today society demonstrates the need for information skills more than ever before (Fourie and Bothma 2006: 469). Tinio (2002) defines ICTs as diverse technological tools and resources that are used to: communicate; create information; disseminate information; store information; and, manage information. These technological tools and resources could include computers, the Internet, radio and

television (broadcasting technologies) and telephony (Tinio 2002). ICT is an umbrella term that is used to refer to any communication device or application. The term ICTs in this study refers more especially to information databases, emerging social networking tools and other online resources. Examples of ICTs relevant to this study include: e-mail; social networks such as Facebook, Twitter and Blogs; Internet websites; information databases (bibliographic and full-text); etc.

1.7 Overview of research methodology

The current study lent itself to the use of mixed method research as both qualitative and quantitative data were collected. It was envisaged that collecting data from different population groups would contribute to the collection of rich data and increase the reliability of the data. Thus self-administered questionnaires were distributed in 2010 to 227 (75%) of 303 ECP students engaged in the information literacy module, interviews were conducted with the Subject Librarians teaching IL to the ECP students at DUT and a separate interview schedule was used to conduct an interview with the DUT CELT ECP Coordinator. To assist the researcher in compiling items for the research instruments, a variety of literature was consulted, giving the researcher a sound insight into aspects that needed to be probed.

For the purposes of this study the researcher used numerical values to code the data that was collected from the survey questionnaire whilst the qualitative data collected from the interviews was analysed by grouping responses into themes or concepts (content analysis). Frequency counts of the responses to open-ended questions were also presented. The analysis of the data from the survey questionnaire was done with the assistance of the computer software, *SPSS* (version 18.0). This software allowed the researcher to analyse and present the findings by means of graphs and tables. The qualitative findings were presented by means of narratives, graphs and tables wherever possible. Frequency counts were also presented where possible to highlight the number of respondents that shared the same or similar view.

1.8 Limitations and delimitations of the study

Pajares (2007) defines limitations as the potential weaknesses of the study. Limitations are those aspects that fall outside the researcher's control that could have an adverse effect on the research findings. In the case of this study language could be identified as a possible limitation of the study. The majority of ECP students engaged in the IL module at DUT are English second language students and thus their complete understanding of the questionnaire might have been problematic in places. However, as explained in Chapter Three, the researcher made every effort in the design of the self-administered questionnaire and its pretesting to obviate difficulties here.

Delimitations on the other hand, have been defined by Pajares (2007) as boundaries that the researcher sets to exclude factors from the research. Delimitations assist researchers to narrow the scope of research. In the case of this study, the researcher opted to include only ECP students engaged in the IL module in the study, although the digital divide is experienced in other IL classrooms as well. The researcher chose to use ECP students so that generalisations among specifically ECP students could be made as every ECP student engaged in the IL module at DUT in 2010 (at the time of the study) was included in the population of the study. The duration of the ECP programme varies in the different departments at the DUT that offer the ECP and although there were students who were registered for the ECP programme, only those students who were engaged in the IL training at the time of the study were included in the population.

A further delimitation was that although all Subject Librarians at DUT teach information literacy, not all Subject Librarians teach IL to ECP students. There are only six Subject Librarians who teach IL to ECP students at DUT. This was one of the delimiters set for this study.

The Extended Curriculum Programme is offered at most higher education institutions in South Africa. However, for the purpose of this study the researcher limited the research to DUT as it was believed that ECP is a relatively young programme and many institutions are still experiencing teething problems. A wider study, perhaps at doctoral level, at a later stage could possibly carry out a national comparison of ECP programmes.

1.9 Structure of research report

This research report consists of five chapters. The first chapter provides details regarding the background to the study; the research problem; research objective and sub-objectives; motivation for the study; definitions of terms relevant to the study; an overview of the research methodology used; limitations and delimitations of the study; and, an outline of the research report. Chapter Two reviews literature relevant to the study. Chapter Three discusses the methodology used to carry out the research and Chapter Four presents the findings of the study. The concluding chapter (Chapter Five) offers discussion of the findings and based on this discussion, conclusions are drawn and recommendations are made. A reference list is included and necessary appendices are attached.

1.10 Summary

This chapter introduced the research problem that the study investigated and provided a background to the study. The objective and sub-objectives that guided the study were also presented. Relevant definitions, motivation for the study, an overview of the methodology used, limitations and delimitations of the study, and an outline of the research report were presented in this chapter as well. The next chapter reviews the wealth of literature available on the topic.

Chapter 2: Literature review

2.1 Introduction

A literature review is the starting point for researchers to find out about research that has been done on the topic and to assimilate one's thoughts and ideas in relation to past research (Denscombe 2003: 115). Marshall and Rossman (2006: 43) outline the importance of the literature review in helping the researcher to gain a conceptual framework and to contextualise the topic in relation to other research. This helps the researcher in determining whether the topic or similar topics have been researched previously. The literature review helps in ascertaining what was done previously on the topic or related topic and what is currently being done in this area.

Bless, Higson-Smith and Kagee (2006: 24) emphasise the importance of the literature review in creating an awareness of the topic and the latest developments on the topic. The literature review can also be used to guide the researcher in regard to the methodology that best suits the topic (Bless, Higson-Smith and Kagee 2006: 25).

According to Marshall and Rossman (2006: 43) the literature review serves four basic functions. These functions are: firstly, it demonstrates the assumption/s that underpin the research, secondly, it demonstrates that the researcher is aware of other research or related research that supports the study, thirdly, it shows that the researcher has identified a gap in the existing body of knowledge and that the proposed study will fill that gap; and lastly, the literature review assists the researcher in refining and redefining the research objectives and sub-objectives.

This chapter thus presents the literature that was reviewed regarding the impact of the digital divide on information literacy training. It examines terminologies that are used in related research and generally assists in developing a framework for the research. Through available literature (albeit a dearth of it in some cases), this chapter also examines

Extended Curriculum Programmes or their equivalents internationally and nationally in order to place this study in its relevant context.

2.2 South African tertiary education

In the pre-1994 era, the policy of apartheid had dominated every aspect of South African society. Educational practices were based along the lines of segregation, that is, by racial groups. Patterns of racial segregation and unequal provisions have resulted in inequalities between white and black students (Pavlich and Orkin 1993: 1-2). Between 1960 and 1984 legislation was passed that had impacted on the education of different racial groups (Behr 1984: 241). Pavlich and Orkin (1993: 1-3) explain that institutions were funded unequally on racial grounds. Black students had been oppressed and denied access to universities (Swartz and Foley 1996: 34). Singh (2004: 4) claims that apartheid education promoted separate development, providing "inferior" education to "non-whites". According to Swartz and Foley (1996: 38) majority of students entering tertiary institutions had received "apartheid designed education" which did not expose them to technology or digital information as these schools were largely under-resourced. Much of this remains unchanged. Although South Africa is more than fifteen years into democracy the divide has not been eliminated as yet. It is still experienced and seen at tertiary institutions in South Africa. As Singh (2004: 5) points out, South Africa will take a long time to heal itself from the effects of apartheid education.

The demographics of tertiary institution student enrolment in South Africa has evolved over the years. During the apartheid era students attended such institutions according to their race and with the result the student body was a homogenous group. Today we have a heterogeneous group of students, by race, economic background, educational background, information literacy, digital background, etc. This heterogeneity has contributed to the digital divide.

The educational focus too has evolved over the years. Education is now learner-centred and thus much of the learning takes place outside the classroom, for example, in libraries

(Lippincott 2005: 1). The library plays a pivotal role in assisting students in gaining lifelong learning skills, for example, sourcing information. Tertiary education is expected to provide learners with a wide range of skills and knowledge. Students should develop critical thinking skills and cultural and civil value systems and at the end gain a qualification in a specific discipline (Ojedokun 2007:1). Ojedokun (2007: 3) further emphasises the importance of a quality tertiary education that will enable a student exiting the institution to contribute to the country's workforce, bringing the knowledge and skills into the work environment. He further explains that a knowledgeable and skilled workforce will then be able to contribute effectively to the global economy. While this is one of the current needs of South Africa, it becomes difficult to produce a knowledgeable and skilled workforce in view of the impact of the digital divide.

2.3 The digital divide

Society has evolved over the years, especially with the information overload and the information environment evolving so rapidly. Society today demonstrates the need for information skills more than ever before (Fourie and Bothma 2006: 469). Information and communication technologies (ICTs) are also here to stay. With the information explosion we see that the digital divide is increasing as well. The digital divide has increasingly grasped the interest of many institutions, the government and many organisations. This is further reiterated by Attewell (2001: 252) who posits that the challenges posed by the digital divide is of interest to political, business and government organisations alike. Higher education and other libraries in third world countries attempt to straddle this divide (Darch and Underwood 1999: 285). However, it is interesting to note that this is not only a problem faced in developing countries as research done by Attewell (2001: 252) discusses the problem of the digital divide due to unequal access to computers in the home and in school in the United States of America (USA). Attewell (2001: 253) explains that access and use of computers are main areas of concern in terms of the digital divide.

Libraries are no longer quiet places where students come to work on assignments and read (Tickle 2009: 7). Today, the library is a hub of activity where students come to use the latest technology, discuss assignments or projects with friends or study in groups or

connect up to their laptops, or connect to one of the social communication systems, for example, Facebook, e-mail, etc. Tickle (2009: 7), observes that students are no longer passive receptors of knowledge but there is the need to engage them with the latest technology. While the scenario that Tickle (2009: 7) describes is largely prevalent in the United Kingdom (UK) and other developed countries, in South Africa, however, libraries still have to take cognisance of the digital divide and thus there is still the need for books and passive learning. At the same time there are the digitally advantaged students who come to the library to use their laptops, the E-zone, etc. A study at Queensland University of Technology (Australia) by Lodge (2010: 103) reaffirms that although students use social networking sites, they still prefer face-to-face contact or communicating via a telephone. The study by Lodge (2010: 103) also found that students who were born before 1970 are less likely to use social networking sites. Although this may be true in Australia, in South Africa there are students who were born after 1970 but who are not familiar with any of the social networking sites.

There is wide disagreement on exactly what the 'digital divide' really is (Salinas 2003: 131). Salinas (2003: 131) explains that the disagreement arises from the various definitions of the digital divide. When looking at the digital divide, does one look at the availability of computers, technology and the infrastructure needed or does one look at the ability to access and effectively use the available technology? The researcher agrees with Salinas (2003: 132) that "the digital divide is about people and not computers". The digital divide therefore can be seen to have varying aspects to it, none of which is less important than the other but for the purpose of this study the researcher is concerned with the ability to access the digital information that is available.

Mutula (2005:122) explains that the digital divide is defined in different ways by different authors. According to Mutula, it refers to the inequitable access to information and communication technology (ICT), or access to and effective use of technologies. He further explains that the digital divide is a "multi-dimensional phenomenon" which could be categorised into three sections, namely, divergence of Internet access by developed and developing societies, the gap that exists between the information rich and the information poor and the divide that dictates who uses or does not use

technology. In South African higher education institutions, largely due to apartheid, as outlined above, there are those students who have never used the Internet or disadvantaged students from the rural areas who have little or no knowledge of technology. Many of these students have never held a computer mouse, have no keyboard skills and thus teaching them information literacy without addressing these problems can prove to be counterproductive. Salinas (2003: 134-135) supports the idea that access to the technology is not enough to bridge the digital divide and thus training becomes an important aspect to address this problem. Likewise, Fourie and Bothma (2006: 469) explain that the digital divide is not just about access to ICTs, but about the ability to retrieve information.

Salinas (2003: 134-135) also stresses the importance of the ability to critically and effectively use information and to communicate it successfully. The researcher has observed that students at the Durban University of Technology (DUT) have access to technology but some have no prior knowledge of how to use the information tools, for example, databases, the Internet or the Online Public Access Catalogue (OPAC) to retrieve information that is needed. Some students have never seen or touched a mouse or a keyboard. Some students tend to use the mouse as a pointing device. Thus while training in the use of these information finding tools is important, training in the use of the technology must be addressed first.

Cullen (2001: 311) defines the digital divide as the gap or divide that exists between those with ready access to ICT tools, and the information they provide, and those without such access or skills. The experience of the researcher is that in South African higher education institutions, particularly at the DUT, there are students who fall into both these categories. The digital divide is very prevalent at DUT. Some students have no such access or skills and yet there are also students who have had access and are skilled in the use of and have vast experience with ICTs. Four key issues have been identified as factors contributing to the digital divide. These are "physical access to ICTs; ICT skills and support; attitudes and content" (Cullen 2001: 313). Attitudes and content also have relevance to this study. Students that come from a rural background are generally accustomed to an oral tradition of communicating information. Using the

Internet is a conflicting practice as compared to the oral practice they use. These students are also often accustomed to censored information and use of South African terminology whilst the Internet has no restrictions on what is available via it and the terminologies are largely western (Cullen 2001: 313). The information explosion has resulted in students being exposed to international terminologies which are not necessarily comprehended by South African students. In South Africa students are also restricted in terms of what they can access. Higher education institutions in developing countries still experience access, bandwidth and other related problems. Thus, universities and higher institutions restrict what students can access. This could be regarded as censorship. Thus attitudes and content could also play an important role in the digital divide.

Singh (2004: 1) refers to the "global information society (GIS)", a society where every individual is connected to anyone via the globe by the Internet. This situation is difficult to manage as there are billions that have no access to technology and may not have access in a lifetime. Singh (2004: 1) describes the digital divide as a situation where there are the "information haves and the information have-nots". He further states that poverty, illiteracy, the lack of infrastructure and inadequate government interest has further widened the digital divide. The impact of the digital divide is prevalent at the DUT. In a single classroom there would be those students who come from a rural background with no prior experience or skills with ICTs and then one would find students who have had exposure and have skills to use the ICTs that are currently available. According to Singh (2004: 4) the digital divide is very wide in South Africa, and he cites statistics that reveal the gap: 4.5% information haves and 95.5% information have-nots. Singh (2004: 4) further explains that apartheid was the main contributing factor to the digital divide. Darch and Underwood (1999: 285) support Singh's (2004: 4) assertion when they claimed that the gap between the rich and the poor in South Africa is the largest in the world. They too pointed out that this is due to the skewed resource provision during the apartheid era.

In a single information literacy (IL) classroom one could find a student who has grown up with technology as well as a student who has never used technology before and is thus grappling with the use of the mouse, keyboard and other information technology

resources that need to be mastered in the classroom. One could find a "digital immigrant", who may be described as a student who was not born into the digital world but who is adapting to technology (Prensky 2001: 3). Prensky (2001: 1) describes the "digital native", on the other hand, as a student who has grown up with technology. It is interesting to note that this scenario is not limited to South Africa or developing countries only. Kennedy et al. (2008: 117) indicate that first year students entering the University of Melbourne (Australia) are also a heterogeneous group in regard to technology and that this could pose a "potential digital divide". Kennedy et al. (2008: 117) indicate that while "net generation" students have embraced the use of computers and ICTs, this is not the experience of all students. The term "digital native", however, does not describe the current South African situation adequately because most current students are born in the digital era but not all students have prior experience or exposure to current technology.

Brown (2002: 1) examined the perceived ease of use of web-based technologies in the learning and teaching environment. He demonstrated that "computer anxiety" influences the use of technology. The introduction of technology in the teaching and learning environment may be a further impediment: the IL classrooms in South Africa include both digitally advantaged students and digitally disadvantaged students in the same classroom, posing a problem to the teaching and learning environment. Web-based technologies are believed to facilitate the learning process and thus the ease of use is necessary (Brown 2002: 3). Kennedy et al. (2008: 110), in a study done at the University of Melbourne on first year students' experiences with technology, however, highlight the fact that high levels of usage and skill does not convert into a preference for increased use of technology in the classroom. The study further indicates that students prefer a moderate use of technology in the classroom and technology could also supplement the courses. Students from disadvantaged backgrounds face challenges in a web-based environment. Kennedy et al. (2008: 117) also explain that basic technology skills on the part of students do not necessarily translate into sophisticated skills, enabling them to use other information databases or possess general information literacy skills.

Lippincott (2005: 1) uses the term "net generation" to describe the students who currently enter higher education institutions. The term "net generation" may be interchangeably used with the "digital native", a term that Prensky (2001: 1) uses. Manual (2002: 195) puts forward more terms that are synonymous to the "digital native": "Nintendo Generation", "Millennials" or "Generation Y". All these terms refer to students who have grown up with computers, cell phones and video games and thus are accustomed to a multimedia environment. These students prefer to figure things out for themselves. For the purpose of this study the terms 'digital native', 'digitally advantaged' and 'digitally disadvantaged' would be used. The researcher elected to use these terms as majority of students entering DUT currently are born post 1970 and yet they are not truly 'digital natives'. Lippincott (2005: 1) asserts that the "digital native" cannot be expected to sit in a classroom learning the library system from librarians who are considered as experts in the field, learn in a traditional library setting or learn text-based information. Instead, they prefer to learn through gaming, or the use of social networks, for example, Blogs, Twitter, Facebook and other interactive techniques. Kennedy et al. (2008: 110), in their study, conclude that it is an assumption that "digital natives" prefer technology in the classroom because of their use of various technologies in their daily lives. The study done by Kennedy et al. (2008: 118) provides evidence that the assumption that the integration of ICTs into the academic curricula will benefit all students or the academic world is incorrect. The current environment in which most training is undertaken at DUT Libraries is such that there is the presence of both the 'digital native' who cannot be expected to sit in a traditional classroom setting and be instructed in the use of databases, library systems, etc. and the digitally disadvantaged student who needs to be nurtured and does not understand the basics of technology tools, let alone databases and any other advanced library system.

This section has shown that writers have provided different definitions and aspects to the digital divide. The aspects that the digital divide covers include training, access, attitudes of ICT users, etc. However, for the purpose of this study the digital divide refers to the inequitable access to ICTs and the lack of experience with ICTs and the fact that the majority of students, in a developing context like South Africa, coming to tertiary education institutions today do not generally have prior experience with information tools thus impacting on information literacy training that is being offered to

ECP students at tertiary education institutions. The information literacy module at the DUT is discussed in more detail in Section 2.4. However, one of the outcomes of the information literacy module is the ability to source information from all available sources. How can digitally disadvantaged students be expected to attain this outcome when proficiency in the use of ICTs and other information tools is lacking? At the same time, digitally advantaged students are likely to find basic training in the use of ICTs boring and are likely not to want to be taught basic navigation through the Internet, something they have grown up doing.

2.4 Information literacy

In the 1970s and 1980s a commonly used term for information literacy education was 'library education' or 'library instruction' or 'bibliographic instruction'. According to Andretta (2005: 6) these terms referred to the teaching of the use of access tools such as library catalogues and other library reference sources that aided the user in searching for information. This instruction was teacher-centred whereas the emphasis in information literacy is on independent learning and is student-centred.

Interest in information literacy (IL) started in the 1990s and since then has grown rapidly. Sayed (1998: xiv) outlined the IL initiatives that tertiary institutions in the Western Cape region undertook in 1995. Thus it is evident that interest in information literacy began in the 1990s in the Western Cape region of South Africa. According to De Jager and Nassimbeni (2002: 168) the IL policy framework was formulated from three policy dormains, namely, education policies, information and communication technology (ICT) policies and library and information services policies. De Jager and Nassimbeni (2003: 108) attribute the interest in information literacy during the 1990s to the influx of information technology.

According to Ojedokun (2007: xiii) the concept of 'information literacy' became important because of the emergence of the 'information age'. IL has been commonly defined as the ability to identify the need for information; know the importance of

accurate and authentic information; develop search strategies to assist in finding information; source information; evaluate information; use and organise information effectively (Andretta 2005: 15). Ojedokun (2007: 22) explains that an information literate person is one who has learnt how to learn. Andretta (2005: 1) further clarifies that information literacy is about independent and lifelong learning, with emphasis on knowledge construction.

Rippey and Ryan (2007) define information literacy as the process of retrieving and evaluating information and not just the process of acquiring knowledge and doing research in a particular field. They further highlight the impact of technology on libraries as there are various formats that information is now available in. This therefore has a direct impact on digitally disadvantaged students who are usually unable to access these various sources due to their lack of skills in retrieving information via electronic sources. According to Bruce (2002) information literacy is a basic skill needed in the current environment of rapid technological change.

Rader (2000: 378) points out that information literacy education has always taught one how to access, retrieve and evaluate information, which includes electronic formats as well. De Jager and Nassimbeni (2003: 108) define an information literate person as one who can recognise the need for information, access the needed information effectively and efficiently, evaluate information and sources critically, incorporate the selected knowledge into one's own knowledge base, use information effectively to fulfil a goal, use information ethically and, lastly, recognise that lifelong learning and active citizenship require information literacy.

A term that is commonly used today to describe the student's ability to use the provided information tools effectively and critically is 'information fluency' (Salinas 2003: 135). Salinas further points out that libraries have always been leaders in creating and implementing change and the digital era is no different. Libraries are once again faced with the impact of the digital divide on IL training. The current trend is an attempt at integrating information literacy and electronic information into the academic curricula

of students (Rader 2000: 379). The information literacy module offered to the Extended Curriculum Programme (ECP) students at the DUT is integrated into the curriculum in some departments and yet in other departments they are still grappling with the inclusion of the new module and thus offer the module as an 'add on', something that the government attempted to avoid (Rambharos 2009). 'Add on' modules will always be seen as extra work by students and thus the expected outcomes will not necessarily be met.

Ojedokun (2007: 26) sees information literacy as a critical component of higher education. He further emphasises that integrating information literacy into the academic programmes is the best way in which information literacy should be offered. De Jager and Nassimbeni (2005: 34) also reiterate the importance of collaborative efforts between the library and academic departments. They further state that the partnership in the teaching and learning process between academics and the library strengthens the links between information literacy, graduate skills and lifelong learning. Collaboration between the academic departments and the library is of vital importance to the success of the programme. Ojedokun (2007: 27) also emphasises the importance of gaining the support of the institutional management as well as the library management when addressing information literacy in the higher education context.

Callison and Preddy (2006: 421) emphasise the important point that a student need not learn how to use only one library or be proficient in one information setting but should be able to move from one information setting to another or from one library to another without finding the setting challenging but should be able to apply the information skills received. This objective can only be reached if students are not digitally disadvantaged and can thus use the digital formats that are available or they will be immediately placed in the difficult situation of not being able to locate information due to their digital disadvantage. Callison and Preddy (2006: 4) further summarise information literacy as the processes of "engaging with the text and other media to analyse, extract, synthesise, and infer information" that will address student queries. Librarians attempt to en-skill users to be able to meet the above objectives but how can this be possible if students are unable to use the information tools adequately.

Sayed (1998: 83) revealed that 67% of the student population at the University of Western Cape reported minimal computer literacy in 1996. He thus concluded that historically disadvantaged institutions required greater levels of information literacy training than other institutions. De Jager and Nassimbeni (2002: 168) claim that the majority of students in South Africa reach higher education institutions with little or no exposure to libraries and information resources and they do not have skills to utilise facilities and resources that are provided at higher education institutions. They further state that the need for IL at tertiary level is extremely high. The information literacy training at DUT attempts to address this issue but in a generic fashion, thus not taking cognisance of digitally disadvantaged student or even perhaps the digitally advantaged?

Librarians attempt to teach ECP students how to use the databases and expose them to databases that are relevant to their field of study. Salinas (2003: 133) points out that technology has advanced so rapidly thus resulting in information being packaged in an assortment of formats which students need to know how to access. According to Lippincott (2005: 2) the so called "net generation", or as Prensky (2001: 1) refers to them, the "digital natives" are students who regard the World Wide Web as the best place to find all the desired information. This immediately conflicts with what librarians consider 'academic' or 'scholarly'. Although these students are technologically literate they lack information skills that are appropriate for academic work and thus Lippincott (2005: 4) explains that they use inappropriate sources from the Web to support their thinking and ideas. There is a tendency for many of these students not to evaluate the information that they retrieve from the Internet. Librarians (at the DUT and in other places) have first-hand experience of how readily students use Google to gather information for assignments and projects.

According to Kuhlthau, Maniotes and Caspari (2007: 112) students of the 21st century are engaged in locating information sources, choosing what is useful and relevant for their assignments and projects; this is referred to as "inquiry learning". Librarians are encouraging students to engage in "inquiry learning" but this will only become

prevalent once students have gained confidence in the use of available technology and when they are able to use all the ICTs available to them. Sayed (1998: 9) suggests that IL consists of various skills, many of which lecturers assume that students possess and yet the reality is that the majority of students do not possess these skills.

Ojedokun (2007: 24) explains that information literacy in the early days included the concept of computer literacy. Today the information literacy module at the DUT does not encompass the computer literacy module. The computer literacy module is a separate module in the Extended Curriculum Programme, yet, information technology skills are interwoven with information literacy. It is the researcher's opinion, based on years of experience as a Subject Librarian and on her teaching of IL that these two modules should be offered separately. Computer literacy should be offered prior to the information literacy module.

In offering the information literacy training it is important to know the target audience in order to design an appropriate and effective programme. Librarians must know what learners' needs are, how the library could help them and what obstacles exist that prevent them from meeting their academic objectives. Sayed (1998: 6) also argues that it is important for information literacy trainers to note that students coming to tertiary education institutions, in the South African context, have not had equal access and exposure to resources in the different formats. According to Hepworth (2009: 2) students need to be information literate and also understand the academic environment well to be successful in the higher education environment. Somi and De Jager (2005: 260) suggest that students would be considered information literate when they are comfortable in using information in all formats and are able to evaluate and make sound judgements from the information obtained. The experience of the researcher is that the majority of students entering DUT do not understand the academic environment. This could be attributed to the fact that most of these students have never before been exposed to such an academic setting with ICTs, proper libraries, etc. How then can the institution expect them to be successful in their endeavours, especially in the library?

One of the outcomes of information literacy modules internationally, is 'access and retrieval' of information sources. Dunn (2002: 27) describes the competencies that learners engaged in the information literacy module should develop. One of the IL competencies that is outlined, is to "locate and retrieve relevant information, in various formats, using appropriate technological tools". This is a very important competency but how can learners who are technologically disadvantaged demonstrate this competency? Learners cannot be expected to achieve this competency if basic computer or ICT skills are lacking. The difficulties that students experience in finding information because of the different formats that information is available in is also emphasised by Somi and De Jager (2005: 259). Somi and De Jager (2005: 259) point out that due to current technological changes, society needs to have certain capabilities to access information that is available in the various formats. Hence they relevantly posit that South African librarians have faced the challenge of attempting to make library users "information literate" instead of "library literate".

The experience of the researcher is that there are students arriving at DUT who are digitally disadvantaged. These students have no prior experience with ICTs but are expected to retrieve information sources using the databases and other digital or online sources. Hepworth (2009: 7) discusses the process that could be followed, enabling students to develop "higher-order" thinking. According to Bloom's taxonomy higher order thinking includes tasks that require evaluation, synthesis and analysis (Fink 2003: 29). Librarians at DUT would need to narrow the digital divide even before attempting to arrive at "higher-order" thinking activities. Students first need to master keyboard and mouse skills even before learning to access online resources and then only can they be taught to evaluate the online information sources and make strategic decisions. Thus it can be seen that only some "digital native" students would be ready for "higher-order" related activities whilst others still need to learn basic ICT skills.

Dunn (2002: 34) in her study of behaviour scenarios (California, USA) found that the learners usually start the search for information using the computer. She also noted that there was a decrease in the use of print resources and there was a decrease in the number of reference desk queries. This is certainly not the case at the DUT. The experience of the researcher is that at DUT Libraries, digitally disadvantaged students

are still reliant on librarians to assist with basic queries and they are still heavily reliant on printed resources.

E-tutorials (online tutorials) can be an excellent tool that could be used to teach students the information literacy module. However, digitally disadvantaged students would be further disadvantaged due to their lack of digital skills, yet digitally advantaged students would enjoy working independently on an interactive tutorial. Lippincott (2005: 3) points out that librarians may use "gaming technology" or visually oriented instruction aids in teaching the information literacy module. Here again, the digital divide would impact on the information literacy module that is currently offered at the DUT because of having digitally advantaged and digitally disadvantaged students in the same IL classroom.

Libraries and the availability of digital information can play an important role in contributing to the education of students but the digital divide has to be addressed first (Lippincott 2005: 1). Eisenberg, Lowe and Spitzer (2004: 6) highlight that for the use of different information formats, other skills must exist, for example, visual literacy, media literacy, computer literacy, digital literacy and network literacy. Digitally advantaged students often possess the above skills but the end product, which is the completed project or assignment, often lacks substance (Lippincott 2005: 8). This is because, as Hepworth (2009: 5) explains, "digital native" students can source information without considering the value of the information or assessing whether information skills were applied when accessing information. It can thus be seen that the digital divide does impact on information literacy training and that a generic approach to teaching and learning information literacy does not necessarily serve the purpose of both groups, that is, "digital natives" and "digital immigrants".

2.5 Addressing the impact of the digital divide on information literacy training

Lippincott (2005: 3) suggests that librarians repackage the information and skills that they offer using updated methods to teach students. Manual (2002: 195) also suggests changing the teaching and instructional methods to accommodate "digital native" students. It is also suggested by Lippincott (2005: 3) that librarians use "gaming technology" or visually oriented instruction aids. Lippincott (2005: 5) points out that "net gen" or "digital native" students prefer interactive web sites, study tips and guides. It is also suggested by Lippincott (2005: 5) that libraries introduce interactive tutorials on the various aspects of information literacy. To repackage the information literacy module and ensure that it is responsive to their needs and style, librarians need to be imaginative, creative and apply technical skills to fulfil the preferred teaching and learning methods of the net generation students (Lippincott 2005: 5).

"Digital native" students tend to view traditional teaching as boring and are thus not responsive to this teaching method (Manual 2002: 207). Manual (2002: 200) suggests that students learnt better and were more favourable to the teaching and learning setting when the method was changed from lecturing regarding a problem to online interaction where students experienced the limitation of the Internet first-hand. Manual (2002: 201) further points out that students are "visual learners" and thus instructional material must captivate their attention. Students today have spent more time watching television and surfing the Internet than reading books. Manual (2002: 203) points out that these students are so accustomed to the entertainment world which is customised to keeping their attention and making them the "absolute ruler" that they expect education to be as entertaining. 'Digital natives' thus prefer a pace and a learning environment customised to their needs instead of traditional teaching methods used. Active learning should thus be introduced to reduce the likelihood of boredom (Manual 2002: 207). This could be achieved by interactive tutorials and peer-learning, which are considered by digital natives as more productive (Manual 2002: 207-208). It is thus suggested by Manual (2002: 207) that the content of the IL lessons be presented differently. The focus must move to the learner's skills, attitudes and needs. Kennedy et al. (2008: 120) explain that educators must be attuned to the changing educational scenario and the diverse

characteristics of first year students. They further explain that the use of a wide variety of technology available in higher education must be informed by 'who our students are'. It is also important for librarians to be conscious of the inclusion of technology into the IL classroom.

According to Kuhlthau, Maniotes and Caspari (2007: 112) students of the 21st century are engaged in locating information sources, choosing what is useful and relevant for their assignments and projects which is referred to as "inquiry learning". Librarians encourage students to engage in "inquiry learning" but this will only become possible once students have gained confidence in the use of the available technology and when they can use all the ICTs available to them. Librarians making digital commons accessible to students could assist in narrowing the digital divide (Springer 2009). The term digital commons is defined by Berkeley Electronic Press (1999) as a visible platform where intellectual property, that is, dissertations, theses and other publications are made available in a digital format. However, the researcher here uses the term to describe a shared space that makes digital resources available at an institution of higher learning to facilitate access to digital resources, including the intellectual property of the institution. Librarians throughout the world still offer access and training to technologically challenged students in an attempt to bridge the digital divide.

Another important suggestion to resolve the problem of training a digitally diverse group, according to Singh (2004: 5), is to introduce computer literacy across all faculties. Students must be skilled in the use of computers, operating systems, word processing, spreadsheets, presentation software, web browsers and e-mail. The experience of the researcher is that not all students at the DUT enrol for a computer literacy course. Secondly, students do not necessarily do the computer literacy course at the beginning of the year when the course is really needed.

Blignaut, Venter and Cranfield (2000: 228) who undertook research on Computer Science students found that it is possible to expedite the closure of the digital divide by offering computer literacy and Computer Science in the first semester to accommodate

students from diverse backgrounds. Blignaut, Venter and Cranfield (2000: 228) stress that ensuring that Computer Science students are exposed to computer literacy and Computer Science in the first semester would give students the necessary skills needed to bridge the digital divide. They support Lippincott (2005: 5) in recommending that interactive exercises are essential in mastering the skills of the usage of the mouse, the keyboard, etc. The researcher is also of the view that all ECP students entering tertiary institutions need to gain mastery of computer skills, which includes keyboard skills, mouse usage skills, etc. before the module on information literacy is undertaken. This will alleviate the problem of the impact of the digital divide on information literacy training.

Since the DUT currently lacks the resources to accommodate digitally advantaged and digitally disadvantaged students in separate venues, librarians need to develop more tutorials, exercises and guides that will accommodate digitally advantaged students whilst "hand-holding" takes place with digitally disadvantaged students (Lippincott 2005: 4).

The need to be information literate is even more important now than ever before due to the information overload that society is experiencing. With the current student population, DUT Libraries have embarked on the delivery of information literacy to students registered at the DUT to create an information literate student body. However, this study focuses on offering of the information literacy module to Extended Curriculum Programme students only. The rationale for this programme and the actual course outline is discussed in the next section.

2.6 Extended Curriculum Programmes (ECPs) or Foundation Programmes or Bridging Programmes

The South African Department of Education (DoE) had identified the problem that the majority of school-leavers are not ready or are under-prepared for higher education (Hay and Marais 2004: 59). De Jager and Nassimbeni (2003: 109) reiterate that South

African students come to higher education with severe disadvantages, as compared to the students in Western countries. The under-preparedness of school-leavers for higher education presented a problem to the development of South Africa, post-apartheid. During the post-apartheid era a number of efforts were made to address this problem.

According to Scott, Yeld and Hendry (2007: 2) the Council for Higher Education (CHE) confirmed that higher education in South Africa had been segregated on racial grounds. Reynolds (2008: 81) reiterates that unequal primary and secondary education impacts on students gaining entrance into higher education institutions. Reynolds (2008: 81) further points out that one of the methods used to address this problem is by the introduction of Foundation Programmes. Scott, Yeld and Hendry (2007: 2) further disclose that "black" students performed worse than "white" students in higher education institutions. It was thus decided that strategies needed to be developed to address this problem. The absence of strategies to address the under-preparedness of students and to enable these students to succeed in higher education led the DoE to introduce the Foundation, Bridging and, more recently, the Extended Curriculum Programmes. There were intensive policy changes in the higher education sector in the post-apartheid era in order to change teaching and learning practices (De Jager and Nassimbeni 2005: 31). In this context, Scott, Yeld and Hendry (2007: 37) also reveal that socio-economic inequalities in South Africa are among the worst in the world, thus exacerbating an already difficult situation.

Traditional educational approaches continue to exist at some higher education institutions even though a heterogeneous student population prevails (Scott, Yeld and Hendry 2007: 56). It has been further emphasised that some of the new intake at higher education institutions are predominantly students from a disadvantaged background. It can therefore be seen that while access has been addressed, another problem has emerged, and that is, a problem with throughput and success rates (Scott, Yeld and Hendry 2007: 60). According to Scott, Yeld and Hendry (2007: 60) the Council for Higher Education also highlights that new educational strategies had to be introduced to ensure that problems regarding throughput and success rates are addressed. Hence the

emergence of the Foundation or the Bridging or the Augmented programmes in higher education in South Africa.

2.6.1 Foundation or Bridging Programmes

The DoE introduced Foundation or Bridging programmes in an attempt to facilitate access to higher education for under-prepared school-leavers. Wood and Lithauer (2005: 1002) claim that Foundation Programmes provide alternate routes to access higher education institutions. Many students did not achieve a matriculation exemption (an educational requirement for acceptance into first-degree study at a South African university) and thus would be excluded from higher education, particularly universities. The Bridging or Foundation Programmes were not subsidised programmes (Hay and Marais 2004: 59). Institutions thus relied on donor funding for their existence. The aim was essentially to widen access to higher education for disadvantaged students through Foundation or Bridging courses. However, according to Hay and Marais (2004: 62), these programmes had a few drawbacks, for example, the programme was seen as an 'add-on' and there were no credits toward the degree the student intended to study. Research done on the Nelson Mandela Metropolitan University Foundation Programme (UFP) indicates that the Foundation Programme not only provided students with knowledge in core areas of their studies but also with knowledge, skills, values and attitudes outside of their academic sphere (Wood and Lithauer 2005: 1002). Thus while the problem of access was resolved with the introduction of Foundation and Bridging courses, the throughput rate and the drop-out rate increased (Wood and Lithauer 2005: 1008). Thus the DoE introduced the Extended Curriculum Programme.

2.6.2 Extended Curriculum Programmes - internationally

Foundation or the Bridging Programmes could be seen to serve the same purpose as the General Certificate of Education (GCE) Advanced Level (A levels) which is offered by institutions in England, Northern Ireland and Wales. 'A levels' is normally undertaken over two years. This qualification is used to determine the suitability of students for entrance into higher education (Parry 1971: 26). We therefore see that Foundation or

Bridging programmes and the GCE A Levels have a similar function of screening students for entrance into mainstream academic programmes in the case of Foundation and Bridging programmes, and into University with the GCE A Levels.

Michigan State University of Osteopathic Medicine offers an Extended Curriculum Programme (Michigan State University 2009). The academic year is thus extended by a year. However the reasons for offering the extended programmes are vastly different compared to South Africa. There are a variety of reasons why the Extended Curriculum Programme is offered to students in the case of the former. These include academic difficulties, family or work obligations, health issues, off campus employment or financial difficulties. The ECP allows students more time, more flexibility and gives them a chance to better understand the course or programme they are enrolled for. This is unlike in South Africa where students are enrolled into the Extended Curriculum Programme because of a 'disadvantaged' background or under-preparedness for higher education.

The Oxford College of Marketing also introduced a Graduate Foundation Programme (Oxford College of Marketing 2009). This programme, however, unlike Foundation Programmes offered at South African higher education institutions, is not meant to facilitate access to higher education but assists students wishing to pursue or advance in a career in marketing by studying for the Chartered Institute of Marketing (CIM) qualification. This Foundation Programme allows students to undertake lower level courses prior to them actually registering for a Diploma or Postgraduate qualification in Marketing. The Oxford College of Marketing offers short courses designed to assist marketers revise basic theory that is usually covered in lower level courses and prepare students for the entry level tests that are to be taken for the CIM qualification (Oxford College of Marketing 2009). There are CIM courses for every stage of a marketing career, that is, Introductory Certificate in Marketing, Diploma in Marketing and Chartered Postgraduate Diploma in Marketing through to the Chartered Marketer Programme (Oxford College of Marketing 2009).

The Lancaster Foundation Programme is offered in Nigeria as well as in China, but the degree that is awarded is from Lancaster University in the UK (Lancaster University 2009a). Students study at a university in Nigeria or at a university in China. There are strong ties between Lancaster University and the other countries where the Foundation Programmes are run (Lancaster University 2009a). This Foundation Programme runs over one year and is designed by experts from Beijing, Guangzhou, Shanghai and Lancaster. The Foundation Programme includes academic and study skills, a comprehensive introduction to computer skills, the British culture and the International English Language Testing System (IELTS) examinations (Lancaster University 2009a). It would seem then that the objective of the Foundation Programme in this instance is to provide support to foreign students, especially from the developing world, studying through a UK university.

The programmes offered in India by the University of Lancaster, however, are different in that in the first two years of the undergraduate study students remain in India and thereafter the final two years are spent at Lancaster University in the UK (Lancaster University 2009b). The two Indian higher education institutions that participate in the Foundation Programme are Manipal Institute of Technology (MIT) and Sikkim Manipal Institute of Technology (SMIT) (Lancaster University 2009b). The degree that is awarded is from the University of Lancaster in the UK. Both these universities of technology offer specialisation in various disciplines. According to Lancaster University (2009b) these areas of specialisation include Electronic Engineering, Mechanical Engineering, Mechatronic Engineering, Computer Systems Engineering, Electronic Communication Systems, Communication and Computer Systems, Information Technology and Media Communication and a number of degrees in the Biological Science fields. These are areas in which disadvantaged students and under-prepared students may never have the opportunity to study. However, with the introduction of the Foundation Programme under-prepared and disadvantaged students are given the opportunity to gain qualifications that otherwise would have been impossible. The Foundation Programme students may also progress to postgraduate studies at Lancaster University in the UK.

This discussion drawn from the literature points to a pattern where generally Foundation Programmes and ECPs seem to be offered in developing countries to bridge the gap that exists between secondary school and higher education, whilst it is offered to students in developed countries to aid in creating a balance between academic life and one's personal life situation.

2.6.3 Extended Curriculum Programmes in Africa

A search for literature on ECPs or Foundation Programmes in Africa (excluding South Africa) revealed very little. Botswana offers a programme that is called The Botswana General Certificate of Secondary Education (BGCSE) (Koosimile 2004: 211). It is observed that the Extended Curriculum Programme here is not offered at higher education level but rather at secondary school level. The curriculum includes both the Core Curriculum and the Extended Curriculum. The Core Curriculum includes mainly basic knowledge, skills and attitudes, such as essential physics concepts and principles that are compulsory for students following the core curriculum syllabus, whilst the Extended Curriculum is an 'advanced curriculum'. According to Koosimile (2004: 211) the Extended Curriculum is not a mere extension of the Core Curriculum but covers more skills and content than the Core Curriculum, such as, knowledge with understanding, the ability to handle information and solve problems and the ability and skill to experiment and investigate. Hence the ECP in this context is something quite different to the South African concept of ECP.

The Foundation Programme was introduced at Lancaster University in Nigeria as a one year programme to assist students to continue studying at undergraduate level at Lancaster University or at other UK universities (Lancaster University 2009c). Here again the programme includes skills in academic and study skills, intense introduction to computer skills and an introduction to contemporary British culture (Lancaster University 2009c). The students who enrol for this programme are also expected to enrol for one of three subjects that are compulsory, which are Business and Management; Science and Computing and Computing and Library and Social Studies. It can thus be seen that there are similarities and differences in what is being done here

(through a UK university) and what is being done in South Africa. It can be observed that Lancaster University places emphasis on academic, computer, library and study skills which is common to what is offered in ECPs in South Africa. The difference, however, is that Lancaster University, being a British institution, also includes in the curriculum a section on British culture, for obvious reasons. Students in South Africa are not exposed to any cultural studies in their ECPs.

2.6.4 Extended Curriculum Programmes in South Africa

In recent years there has been an extremely high "failure, repeater and dropout rate" at higher education institutions in South Africa and thus the Department of Education (DoE) has provided special funding for the Extended Curriculum Programme (ECP) at South African universities (Cape Peninsula University of Technology 2008a). In 2004 higher education institutions had to apply for funding from the DoE (Department of Education 2004) to offer the Extended Curriculum Programme. The ECP is offered as an extended integrated course, which could be extended by one or two years. According to the National Plan for Higher Education, the Foundation Programme was to be considered a recurrent, additional provision to the standard programme (Department of Education 2004). The National Plan also indicates that the most important aim of the Foundation Programme is to improve the success and graduation rates of students in Higher Education institutions from disadvantaged backgrounds (Department of Education 2004).

According to the DoE the focus of the Foundation Programmes can either be such that the Foundation courses are core subjects or the courses must be extended but must be an integrated curricula incorporating the Foundation provision (Department of Education 2004). The DoE emphasises that it will not fund programmes that are add-on or concurrent interventions. The current emphasis is thus on an integrated approach to the support modules that are offered and not stand-alone programmes. According to Reynolds (2008: 82) Foundation Programmes are offered at most higher education institutions in South Africa to enable access to higher education institutions for African students. Information literacy, for example, serves to unpack the integration that is

emphasised: The ideal that the DoE desired is that assignments, projects and other academic related work in the subjects that are core to a diploma or degree programme must have a component that requires information literacy skills. The librarian is then required to work in liaison with the academic department to ensure that this integration takes place. Information literacy is thus not taught as a generic model but is meant to be well integrated into the academic programme. All information literacy lessons should link up with the academic programme.

Students enrol for the ECP based on their National Senior Certificate (Grade 12) results, together with other admission requirements, for example, aptitude tests which indicate that the student may succeed in the field with additional support. These students, however, need not meet the minimum requirements for a particular qualification but must meet the minimum entry requirement into tertiary institutions. The purpose of the Extended Curriculum Programme is to improve the graduation rates of disadvantaged students (Cape Peninsula University of Technology 2008b). ECP students enrol for the normal mainstream courses in addition to active learning components and other related support courses, for example, information literacy or computer literacy. It must be noted that each higher education institution offers the ECP differently.

In South Africa Foundation or Bridging Programmes were initially offered by higher education institutions, followed by the Extended Curriculum Programme which was introduced to institutions by the DoE. Felix (2002) explains that the Extended Curriculum Programmes usually extend over four years, although the actual components of the programme may differ from one institution to another. Felix (2002) also reveals that the ECP is institution-specific. The ECP programme at the Nelson Mandela Metropolitan University, for example, includes critical thinking, problem solving and public speaking (Felix 2002). These are required life-long skills which many students entering institutions of higher education do not possess. The primary purpose of the ECP is to provide students from disadvantaged backgrounds access to tertiary education by providing them with the skills and knowledge necessary for their

academic programmes. What follows are some examples of ECP programmes offered by South African higher education institutions.

The Mangosuthu University of Technology (MUT) offers access to students from diverse backgrounds and particularly promotes the interest of students from a disadvantaged background (Mangosuthu University of Technology 2010). The programmes offered include "planning skills, adaptive skills, technical skills and maintenance, development and productive skills in Engineering, scientific, agricultural, biomedical and allied professional disciplines" (Mangosuthu University of Technology 2010). These skills facilitate integration into the mainstream academic programme, making it easier for the student to be successful in higher education.

The University of Kwazulu-Natal (UKZN) also offers Foundation Programmes to assist students from disadvantaged educational backgrounds to fulfil their academic potential (University of Kwazulu-Natal 2010). The programmes offered by UKZN may be in the form of access and Foundation Programmes or restructuring first year courses or additional courses in essential skills, for example, communication or academic writing (University of Kwazulu-Natal 2010). UKZN offers different courses that make access to university possible to the student from a disadvantaged background. A four-year degree may be extended by a year, where extended support is given in the first year of study to students from a disadvantaged background (University of Kwazulu-Natal 2010). The university also offers a "one year access programme" for students from disadvantaged backgrounds who do not meet the entry requirements for particular programmes (University of Kwazulu-Natal 2010).

The University of Cape Town (UCT) introduced the Extended Curriculum Programme in 2001 (University of Cape Town 2002). The programme, like other such programmes, was introduced to facilitate access and success in the Business Science curriculum. This programme has been renamed the "Sanlam Investment Management" Extended Curriculum Programme. The ECP was sponsored initially by Sanlam. The programme accommodates students that are talented in the field but did not meet the entrance

criteria to the university (University of Cape Town 2002). In 2001 the university reported that there was a 97% pass rate into second-year with some students earning 75% for five first year subjects in the Business Science Programme (University of Cape Town 2002).

The Cape Peninsula University of Technology also offers the Extended Curriculum Programme. The former Foundation Programmes which are the current ECP are extended diplomas. Year one of a student's study programme is extended over two years. ECP students here would also enrol for active learning components, for example, group or project work or other support work, for example, problem solving, report writing, etc. (Cape Peninsula University of Technology 2008a). It can thus be seen that the Extended Curriculum Programme is not less loaded or that students have more time in first year but that the programme is extended because of the support with the foundation provision (Cape Peninsula University of Technology 2008a).

The University of the Free State offered a Career Preparation Programme (CPP). This programme was offered since 1993, also to facilitate access to higher education. The programme addressed not only the problem of access but also offered students skills and competencies for life-long learning (Hay and Marais 2004: 63). Hay and Marais (2004: 63) point out that the entrance requirement for this programme is a school-leaving certificate. This programme enables students to enter "general-formative and vocationally-directed" studies. Students could then enrol at any of the universities, university of technologies and vocational colleges in the Free State region to further their studies (Hay and Marais 2004: 63).

The University of Limpopo introduced its Extended Curriculum Programme in 2004 (University of Limpopo 2006). The programme was called "Pathways Program" which assisted in nurturing "at-risk" students and in increasing the throughput rate of the university (University of Limpopo 2006). This was done by the introduction of a mentorship program for "Pathways students" (University of Limpopo 2006). The University of Limpopo targeted the ethnic, cultural and linguistic minorities. These

students were inadequately prepared for higher education (University of Limpopo 2006).

According to Felix (2002) the aim of the Foundation or Bridging Programmes at the then Port Elizabeth Technikon, now part of the Nelson Mandela Metropolitan University, was to provide access and develop the student to his or her full potential. One of the disadvantages of the Bridging or the Foundation Programme that Felix (2002) outlined was that it did not allow for articulation from one higher education institution to another because the programmes were institution specific. Some of the subjects included in the Foundation and the Bridging Programmes at the Port Elizabeth Technikon were critical thinking, problem solving and public speaking (Felix 2002).

Rhodes University offers a Foundation Programme in the Faculty of Humanities. In 2005 there was a shift away from a separate course which was called ELAP (English Language for Academic Purposes) to a semi-integrated model (Reynolds 2008: 82-83). Reynolds (2008: 83) illustrates the way the Foundation Programme is offered as follows: If students are studying Anthropology, students are taught and assessed by an academic staff from the Anthropology Department, in addition to an augmented course which is taught and assessed by an academic development lecturer. Foundation students attend a weekly general academic literacy, computer literacy and information literacy class. This is seen as a shift from a stand-alone Foundation course to a semi-integrated course. This offering is also seen as preparing students for the working world as they acquire competencies, skills, attitudes and values that allow them to contribute effectively to the economy.

A Foundation Programme was first offered in 1999 at the Nelson Mandela Metropolitan University (NMMU) to facilitate access to students who did not meet the minimum requirements for entrance to the university (Wood and Lithauer 2005: 1003). Students who successfully complete the Foundation Programme are guaranteed admission to a degree programme. Wood and Lithauer (2005: 1003) further highlight that the Foundation Programme was initially only offered to prospective students in the

Faculties of Science and Commerce and the Department of Pharmacy in the Faculty of Health Sciences. However, within two years, due to demand the programme was offered by all mainstream programmes at the NMMU. The programme is highly student-centred. This was one of the recommendations of the DoE. The University uses small group teaching, mentoring sessions and the focus is on holistic development of the student (Wood and Lithauer 2005: 1003-1004). The prime goal of the programme was to holistically develop under-prepared students. A study undertaken at the university, to assess the Foundation Programme shows that the programme helped to bridge the gap between secondary education and tertiary education (Wood and Lithauer 2005: 1007). It also highlighted the fact that as access to higher education widened, institutions are faced with a more diverse group of students with differing academic abilities, social background and economic backgrounds. The disadvantage of the programme was the stigma attached to being registered into the Foundation Programme and not into mainstream programmes. Nevertheless, it was found that the Foundation Programme equipped students with academic skills (Wood and Lithauer 2005: 1011). Students in the programme also indicated that they experienced interpersonal and intrapersonal growth, which they believe assisted them in attaining academic success.

Research done by Machika (2007: 121) at the University of Johannesburg on the Bridging Programme outlines the way the programme was offered. The Academic Support Unit (ASU) was established in 1998 to offer the Bridging Programme to students whose Grade 12 results did not allow them access to higher education institutions (Machika 2007: 121). The Higher Education Act 101 of 1997 made higher education institutions aware of the shift in emphasis from "access to success" and thus the need to support the learner (Machika 2007: 121). The Bridging Programme was offered initially to Faculty of Engineering students. The Bridging Programme was over six months. The ASU taught academic development subjects, for example, Life skills and English while the Faculty of Engineering taught Mathematics, Physics and Chemistry components of the diploma (Machika 2007: 121). Students were able to register for a National Diploma on the successful completion of the six-month Bridging Programme. In 2001 the University, however, decided that the Bridging Programme would be completely managed by the Academic Support Unit and not the Faculty of Engineering.

The various medical schools of South Africa have not been exempt from addressing access to medical schools. Again it is seen that different universities address the issue differently. Lehmann and Sanders (1999: 187) revealed that the different institutions have complicated formulae and procedures to ensure equitable access to the universities by all races. Learners that are selected for registration from disadvantaged backgrounds are exposed to some form of support, for example, mentoring, Extended Curriculum Programme and outreach programmes (Lehmann and Sanders 1999: 187).

In summary then, it can be seen that the common purpose in offering the Foundation or Extended Curriculum Programme is to assist educationally disadvantaged students to gain access, adapt and excel at higher education institutions. The Extended or Foundation Programmes made it possible for students from educationally disadvantaged backgrounds in South Africa to further their academic life instead of being excluded from higher education institutions.

2.6.5 The Extended Curriculum Programme (ECP) at the DUT

Rambharos (2010) of CHED (Centre for Higher Education development), now known as the Centre for Excellence in Learning and Teaching (CELT) explained that ECP has been offered at DUT since 2005, initially as a pilot study. In 2005 only three faculties offered the Extended Curriculum Programme (Hlengwa 2005: 1). This included the Faculty of Health Sciences, for two of its programmes, namely, Dental Technology and Somatology. The Faculty of Arts and Design had an Augmented Programme which was offered across five diplomas. There were also five diplomas in the Faculty of Commerce that offered the Extended Curriculum Programme (Hlengwa 2005: 1). It must be noted that the programmes were structured differently to accommodate the specifications of the different disciplines (Hlengwa 2006: 3).

In the Faculty of Arts and Design the Augmented students were taught the appreciation of Art and Design. Hlengwa (2006: 3) further emphasises the importance of the visual and practical projects thus ensuring that the Augmented Programme includes site visits,

case studies and research projects. The objective of the Augmented Programme, according to Hlengwa (2006: 3), was to produce "creatively enlightened learners". First year Augmented Programme students attained 20% of the credits towards the first-year of the mainstream programme and the balance of the 80% towards the first year mainstream programme was done in the second year of the Augmented Programme (Hlengwa 2006: 5). Hlengwa (2006: 5) further explains the support offered to the Augmented Programme students in the form of educationally structured and supervised weekly tutorials in two of the 'bottleneck' subjects per department, for example, Mathematics or Physics in the Department of Industrial Engineering. The Oxford English reference dictionary defines "bottleneck" as "an obstruction to the even flow of production" (Pearsall and Trumble 2002: 168). 'Bottleneck' subjects refer to subjects where there is a high failure rate. Students may pass all other subjects but due to the 'bottleneck' subject still remain in the educational system due to failure in a subject or in subjects.

In the Faculty of Commerce there were five qualifications where the Extended Curriculum Programme was offered (Hlengwa 2006: 8). These qualifications were National Diploma (ND): Commercial Practice, ND: Management, ND: Marketing, ND: Retail Business Management and ND: Small Business Management. Essentially this meant that a three year diploma took four years to complete in the ECP. First year students were required to undertake two full time equivalent (FTE) subjects. These two FTE subjects are designed to develop students' understanding of concepts and practices that underpin Commerce. In the second year Commerce students, like Arts students, were exposed to educationally structured and supervised tutorials (Hlengwa 2006: 9).

The Durban Institute of Technology, DIT as it was previously known, made a decision to refer to the Foundation courses as either 'Extended Curriculum Programmes' or as 'Augmented Programmes' (Hlengwa 2005: 1). In 2006 the ECP was formalised. The aim of the ECP is to assist students in developing independent learning skills and gaining conceptual knowledge of the subjects that they are enrolled for (Cape Peninsula University of Technology 2008b). ECP subjects are not new subjects but are extensions

to the existing curriculum. Hence ECP is well integrated into the mainstream curriculum.

The Extended Curriculum Programme at DUT includes various modules or interventions. Some of the interventions included are English Communication, End-User Computing, Academic Literacy and Information Literacy (Hlengwa 2005). These modules are not add-on modules but supplement the skills that students require in their core courses to complete assignments, projects, etc. All teaching and learning are required to be well integrated into normal assessments. Students are involved in learning academic content whilst also engaged in information literacy. These two activities must not be seen separately but as an integrated activity (Cape Peninsula University of Technology 2008a).

2.7 Summary

The literature reviewed in this chapter examined the relationship between the digital divide and information literacy. It also examined the concept of ECPs and their equivalents internationally, nationally and at the DUT where the current study is located. The latter served to place the current study into relevant context. The next chapter discusses the methodology followed in conducting the study.

Chapter 3: Research methodology

3.1 Introduction

Research methodology gives the researcher direction on how to study or solve issues or problems (Terre Blanche and Durrheim 2006: 6). Bless, Higson-Smith and Kagee (2006: 1) explain that research is about defining a research question and then finding a systematic method to find solutions to the research question. The research problem addressed in this study is the impact of the digital divide on information literacy training of Extended Curriculum Programme (ECP) students and hence the overall objective of the study was to investigate what impact the digital divide has on the information literacy (IL) training of ECP students at the DUT and to recommend guidelines for teaching and learning of information literacy that would accommodate both the digitally advantaged and the digitally disadvantaged. The sub-objectives of the research were as follows:

- to identify in what ways the digital divide impacts on the IL training of ECP students;
- to identify innovative teaching and learning methods to accommodate the diversity of students in the IL classroom; and
- to recommend guidelines for teaching and learning of IL in the Extended Curriculum Programme that accommodates the digital divide among participating students.

Wisker (2001: 114) aptly describes research as asking questions and beginning to answer questions, seeking knowledge and attempting to understand the world and the processes involved in the world. Although interest in information literacy developed in the 1990s, the way in which it is delivered as a module or teaching and learning material is constantly evolving. Hence this study attempts to understand the information literacy training offered at the Durban University of Technology. Research is based on enquiry methods and hypotheses which contribute to existing knowledge (Wisker 2001: 114). The sections that follow discuss research methodology as it relates to this study.

3.2 Research methodology

Research methodology is the principle and philosophy that guides research. The research topic also dictates which research methodology will be used to support the research and the method of data collection (Wisker 2001: 137). The current study investigates the impact of the digital divide on information literacy training and thus the researcher opted to use survey research to collect data (discussed further in Section 3.2.2.1). Bless, Higson-Smith and Kagee (2006: 43) maintain that the research problem, the amount of knowledge at the inception of the investigation of the problem, the properties of the variables and the purpose of the enquiry all influence the research method that is chosen. The researcher, in this study, has been involved in teaching components of information literacy for the past 20 years and thus was prompted to investigate the impact of the digital divide on information literacy training due to the diverse student population of higher education institutions in South Africa.

There are three recognised approaches to conducting research, namely, qualitative, quantitative and mixed methods (Ivankova, Cresswell and Clark 2007: 255). The current research topic lent itself to the use of mixed method research as both qualitative and quantitative data was collected. King and Horrocks (2010: 7) state that quantitative research is about measurement, where information about aspects of the world is captured accurately and is expressed in numbers which are represented in percentages, probability values, variation ratios, etc. In the case of the current research some of the data that was required could best be expressed in numbers so that appropriate conclusions could be drawn. However, it was also necessary to obtain text data which allowed respondents to express themselves more fully.

King and Horrocks (2010: 11) explain that theoretical principles are rooted in interpretivism which is the interest in how the social world is experienced and understood. Interpretivism is more complex than it appears because people's interpretations of the same or similar facts and events may differ (King and Horrocks 2010: 11). The digital divide is understood differently by different people. It depends on the experiences and views of students and staff. Hence qualitative research is about understanding social and cultural processes and the context of the various behaviours (Nieuwenhuis 2007: 51). In the current study the researcher

set out to understand the impact of the digital divide on information literacy training. It is often assumed that students at a tertiary education institution would have basic computer skills and information literacy skills but this is often not the case. Nieuwenhuis (2007: 51) further states that qualitative research is concerned with the "why" questions of research. Qualitative research is undertaken when there is a desire to "understand meanings", or to investigate, describe and understand "experience, ideas, beliefs and values" (Wisker 2001: 138), as was the case in the current study. When one studies students' learning styles, approaches to study and their educational backgrounds, it is best done using a qualitative approach (Wisker 2001: 138). Quantitative approaches might be too restrictive and not allow students to explore and express their responses optimally whereas qualitative approaches allow for the subjective nature of students' responses.

In this study there were interviews that were carried out with the CELT Coordinator of ECP and with Subject Librarians teaching IL to ECP students. Both interview schedules enabled the researcher to collect qualitative and quantitative data. The questionnaires used to survey ECP students of the DUT also gathered both quantitative and qualitative data. There were questions in all three instruments that sought a contextual contribution to the research. The current research investigates a real-world issue: that of having digitally advantaged and digitally disadvantaged students in the same IL class expecting both the groups to reach the same teaching and learning outcomes without frustrating either group.

Mixed method research collects both quantitative data and qualitative data that allows for the construction of knowledge about real-world issues (Ivankova, Creswell and Clark 2007: 260). In the case of this study, the researcher felt that it would be best to use a mixed method approach. Mixed method research is the combination of both quantitative (numerical data) and qualitative data (text data). Both these methods were used as it was considered important in gaining a better understanding of the topic that was being researched. "The truth" ultimately is the most important issue in understanding a research problem and the use of both qualitative and quantitative approaches leads to a more comprehensive understanding of a research problem (Ivankova, Cresswell and Clark 2007: 263). Hence in this study both numerical and text data were collected to assist in addressing the objective and sub-objectives of the study.

3.2.1 Population and sampling

According to Bless, Higson-Smith and Kagee (2006: 98) a population is the entire set of people who are the focus of the research. The population is the entire set from which generalisations will be made (Sapsford 2007: 6). It is essential to clearly define the population of the study in order to make these generalisations (Bless, Higson-Smith and Kagee 2006: 99). Information literacy is offered to all students at the Durban University of Technology, however, for the purpose of this study the researcher only investigated the impact of the digital divide on the Extended Curriculum Programme students and thus the population included only those elements that have association with ECP. These elements are ECP students engaged in the IL training (see Table 3.1), Subject Librarians teaching the IL module to ECP students (see Table 3.2) and the CELT Coordinator of the Extended Curriculum Programme (see Table 3.3). Bless, Higson-Smith and Kagee (2006: 99) go further to explain what the operational definition of population is: it is the boundary condition which allows the researcher to establish whether or not an element belongs to a population. In the case of this study, the first boundary that can be considered is that the population was selected only from the DUT. Then, as highlighted above, all students at DUT are offered some components of the IL module but it is only ECP students who were included in the population of this study. A further boundary is that although there were 11 Subject Librarians employed at the DUT at the time of the study only the six who taught the IL module to ECP students were included in the population. These were the boundaries that were set to demarcate the population of the study.

The first two elements of the population impact directly on the study. The ECP students are the ones who experience the impact of the digital divide and Subject Librarians are ones who teach the IL module and thus have first-hand experience of having both digitally advantaged and digitally disadvantaged students in the same IL classroom. The ECP Coordinator, however, does not have direct experience with the classroom situation or have any first-hand experience with ECP students but does have an overview of the ECP programmes run at the DUT.

Not all students who were registered for the ECP were necessarily engaged in the information literacy module. They might have completed this module in the previous year and thus were excluded from the study. This was a further boundary that was set. It was very difficult to obtain the exact number of registered ECP students because of the number of de-registrations, late registrations and change in the course of study by students. The Integrated Tertiary Software (ITS) system of the DUT unfortunately could not provide the correct number of registered ECP students because of the way the details of ECP students had been captured. The Extended Curriculum Programmme is a relatively new programme at the DUT and thus in order to track the success rate of the programme, ECP students who initially registered as ECP students, are still captured as Extended Curriculum Programme students, even though they may have joined the mainstream programme (Rambharos 2010). The reason cited for this was to track the progression of the ECP students. In this way the institution would be able to assess the throughput and success rate of the students.

One way of gathering information about a group of people would be to collect information from each person in a group (Denscombe 2003: 11). According to Denscombe (2003: 11) social researchers cannot always collect data from everyone in the target population and thus sampling is necessary. Sampling is necessary because people are different, that is, they have different characteristics, economic backgrounds, etc. (Babbie and Mouton 2001: 164-203). Information must thus be systematically gathered from a portion of the population, the sample, before the subsequent findings can be generalised onto the entire population. It is therefore important to ensure that a sample is representative of the entire population.

Denscombe (2003: 12) explains that there are basically two kinds of sampling techniques, that is, probability or random sampling and non-probability sampling. Wisker (2001: 138) very simply defines a sample as a chosen group that represents a larger group on whom the research will be carried out. According to Bless, Higson-Smith and Kagee (2006: 100) in random sampling each member of the target population has an equal chance of being selected into the sample. In non-probability sampling the probability of including the different elements of the population into the sample is unknown. This could lead to

important elements of the population being left out. Hence it would be difficult to say how representative a sample is of the target population and thus generalisations may be difficult to make (Bless, Higson-Smith and Kagee 2006: 100). By carrying out a census rather than sampling, as was the case in this study, many problems that could threaten the validity of the study was eliminated, for example, sampling errors or sampling bias, and concerns of representativeness.

Wisker (2001: 139) highlights that sampling forms an important stage in the research process. The researcher must choose a sample size that will be representative of the larger population that is being studied (Wisker 2001: 139). A very small sample might not be representative of the broader population and thus generalisation of the findings might not be possible. In this research the researcher felt that the ECP group was a relatively small group compared to students in mainstream programmes and thus sampling would lead to a very small group being studied which could threaten the validity of the study.

Therefore, for this study, the researcher decided to carry out a census instead of selecting a sample. A census involves acquiring and recording information systematically about the members of a particular population (Babbie and Mouton 2001:230). According to Sapsford (2007: 7) a census is a study of every member of a particular population. A census is distinctive among large-scale surveys because data is collected from every member, whereas most researchers would make do with a sample (Sapsford 2007: 7). Thus a census of the students in the Extended Curriculum Programme who were engaged in the IL module was carried out. The number of ECP students engaged in the IL module in 2010 was 303. At the inception of this research the ECP number was large (431), but manageable, but subsequently the Faculty of Engineering and Built Environment withdrew from the ECP offering and thus the decrease in ECP student numbers to 303. The DUT campuses that offer the Extended Curriculum Programme are all based within the province of Kwa-Zulu Natal and therefore there were no geographical restrictions preventing the researcher from reaching the entire population. Table 3.1 captures ECP student enrolment numbers per department and per faculty (as submitted by the ECP Coordinator) for 2010. Table 3.2 lists Subject Librarians involved with the ECP programme at DUT and Table 3.3 the ECP Coordinator.

Table 3.1

ECP student enrolment: 2010

Faculty	Foundation/ECP programmes	ECP enrolment 2010
Applied Science	Food and Nutrition Science	10
Arts and Design	Fine Arts	15
	Graphic Design	12
	Interior Design	8
	Jewellery Design	8
	Photography	9
Health Sciences	Biomedical Technology	22
	Child and Youth Development	10
	Dental Technology	22
	Environmental Health	18
	Homoeopathy and Chiropractic 1	16
	Homoeopathy and Chiropractic 11	8
	Wellness 1	18
	Wellness 11	23
Management Science	Applied Management (Midlands)	30
	Hospitality and Tourism Management 1	31
	Hospitality and Tourism Management 11	13
Accounting and Informatics	Cost and Management Accounting	30
Total		**303**

Table 3.2

DUT Subject Librarians teaching IL to ECP students

Faculty	Number of Subject Librarians teaching ECP per faculty
Health Sciences	2
Applied Sciences	1
Arts and Design	1
Management Sciences	1
Accounting and Informatics	1
Total	**6**

Table 3.3

CELT ECP Coordinator

Involvement with ECP	Number of staff
CELT ECP Coordinator	1
Total	**1**

3.2.2 Data collection

There are different methods of data collection in qualitative research, namely, observation, interviewing and survey questionnaires (Marshall and Rossman 2006: 97). Each method has its own advantages and disadvantages. Fowler (2009: 69) states that the mode of data collection, that is, mail, telephone, online, personal interview or group administration, depends directly on the sample frame, research topic, characteristics of the sample and, lastly, the availability of staff and facilities. The researcher, in this case chose to use interviews and survey questionnaires which lent themselves to the mixed method approach of this study. Fowler (2009: 71) emphasises the importance of considering the type of population when deciding on the data collection tools. Some of the considerations according to Fowler (2009: 71) would include computer, reading and writing skills of the population.

The researcher must also consider whether the respondents are motivated to participate in the research (Fowler 2009: 71). For the purpose of this study the researcher chose survey research by interviewing and group administration of questionnaires, to collect data. The researcher was of the opinion that it would be easy to reach the participants of the research using a survey questionnaire and interview schedules. ECP students of DUT were considered a captive audience thus distributing the questionnaire to them was considered easy to accomplish. The interview schedules, it was believed, would assist in obtaining rich data from Subject Librarians teaching IL to ECP students and from the CELT ECP Coordinator who has an overview of the ECP programme. The data collection process began on the 28 May 2010, with interviews of Subject Librarians and ended on 11 October 2010. Details of the survey research are discussed in Section 3.2.2.1.

3.2.2.1 Survey research

In survey research the questions may be posed orally, written or be a combination of both these methods. According to Fink (2009: 1) surveys can either be self-administered questionnaires that respondents fill out on their own or with assistance or it could be an interview done face-to-face, or on the telephone. The researcher utilised a self-administered questionnaire (see Appendix A) to survey ECP students at the DUT. There were advantages and disadvantages in using this method of data collection. Using a self-administered questionnaire was less labour intensive and allowed the researcher to collect data from a large number of students. However, the disadvantage was that some students did not respond to all the items in the questionnaire. Students were often rushing off to their next class and thus students handed in the questionnaires by passing them along via other students until they reached the researcher. This did not allow the researcher time to peruse each and every questionnaire to ensure that all questions were answered. It can therefore be said that in survey research the researcher and the participants are working together to research the identified problem.

A researcher has to take into consideration a number of factors when deciding to use survey research as a method of data collection. Fink (2009: 13) suggests that the topic must be well defined and that the researcher must consider what is needed from the

respondents and what information can be extracted from the information received from the survey. The researcher always kept the objective and the sub-objectives of the study in mind when the instruments were being drawn up. Fink (2009: 14) also suggests that the researcher must ensure that the survey includes all the items that will yield the information that is required. If any aspect is omitted, then the researcher will not be able to answer the missing area of the research problem. To assist the researcher in ensuring that the research problem was well researched and adequately covered by the research instruments, the researcher prepared a table outlining the objective and sub-objectives of the study and their corresponding data sources and data collection instruments. This proved to be very useful in tracking that all aspects of the research topic were being probed by the research instruments.

Ensuring that the respondents are prepared to reveal certain information in a survey is very important (Fink 2009: 14). In the current research the researcher attempted to address this aspect by making use of the Likert scale in the student questionnaire. This assisted by allowing the respondent to merely select from the categories provided. Some students might not have wanted to reveal their 'digital status' and thus by providing them with relevant options the researcher hoped that it would draw out the required information. Fink (2009: 15) also advises that the researcher should not ask unnecessary questions which have no impact on the topic that is being researched. The researcher was mindful of this and thus constantly read and re-read the items in the questionnaire and the interview schedule, going back to assess whether each item had an impact on the objective or sub-objective of the research.

A survey research instrument should be preceded by an introduction which can be a covering letter or an explanation of the research undertaken on the questionnaire itself, or a verbal introduction to the survey that is being undertaken (Fink 2009: 36). In the case of this study the research was introduced and explained to ECP students who were also asked to read the opening paragraph on the first page of the questionnaire (see Appendix A) explaining the purpose of the survey. An informal introduction to the current study was sent via e-mail prior to the interview to all Subject Librarians who were identified as

interviewees. A consent letter (see Appendix B) which introduced the title of the current study was given to the interviewees before the interview began.

The study used different methods of surveying the identified population. The 2010 ECP students of the DUT were surveyed using a questionnaire. This is discussed more fully in Section 3.2.2.3. The ECP Coordinator and Subject Librarians involved in the teaching of IL to ECP students were interviewed. Details of the interviews and the design of the interview schedules are discussed more fully in Section 3.2.2.2.

3.2.2.2 Interviews

A method of carrying out a survey that is most common in society is the interview (King and Horrocks 2010: 1). Interviews are best described as the exchange of views between two people (Kvale 2007: 5), in the case of this study, between Subject Librarians and the researcher or between the ECP Coordinator and the researcher. This exchange can take place either face-to-face, as was the case in this study, or via a telephone (Babbie and Mouton 2001: 249). The advantages of interviews are varied. However, the interview process itself is dependent on a number of issues.

King and Horrocks (2010: 42) suggest that the physical space has a great impact on the outcome of the interview. It is important that the physical space is a comfortable, private and quiet environment. Interviewing of Subject Librarians in this study took place either in their offices or in the library boardroom which provided a comfortable and quiet environment but it did not always afford the interview process the privacy required as there were instances when Subject Librarians had to attend to library queries. The interview with the ECP Coordinator took place at the researcher's home, a venue chosen by the ECP Coordinator. This venue provided comfort, privacy and a quiet environment.

It must, however, be noted that the interview process poses a threat to anonymity as the interviewer becomes familiar with all the interviewees. King and Horrocks (2010: 44) also emphasise the importance of using an audio-recording device to capture the interview.

However, it is also emphasised that participants need to be made aware of the use of these devices and confidentiality must be emphasised. In terms of this study the researcher used a recording device, a dictaphone, for all interviews, except one where the Subject Librarian objected to the use of the device. The Subject Librarian in question explained to the researcher that it made him uncomfortable and under no circumstances was the device to be used. The researcher respected the Subject Librarian's request. In this instance a detailed record of the interview was kept.

Building a good rapport with interviewees is very important to the interview process to make sure that the researcher encourages the interviewee to be open and honest with responses (King and Horrocks 2010: 48). Rapport was established very easily as the researcher was acquainted with all the interviewees, they being her work colleagues. King and Horrocks (2010: 48) also maintain that the way the project is introduced and the self-presentation of the interviewer is very important. Denscombe (2007: 184) reaffirms that people respond differently to the interviewer depending on how they perceive the interviewer. Interviewer bias could be experienced due to personal characteristics that could include racism, sexism, etc. (Mouton 2001: 106).

The interviewees in this study were sent an informal letter of introduction to the study. The letter outlined the topic of the study and the potential benefits of the study. Hence all participants were fully aware of the study and the interviews that were going to take place. A consent form (refer to Appendix B) was also prepared and each Subject Librarian completed and signed the consent form at the beginning of the interview. The way that questions are asked also has an impact on the outcome of an interview (King and Horrocks 2010: 48). The researcher had to be guarded in the way questions were posed due to her personal views on the topic. The interviewer was careful in not asking leading questions and probing the interviewee for a response was done in a sensitive way as not to lead the interviewee to a particular response. These probes must add depth to the interview data (King and Horrocks 2010: 53). The experience of the researcher was that a few Subject Librarians needed more probing to assist them think about issues on the digital divide and the classroom situation whilst others had a lot to contribute to the research.

It is important for the interviewer to listen effectively. The interviewer should not ask a question about an issue already highlighted by the interviewee because of not having listened to the response of the interviewee (King and Horrocks 2010: 52). It was the experience of the researcher that many Subject Librarians' familiarity with the content often got them speaking about an aspect of the research that was still to come in the interview schedule. The researcher thus had to be careful not to ask questions about the same aspect but rather to ask for elaboration or clarification. The researcher also informed interviewees that the aspect that they were discussing would come later and thus other perspectives might be asked for.

An advantage of using an interview schedule is that all questions outlined on the interview schedule are asked without the omission of some. Denscombe (2003: 165) states that the researcher can get factual information from people and address issues of experiences and feelings with the use of open-ended questions. In this study the researcher interviewed Subject Librarians who teach IL. A further advantage of interviews is first-hand information and the depth of information the interviewee may have (Denscombe 2003: 165). The ECP Coordinator has an overall picture of the Extended Curriculum Programme and therefore interviewing her was useful to the study. The interview can also take on different approaches, that is, structured interviews, semi-structured interviews and completely open or unstructured interviews. The researcher opted for semi-structured interviews (the motivation for this is presented in Section 3.2.2.2.1).

The researcher interviewed five Subject Librarians using an interview schedule (see Appendix C) and a separate interview schedule (see Appendix D) was used to interview the ECP Coordinator. Although there were six Subject Librarians who were directly involved in the teaching of the Extended Curriculum Programme only five were interviewed because one Subject Librarian was seconded to the post for a short term and lacked experience and knowledge of the Extended Curriculum Programme. It was believed that interviewing this Subject Librarian would not add value to the study. Table 3.4 illustrates the total number of Subject Librarians involved with ECP and the number of Subject Librarians eventually interviewed.

Table 3.4

Subject Librarians interviewed

Faculty	Number of Subject Librarians teaching ECP per faculty	Number of Subject Librarians interviewed
Accounting and Informatics	1	1
Applied Sciences	1	1
Arts and Design	1	1
Health Sciences	2	1
Management Sciences	1	1
Total	**6**	**5**

Having the perspectives of both ECP Coordinator and Subject Librarians added rich data and gave the researcher different perspectives of the research problem. These perspectives, it was believed, would assist in addressing the objective and sub-objectives of the study. Additional and valuable information can also be gained by probing the interviewees with follow up questions, drawing more concrete conclusions (Bless, Higson-Smith and Kagee 2006: 119). The researcher conducted the interviews herself because of her understanding of the topic as a whole. The concept of reliability is often questioned when conducting interviews, as many interviewees may not want to be completely honest with certain individuals (Kvale 2007: 122). It is often pointed out that the same set of questions could be asked by another individual and the responses may differ. The researcher's experience was that it is difficult to maintain a neutral stance when probing but nevertheless it is important to ensure the validity of the research. King and Horrocks (2010: 7) point out that the interview as a data collection method relies heavily on the respondent's willingness to provide the researcher with accurate information. The researcher thus assured the interviewee that all information would be kept confidential and that his or her participation would benefit research in an important LIS area and could contribute to improving the IL offering to future ECP students.

3.2.2.2.1 Design of interview schedules

There were several issues that had to be considered when designing the interview schedules. King and Horrocks (2010: 25) highlight the types of questions the researcher should ask to achieve the desired knowledge from the analysis. Again, the researcher was mindful of the objective and sub-objectives of the study, ensuring that data collected would address the identified research problem. Secondly, King and Horrocks (2010: 25) emphasise the scope of the questions, that is, the range of experience that the research attempts to examine. Often, Subject Librarians wanted to discuss issues that were not relevant to the research topic and thus the researcher had to very politely steer the discussion in the correct direction. The third issue that King and Horrocks (2010: 25) highlight is the attempt to avoid presupposition in the research questions that could misrepresent the research. The researcher again, was guarded in the way the interview process unfolded, making sure that the process was going to provide the researcher with valid data and not skewed data.

In structured interviews the interviewer keeps to the questions in the interview schedule and nothing further is probed, keeping a tight control on the questions and the answers (Denscombe 2003: 166). This could inhibit the interviewee and certain thoughts and ideas that the interviewee may have may be lost. Semi-structured interviews, on the other hand, allow the interviewer to probe further to get clarification or obtain further information on the topic (Bless, Higson-Smith and Kagee 2006: 119), as was the case in this study. Hence the researcher used semi-structured interview schedules (see Appendices C and D) as it allowed the researcher to probe for more detailed explanations on the interviewees' thoughts and ideas. This allowed the researcher to collect rich data that contributed to the research.

The questions in the interview schedule were arranged in a particular manner. The beginning of the interview schedule began with biographical data which was considered non-threatening and ones that would encourage a good rapport. King and Horrocks (2010: 55) emphasise the importance of a non-threatening and simple beginning to the interview process. As the interview process developed the interviewer, who in this study was the

researcher, asked more in-depth and thought provoking questions, which assisted in giving the researcher a clear picture of thoughts of interviewees on the topic. King and Horrocks (2010: 56) suggest that it is commonplace for more difficult and 'emotionally charged' questions to be asked once the interview has progressed. When the interview schedule was designed the researcher kept in mind research ethics thus avoiding bias and keeping the objective and sub-objectives of the study in mind.

The questions were unambiguous and thus very little rephrasing was required during the interview (Babbie and Mouton 2001: 253). The interview questions covered the research objective and sub-objectives (Bloomberg and Volpe 2008: 82-83). Thus the researcher ensured that interview questions linked directly to the research objective and sub-objectives of the study. The questions were precise, arranged from general questions to specific questions and avoided bias (Babbie and Mouton 2001: 250).

The interview schedule was not pre-tested as the questionnaire was. It was believed that the researcher would be present to offer clarification, if needed. The respondents in the interview survey were also familiar with the IL programme and the issues that are experienced in the classroom. The issues raised in the interview schedule were designed to correlate with those raised in the questionnaire (see Appendix A) that was administered to ECP students, for purposes of triangulation of data and to strengthen the validity of the data collected.

3.2.2.2.2 Arranging interviews

One of the six Subject Librarians was based on the Pietermaritzburg campus (90 km away from Durban where the main campus is located) and thus the researcher had to make plans to travel to Pietermaritzburg to conduct the interview. However, this became unnecessary as there was a meeting in Durban that the Subject Librarian had to attend and thus the interview was conducted on the Durban campus. The arrangements to conduct the interviews were relatively simple. The researcher communicated with Subject Librarians and the ECP Coordinator via e-mail, telephone, face-to-face or via cellular phone. A diary

of availability of the interviewees was kept by the researcher that helped coordinate the interviews. Subject librarians were contacted by the researcher and a date was diarised to interview respective Subject Librarians. On failing to reach Subject Librarians and the ECP Coordinator via e-mail and telephone the researcher made personal visits to set up the interviews. The researcher kept in contact with the ECP Coordinator via cellular phone to ensure that she was familiar with her surroundings because the interview was taking place at the researcher's home and the researcher did not want the ECP Coordinator to become lost. Eventually only five of the six Subject Librarians were interviewed (as illustrated in Table 3.4), in addition to the ECP Coordinator.

3.2.2.3 Questionnaires

There are many different types of questionnaires such as online or Internet or web-based questionnaires that are delivered either via e-mail or are designed as a web page and the URL is sent to the participant of the survey; self-administered questionnaires that are posted to participants together with self-addressed envelopes enclosed; group administration of questionnaires (Maree and Pietersen 2007b: 157-158), as was used in this research.

The researcher chose to use self-administered questionnaires as justified in Section 3.2.2.3.1. Bless, Higson-Smith and Kagee (2006: 117) explain that self-administered questionnaires are completed by respondents without assistance from the researcher. Students at the DUT who were identified as part of the population completed the questionnaire essentially on their own, despite there being a few queries with regard to terminology used. The administering of the questionnaire to a population of 303 students did not prove to be as easy as was initially envisaged due to poor class attendance, campus student protest action and non-attendance with some classes. "Group administration of questionnaires" is where the researcher waits while an entire group of respondents complete the questionnaire (Maree and Pietersen 2007b: 157). The advantages of this method included: many respondents could complete the questionnaire at one time; the questionnaire administrator, who was the researcher assisted by Subject Librarians, could check the questionnaires for accuracy and assist the respondents with any problems that

may be experienced (although this proved a little difficult because students rushed out once the questionnaire was completed or the questionnaires were handed in by other class mates); it was cheap to administer; and, the response rate was optimal (Maree and Pietersen 2007b: 157). Table 3.5 presents the total number of ECP students per faculty and per ECP programme and the number of students surveyed, which is also represented in percentage.

Table 3.5

ECP students surveyed

Faculty	Foundation/ECP programmes	ECP enrolment 2010	Number surveyed	Percentage return
Accounting and Informatics	Cost and Management Accounting	30	24	80%
Applied Science	Food and Nutrition Science	10	10	100%
Arts and Design	Fine Arts	15	9	60%
	Graphic Design	12	5	42%
	Interior Design	8	6	75%
	Jewellery Design	8	6	75%
	Photography	9	7	78%
Health Sciences	Biomedical Technology	22	19	86%
	Child and Youth Development	10	8	80%
	Dental Technology	22	19	86%
	Environmental Health	18	8	44%
	Homoeopathy and Chiropractic 1	16	12	75%
	Homoeopathy and Chiropractic 11	8	8	100%
	Wellness 1	18	18	100%
	Wellness 11	23	20	87%
Management Science	Applied Management (Midlands)	30	25	83%
	Hospitality and Tourism Management 1	31	23	74%
	Hospitality and Tourism Management 11	13	0	0%
Total		**303**	**227**	**75%**

In this study the ECP target population was literate (university students) and they were familiar with the content of the questionnaire. It was relatively easy to track returns on the questionnaire since a register of each class of ECP students was taken. Although the data collection plan was "group administration of questionnaires", this was not always possible. Class attendance by ECP students in some departments was very poor with the result, administering the questionnaire to these groups took more than a single gathering. Students, in some cases, even saw the researcher individually outside the group to complete the questionnaire as they were asked by friends and colleagues to respond to the questionnaire.

3.2.2.3.1 Questionnaire design

Questionnaires have to be very carefully designed. A good survey instrument includes questions that meet the research objectives, testing them to ensure that they can be first asked by the researcher and then answered by the respondent (Fowler 2009: 115). The researcher was mindful of the objective and sub-objectives of the research when the questionnaire was being developed. Reliability refers to the confidence that the researcher has in the research instrument to repeatedly present the same results. Questions should be precise, avoid bias and should be ordered from general questions to more specific questions (Babbie and Mouton 2001: 233-236). The questionnaire was arranged from the general to the more specific information that impacted on the study. At the beginning of the questionnaire the researcher ascertained the faculty that the student was enrolled with, moving on to biographical questions. The next aspect was the educational background, information that was needed to know the digital status and educational background of students before they came to the DUT. The following aspect of the questionnaire involved the assessment of the current digital status of the students. Lastly, the questionnaire included questions regarding teaching and learning methods that students preferred and recommended to bridge the digital divide in the classroom. The researcher also used filter questions to divide the population into different categories, example, students who used an Internet café and those that did not use an Internet prior to coming to the DUT (see Appendix A).

Mouton (2001: 103) outlines the errors that can occur in the design of a questionnaire as follows: there is no piloting of the research instrument; there are ambiguous, double-barrelled or vague questions, and undefined terms; the researcher assumes things about the respondents; the researcher asks questions that the respondents do not have knowledge about; and lastly, the researcher asks leading questions. The researcher guarded against the above list of errors that could affect the results of the research, by pre-testing the questionnaire. The pre-test revealed that there were some students who were English second-language students and thus found it difficult to understand words like preference, impact, digital divide, etc. Some of these terms were explained in the questionnaire but this was not read by the respondents. Fortunately, the researcher or Subject Librarians were in the classroom during the administering of the questionnaire and thus could explain the terms to those who had queries regarding them.

The researcher had to decide whether open-ended or closed questions or both types of questions were going to be used in the questionnaire. The type of questions used in the questionnaire for this study was both open-ended and closed questions (see Appendix A). Fink (2009: 15) defines open-ended questions as questions that allow the respondent to respond to the question in their own words, allowing for expansion and clarification of the response. The open-ended questions in this study allowed students to elaborate on their responses, thus adding value to the research. Fink (2009: 16) asserts that the expansion gives the researcher insight into why the respondents respond in a particular way but interpretation and analysis of these responses can be very difficult and complicated. The majority of surveys rely on multiple choice questions as this is considered to be more reliable and efficient. It is considered to be more efficient because it is easy to use, score and enter data (Fink 2009: 15). The uniform data that a researcher gets from the multiple choice questions lends itself to reliability (Fink 2009: 15). Both open-ended and closed questions were used in this study. The open-ended questions allowed the researcher to collect rich data by allowing participants the flexibility to express their own thoughts and ideas on the issues being investigated. The closed questions, on the other hand, allowed for collecting data that was easy to analyse and increased the reliability of the information gathered.

The use of multiple methods of data collection is referred to as triangulation which ensures validity (Bloomberg and Volpe 2008: 73). Triangulation involves collecting data from different sources and the use of different research techniques to collect data, as was the case in this research. To reiterate, the researcher collected data from Subject Librarians teaching IL to ECP students at the DUT, the ECP Coordinator and ECP students who were engaged in the IL module, using both qualitative and quantitative methods (as explained in Section 3.2.2). According to Denscombe (2003: 132) using triangulation enhances the researcher's chance of arriving at useful and correct findings. Silverman (2010: 133) states that having a "cumulative" view of data which is drawn from different contexts might give the researcher a "true" reflection of the issue, object or environment; hence the researcher elicited the perspectives of Subject Librarians teaching IL to ECP students, the ECP Coordinator and ECP students engaged in the IL module. The examination of the intersecting data is referred to as triangulation (Silverman 2010: 133). Silverman (2010: 133-134), however, warns that triangulation can make the analysis of data more difficult. The researcher accepted this as a small price to pay in exchange for richer data collection.

3.2.2.3.2 Piloting the questionnaire

A pilot study is defined as the administering of the research instrument under special conditions before the actual survey is done (Dane 2011: 228). A pilot study involves administering a draft of the instrument to a small group of people. A draft questionnaire was administered to 35 students to assess the questionnaire for possible errors and problems that could be attended to before the actual research was undertaken. The researcher would have preferred to use a larger group of students to pre-test the questionnaire but this was not possible (reasons explained later in this section). Although mainstream students were available the researcher wanted to pre-test the questionnaire on past ECP students or students who were no longer engaged in the IL module. The errors that were found in the draft questionnaire are discussed later in this section.

Dane (2011: 227) claims that the pilot study is the most important part of survey research. Had there been no pilot study and the researcher assumed that the questionnaire was fine, the researcher in this study would have had problems gathering data that was important to

the study due to lack of understanding by respondents of certain terminologies used in the questionnaire. The pre-test, in this study, also revealed that the questionnaire was going to yield interesting and substantial data from the participants. The survey data cannot be trusted unless the researcher is sure that the respondents understood the questionnaire and thus provided appropriate responses (Dane 2011: 228). In the case of this study the researcher discovered that there were a few problems identified (these are discussed later in this section).

Fowler (2009: 124) correctly explains that while interviewers can correct problems or misunderstandings during the interview situation, with the self-administered questionnaire problems that respondents encounter are less evident. The interviewer has a chance to rephrase a question while guarding against steering the response in a particular direction. Dane (2011: 228) emphasises the importance of the pilot study in assisting to edit the research instrument and thus avoiding any form of bias. The draft questionnaire in this study did not have any bias but did, however, lend itself to confusion regarding terminology. The researcher revised the questions to ensure that the questions were clear and precise. Question 8 in the questionnaire (see Appendix A) referred to "advantaged" and "disadvantaged" secondary education. The pilot respondents were not clear what an advantaged or a disadvantaged school background here referred to. From reviewing the responses to other related questions there was an indication that students did not quite understand these terminologies and thus the terminologies were clarified by adding within brackets the terms "well-resourced" and "under-resourced", respectively (see Question 8 of Appendix A).

The next question (Question 18 – Appendix A) that posed a problem during the pre-test related to use of the term "computer literacy". Not all ECP students who attended the IL training were familiar with this term as some had not by then been exposed to computer training or others knew the module by a different title. The term "computer literacy" was thus changed to "computer training". Question 19.1 and Question 19.3 (see Appendix A) required that students indicate whether there was a preference for the computer literacy module to be attended "before" or "while" attending the IL module. This question was used to filter students who preferred computer training before and those who preferred

computer training while engaged in the IL training. Initially the researcher used the term "concurrently" but the pilot study revealed that students were confused by the term "concurrently" and thus the term was changed to "at the same time while...". Once the pilot study was completed and the researcher reviewed and identified problems, changes were effected to the questionnaire which assisted in a better understanding of the questionnaire.

Fowler (2009: 124) claims that the best way to pilot the research instrument is in person, with a group of potential respondents. In the case of the current study the researcher opted to pilot the study on past-year ECP students or ECP students who were no longer attending IL training, as they would be familiar with the concepts used in the questionnaire. The researcher did not want to pilot the questionnaire on current ECP students as it was believed that students might not wish to participate twice in the research and this might run the risk of losing respondents for the main study. The draft questionnaire was ready to pilot when annual students had already gone on the winter vacation and the semester students were busy with semester examinations which made it difficult to find available students to pre-test the questionnaire. The researcher managed to pre-test the questionnaire on 35 past-year ECP students or currently enrolled ECP students who no longer attended the IL training. Every attempt was made to contact more students but this proved difficult for the reasons explained above. The pilot study was successful in revealing whether the instructions and questions were clear, and whether there were problems in understanding what kinds of responses were expected (Fowler 2009: 124).

One important outcome of a pilot study is knowledge gained about the amount of time needed to complete the questionnaire (Bless, Higson-Smith and Kagee 2006: 161). Piloting of the questionnaire in this study revealed that it took students approximately 20 to 25 minutes to complete the questionnaire, although a small number of students did take approximately 45 minutes. Fowler (2009: 125) points out that the length of the questionnaire often affects the response rate, which is also dependent on the population and topic being studied. In the current study the researcher had positive feedback from the students in the pilot study in that they found the study to be very interesting. The

availability of participants for this research was of crucial importance. The next section deals with this aspect.

3.2.2.3.3 Availability of participants for the main questionnaire survey

The participants in the questionnaire survey were ECP students currently (2010) engaged in the IL training. At the beginning of the study it was believed that availability of participants would not be a problem because ECP students were a captive group. However, this proved to be an incorrect assumption as the attendance of classes was very poor. Further, some students had already completed the IL module during the first semester of 2010.

A further problem was the unfortunate passing away of one of the DUT Subject Librarians and thus ECP students who were taught by her did not respond to the call to attend IL classes. Also, attempts to liaise via the department ECP coordinator proved difficult with regard to the Hospitality and Tourism Management 11 ECP students. All attempts to survey these students proved in vain and thus the researcher decided that it was no longer feasible to wait for the Hospitality and Tourism Management 11 ECP students as these students were either on study leave or already writing exams at the time the survey was being conducted. This non-participation of Hospitality and Tourism Management 11 ECP students is reflected in Table 3.5. The overall response from the ECP students was relatively good (75%) and thus the researcher believed that not including the Hospitality and Tourism Management 11 ECP students would not significantly affect the overall results of the study.

3.2.2.3.4 Communicating with ECP students

Various methods of communication were used to contact the participants of the main questionnaire survey. At the time of administering the questionnaires students were not necessarily still engaged in the IL training and thus surveying them during the IL period

was not always possible. The researcher thus contacted the respective Subject Librarians requesting them to liaise with the departmental coordinators of the Extended Curriculum Programme to set up a time and date for the questionnaires to be administered. In some instances students were contacted and these students assisted the researcher in bringing their class colleagues together for the survey. The researcher also contacted some students via cellular phone and group administering of the questionnaire was made possible. The response from some faculties was more favourable than from others. It seemed as though the Faculty of Applied Science and the Faculty of Health Sciences were more receptive to the Extended Curriculum Programme and thus surveying ECP students from these two faculties was relatively easy. Some students were also referred to the researcher by participants in the survey and thus the questionnaire was administered to these students individually. It can therefore be said that word-of-mouth also assisted the researcher to conduct the survey and increase the number of respondents. A register was kept and students who came to the researcher individually were added on the register of the class which helped the researcher keep a record of the faculties and departments that participated in the survey. This proved to be a useful back-up to Question 2 of the questionnaire (see Appendix A, Question 2) as not all students filled in the programme that they were registered for.

3.2.2.4 Return rate on survey instruments

Table 3.6 captures the total number in ECP student population engaged in the IL training at the time the study was undertaken and the return rate on the questionnaire administered to this population. The table also presents the number of Subject Librarians who had been teaching the IL module to ECP students at the time of the study and the number of Subject Librarians who were interviewed for this research. Lastly, it includes the ECP Coordinator who oversees the ECP programme at the DUT and who was interviewed for purposes of this study.

Table 3.6

Return rate on survey

Population	Total number	Return rate	Percentage return
ECP students	303	227	75%
Subject Librarians	6	5	83%
ECP Coordinator	1	1	100%

3.3 Reliability and validity

A good level of reliability, according to Denscombe (2003: 300), is when the research instrument provides the same results repeatedly and change is not due to the research instrument that is being used. The pre-test results in this study were no different from that of the main questionnaire survey, however, the queries posed by the pre-test respondents indicated that rephrasing of certain questions was necessary to avoid errors and thus increase the reliability of the research instrument. Validity of an instrument on the other hand, according to Struwig and Stead (2001: 138), can be defined as the "degree to which an instrument measures what it is intended to measure". Content validity is very important. Marshall and Rossman (2006: 201) describe it as the content relevant to the instrument. The items in the questionnaire and in the interview schedules of this study related to the topic of the study. The researcher in this study used multiple research techniques (that is, interviews and self-administered questionnaires) to collect data, and thus the validity of the study was enhanced. The use of multiple research techniques for triangulation purposes increased the validity of the study. The researcher employed multiple methods to confirm data that was collected from one instrument with that collected from the other. Hence the correlation of items, where possible, among the three research instruments (see Apendices A, C and D). In so doing the researcher hoped to

increase the trustworthiness and interpretive validity of the results (Maree and Van der Westhuizen 2007: 39-40).

Establishing reliability or validity alone does not serve any purpose. Both reliability and validity are important to research instruments (Bless, Higson-Smith and Kagee 2006: 160). Thus for this study the researcher made every effort to ensure both reliability and validity, as explained in this section as well as in Sections 3.2.2.2.1 and 3.2.2.3.1 on the design of the interview schedules and the questionnaire, respectively. Once data had been collected the researcher began the process of making sense of the data that was collected. The data had to be systematically analysed. The next section discusses the processes and procedures involved in analysing the data.

3.4 Data analysis

Bless, Higson-Smith and Kagee (2006: 163) explain that data analysis begins once the data has been collected and checked. Once data collection in this study had been completed and the researcher knew that further attempts at surveying ECP students not yet covered in the survey would be fruitless, the researcher began examining the raw data. First the researcher looked at the quantitative data and then the qualitative data where possible themes were established. Once data collection had been completed using a survey, the data is then converted into a form that allows computer analysis (Cresswell and Clark 2007: 129).

The five steps that were followed in this study to code the data (that is, data reduction) were as follows: deciding on a format, that is, the way the data would be organised; designing the code which is the assigning of values to the respondents' answers that can be processed by a machine; coding which assists in converting responses into standard categories; data entry which is translating the data into a computer readable format; and lastly, data cleaning which is checking the data file to ensure accuracy and completeness before the analysis begins (Fowler 2009: 145).

Codes were assigned to the responses to ensure easy analysis and to minimise errors (Cresswell and Clark 2007: 128). For the purposes of this study the researcher used numerical values to code the data, for example, one (1) being strongly disagree and five (5) being strongly agree. However, codes could either be in the form of numbers or alphabetical values (Fowler 2009: 146). Fowler (2009: 146) suggests that it is extremely important that there be a clear rule for what numbers to assign to each response. There would always be questions that are not answered and thus the researcher assigned "missing data codes" for the unanswered questions (Fowler 2009: 146). The analysis of the data was done with the assistance of the computer software, *SPSS* (version 18.0). This software allowed the researcher to analyse and represent the finding by means of graphs and tables.

With regard to the qualitative data collected, King and Horrocks (2010: 152) maintain that identifying areas of the transcript of the interviews that would assist in addressing the research problem is very important. Subject Librarians and the ECP Coordinator had vast amounts of data to contribute to the research and thus it was important that the information that was pertinent to the study was identified, that is, that thorough content analysis was undertaken. It was important to read the transcripts of the interviews carefully. Responses to the open-ended questions were read and the researcher then began identifying the emerging themes before attempting to code the data (King and Horrocks 2010: 152). The researcher ensured that the categories or themes were not too narrow as the research would then have too few entries per category or theme and thus the analysis would be difficult (Fowler 2009: 147). The categories or themes assist group responses that are analytically similar and differentiate between those responses that are different (Fowler 2009: 147). The researcher was vigilant about selecting categories or themes pertinent to this particular study. Fowler (2009: 147) also warns that the responses must be put into meaningful themes or categories to avoid errors in analysis.

The following advice offered by Fowler (2009: 147) to assist in constructing the codes for data analysis were adhered to by the researcher: one should have a clear idea regarding the characteristics of responses that have an analytic significance; note the different kinds of responses to the questions that are important to the research; tabulate some of the answers

and construct codes for classifying those answers (this is to test the codes); extend this to a few more questionnaires if necessary as this will assist in deciding whether there is error in the coding. The qualitative data was allocated codes as well and analysis of this data was done by means of frequency distribution. According to Richards (2009: 110) qualitative research is very personal and thus ownership of the data is a critical factor in the research process. The researcher is passionate about research in this particular area and thus taking ownership of the data came naturally and easily to her. Once data analysis has been completed the researcher needs to evaluate the research methodology used, to uncover possible errors that could be due to the research methodology rather than the participants' responses. Thus, the next section evaluates the research methodology used in this study.

3.5 Evaluation of research methodology

The data collection instruments, that is, the self-administered questionnaire and the interview schedules used in this study generated data that was required. Data gathered together with reviewing of relevant literature enabled the researcher to adequately address the objective and sub-objectives of the study.

The population for the study included all key role players, that is, the Extended Curriculum Programme students, Subject Librarians teaching information literacy to ECP students and the ECP Coordinator and thus the findings are a true reflection of the population that was studied. The return rate on the survey questionnaire was excellent (75%), which also reinforces the above statement that the findings can be generalised to the entire population.

The researcher was able to articulate the questions as outlined in the interview schedule and the interview schedule in turn was able to successfully assist in collecting valuable data on the topic being researched. The ECP student questionnaire also yielded rich and valuable data that contributed adequately to this study.

Content analysis (of qualitative data) and descriptive statistical analysis (of quantitative data) were considered appropriate and adequate for data analysis for this study. However, the researcher was mindful of the fact the being a Subject Librarian herself could bring in certain biases into this study. While every effort was made to ensure objectivity, the researcher was aware that these biases may shape the way data was interpreted, coded and understood. On a positive note, however, this understanding enhanced the researcher's awareness, knowledge and sensitivity to challenges faced by the population of the current study.

The researcher strongly believes that all stages in the research process were adequately followed in meeting the objective and sub-objectives of the study.

3.6 Summary

Chapter 3 discussed the research methodology used in this study. It reviewed the research design of the study and the research methods used, discussing the population of the study, data collection procedures and instruments (including the pre-testing of instruments), and how collected data was analysed. The chapter also evaluated the study's research methodology. The next chapter presents the analysis of results and findings of the study.

Chapter 4: Presentation of findings

4.1 Introduction

Chapter 3 focused on the research methodology and data collection techniques used to gather data required for this study. This chapter presents the findings from the interviews of Subject Librarians teaching information literacy (IL) to Extended Curriculum Programme (ECP) students at the Durban University of Technology (DUT) (refer to Appendix C) and the ECP Coordinator (refer to Appendix D) as well as the findings from the self-administered questionnaire (refer to Appendix A) used to survey ECP students engaged in IL training at the DUT. A total of 227 ECP students (75%) participated in the survey out of a total of 303 ECP students engaged in the IL module during 2010. The number of Subject Librarians interviewed was five of the six Subject Librarians teaching information literacy (IL) to ECP students at the DUT. DUT's ECP Coordinator at the time the study was carried out, was interviewed.

4.2 Reliability and validity

The two most important aspects of precision in research are **reliability** and **validity** (Bless, Higson-Smith and Kagee 2006: 156). Reliability refers to the assurance that the research instrument would repeatedly present the same results (Bless, Higson-Smith and Kagee 2006: 156). Validity of an instrument on the other hand, according to Struwig and Stead (2001: 138), can be defined as the "degree to which an instrument measures what it is intended to measure". In this study multiple research techniques were used (that is, interviews and a self-administered questionnaire) to collect data, so that the validity of the study would be enhanced. Reliability and validity have been discussed more fully in the previous chapter (Chapter 3).

4.2.1 Reliability statistics

To demonstrate the effectiveness of a survey questionnaire, reliability scores must be determined. Many aspects in research cannot be explicitly measured, for example, perceptions and attitudes. To measure attitudes, perceptions, etc. the researcher asks a number

of questions. The responses to such questions are converted to numerical values (Bland and Altman 1997: 572). When items are used to form a scale when probing relevant issues, a degree of internal validity needs to exist. In this study, the Lickert scale was sometimes used (refer to Appendix A) and therefore it is essential to find out whether these questions measured what they were supposed to measure. Pietersen and Maree (2007: 216) explain that a reliability coefficient measures the internal validity of an instrument, known as Cronbach's alpha which is based on inter-item relationship. A reliability of 0.80 or higher is considered as "acceptable" (Pietersen and Maree 2007: 216). The reliability scores for the Likert scale items of the survey questionnaire (4 in total) were determined and the result is shown in Table 4.1.

The overall Cronbach's alpha reliability represented in Table 4.1 is high which implies a high degree of consistent scoring by the respondents for the ordinal scale categories for this research. Ordinal scales, as explained by Maree and Pietersen (2007a: 148), include "numeric data that have been grouped together", for example, the level of agreement with statements (strongly disagree, disagree, unsure, agree, strongly agree).

Table 4.1

Reliability statistics

Cronbach's Alpha	N of Items
.835	4

4.3 Presentation of findings

Data collected was analysed and findings are presented where possible by means of tables, graphs or narratives. Where necessary, percentages have been rounded off to the nearest whole to facilitate ease of presentation on graphs and in tables. The findings from content analysis of responses to open-ended questions are presented in narrative form, grouped by themes and frequency counts have been presented where possible.

The research included three population groups. Data from each group was collected using a different research instrument. A questionnaire was used to collect data from ECP students at

the DUT. Two sets of interview schedules targeted the ECP Coordinator and Subject Librarians teaching IL to ECP students at the DUT.

Section 4.3 presents separately the findings from the three population groups largely by descriptive statistics based on the demographic information of the study. All figures are represented by the frequency, with the percentage given within brackets.

4.3.1 Presentation of findings of questionnaire survey of ECP students

Data was collected from ECP students registered at the DUT who were engaged in the IL module in 2010. The section that follows presents the findings of the survey (refer to Appendix A). Responses to open-ended items of the questionnaire were contextually analysed, with data being grouped into themes or concepts, where possible.

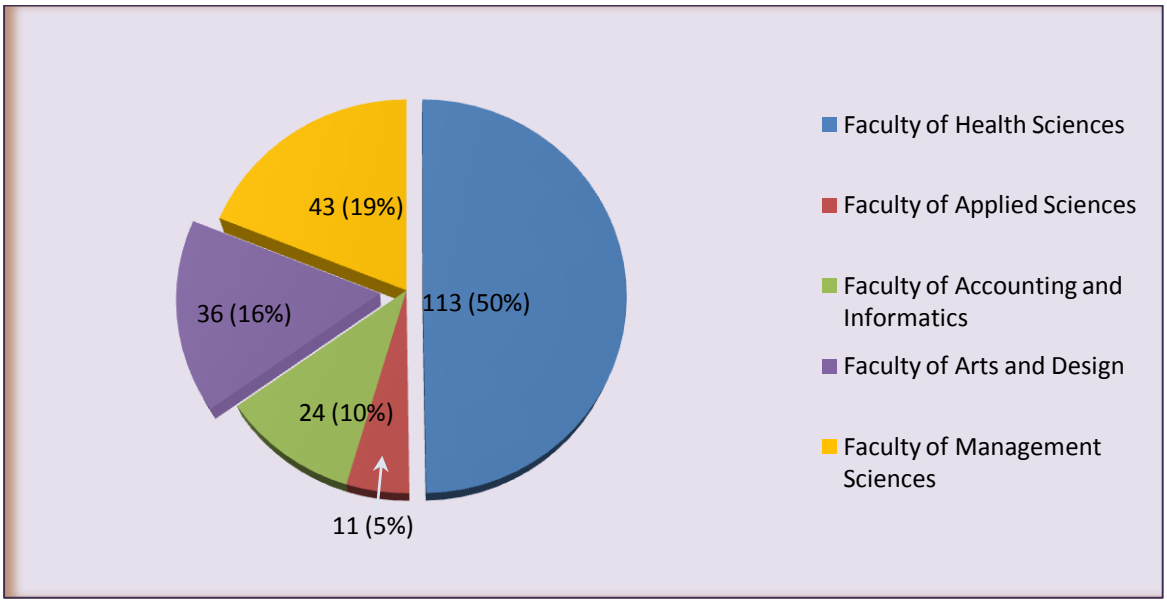
4.3.1.1 Registration of ECP students per faculty

Respondents were asked to indicate the faculty in which they were registered. Figure 4.1 indicates that half (50%) of the students belonged to the Faculty of Health Sciences. The Faculty of Health Sciences at the DUT has a very positive attitude to information literacy and possibly a more favourable relationship with the library compared to other faculties. Hence more departments from this faculty have come on board, offering IL to their ECP students. The Faculty of Health also has the highest number of ECP students (137- see Section 3.2.1 (Table 3.1) of Chapter 3). Figure 4.1 indicates that other faculties had students in approximately 5% incremental ratios from Applied Sciences to Management Sciences.

Figure 4.1

[N=227]

Registration of ECP students per faculty



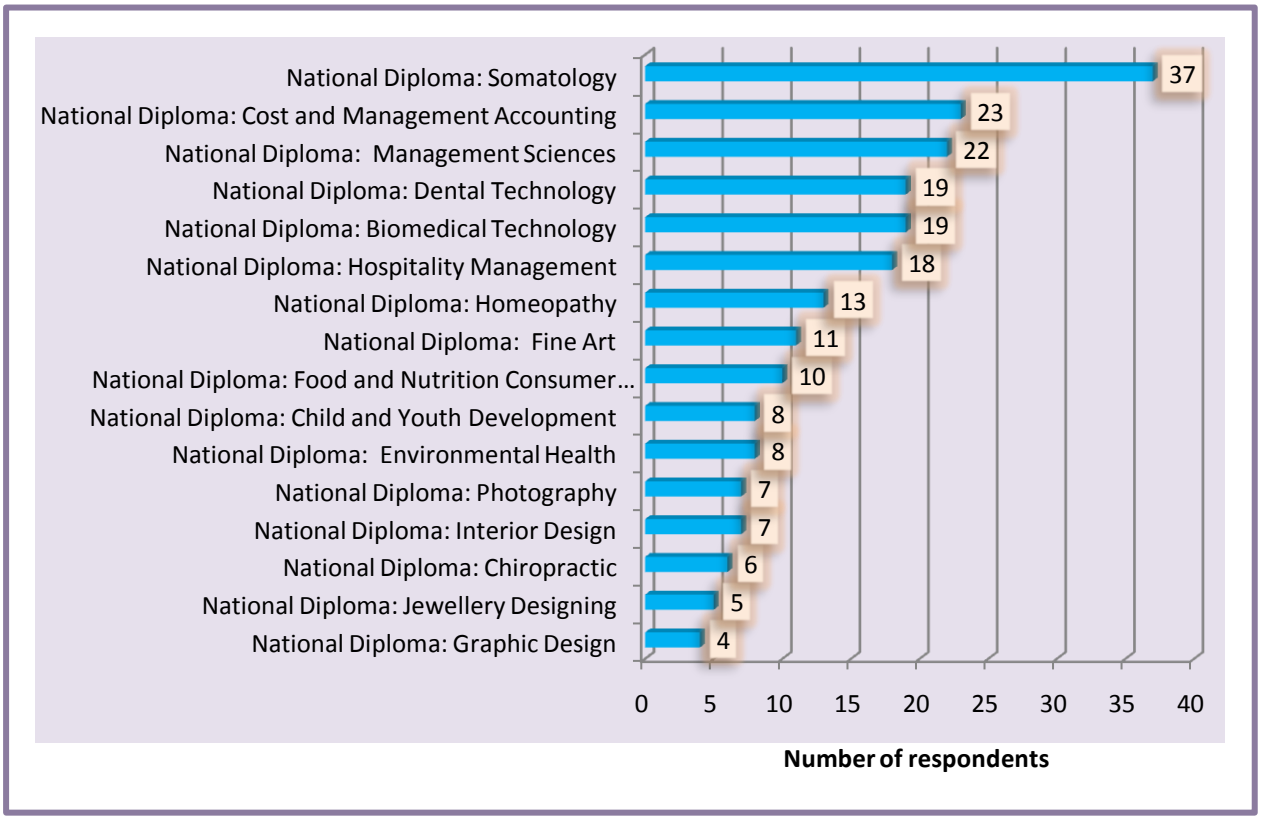
4.3.1.2 Registration of ECP students per diploma

Respondents were asked to indicate the diploma for which they were registered. Two hundred and seventeen (217) students responded to this item while 10 did not respond. Figure 4.2 indicates the number of respondents per diploma. Although the figure appears high (37) for the National Diploma: Somatology, this is a combination of both first and second year ECP students. The number of ECP students per diploma is relatively low (less than 20) in most cases except for the National Diploma: Cost and Management Accounting and the National Diploma: Management Sciences where the number per class exceeds 20 which could prove difficult when assisting individual students with technology based problems.

Figure 4.2

[N=217]

Registration of ECP students per diploma



4.3.1.3 Race and gender profile of respondents

Respondents were asked to indicate their race and gender for the purpose of this study. Table 4.2 summarises the respondents by gender and race. Of the 205 African students, 88 were male. This constituted 43% within the African race group and 39% of the total (226) number of students who responded to the question regarding gender (one respondent did not respond to this item). Comparing African male respondents to the other race groups it is evident that within the male category, 94% were African. There were only six male respondents from all of the other race groups. A similar pattern is observed for African females. The 117 African female respondents constituted 89% of all female respondents. The implication of this for the study is that the African students' perceptions would far outnumber those of other race groups as they constituted 91% of the total number of respondents. DUT, through historical and political evolution, is a higher education institution in South Africa dominated by African student numbers.

Table 4.2

[N=226]

Race and gender profile of respondents

Race group			Gender		Total
			Male	Female	
Race	**African**	**Frequency**	**88**	**117**	**205**
		% within Race	43%	57%	100%
		% within Gender	94%	89%	91%
		% of Total	39%	52%	91%
	Coloured	**Frequency**	**3**	**2**	**5**
		% within Race	60%	40%	100%
		% within Gender	3%	2%	2%
		% of Total	1%	1%	2%
	Indian	**Frequency**	**2**	**12**	**14**
		% within Race	14%	86%	100%
		% within Gender	2%	9%	6%
		% of Total	1%	5%	6%
	White	**Frequency**	**1**	**0**	**1**
		% within Race	100%	0.0%	100%
		% within Gender	1%	0.0%	0.4%
		% of Total	0.4%	0.0%	0.4%
	Other	**Frequency**	**0**	**1**	**1**
		% within Race	0.0%	100%	100%
		% within Gender	0.0%	1%	0.4%
		% of Total	0.0%	0.4%	0.4%
Total		**Frequency**	**94**	**132**	**226**
		% of Total	42%	58%	100%

4.3.1.4 Extended Curriculum Programme students

To ascertain if respondents qualified to participate in the survey of ECP students, they were asked if they were registered ECP students at DUT. All respondents who participated in the questionnaire survey were registered DUT ECP students. The number of ECP students who participated in the study was 227 students out of a total of 303 ECP students.

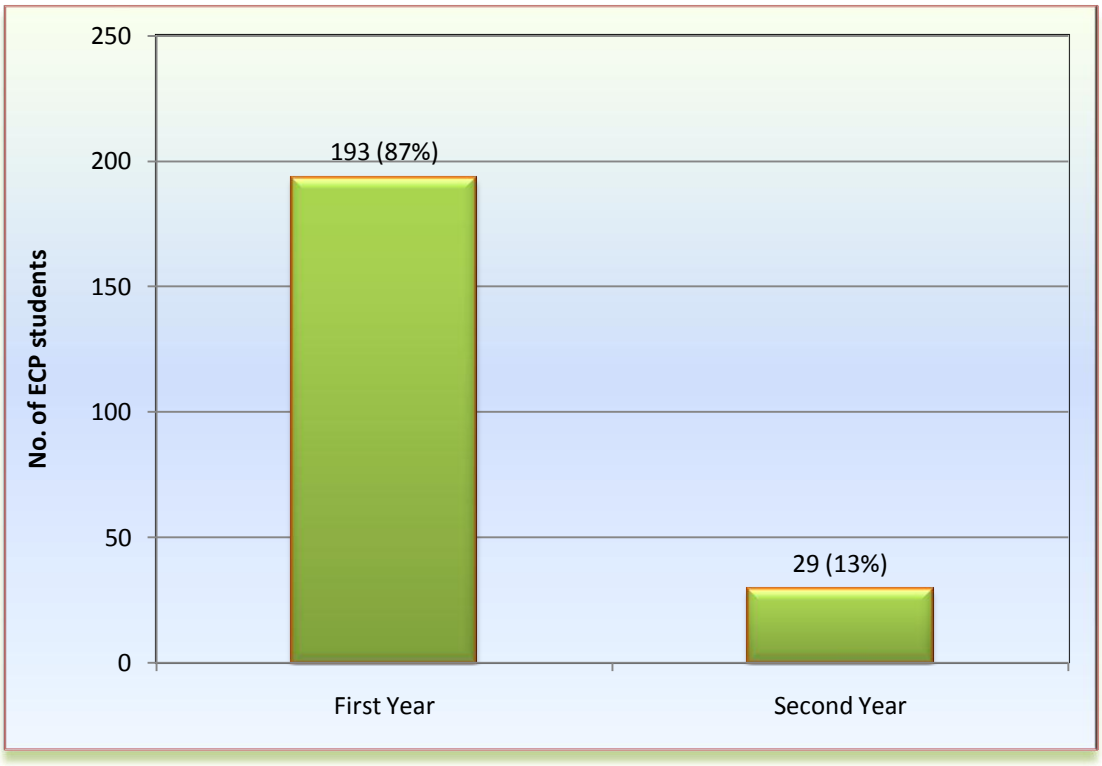
4.3.1.5 ECP year of registration

Respondents were asked to indicate which year of the ECP programme they were registered for. Students either belonged to the first year or second year. Of 222 students who responded to this question (five did not respond) the majority of students, that is, 193 (87%) were in the first year of the ECP programme while 29 (13%) were in the second year. This is captured in Figure 4.3. The Extended Curriculum Programme does not extend into the second year for all departments. The duration of ECP is still not standardised.

Figure 4.3

[N=222]

ECP year of registration



4.3.1.6 Secondary education system

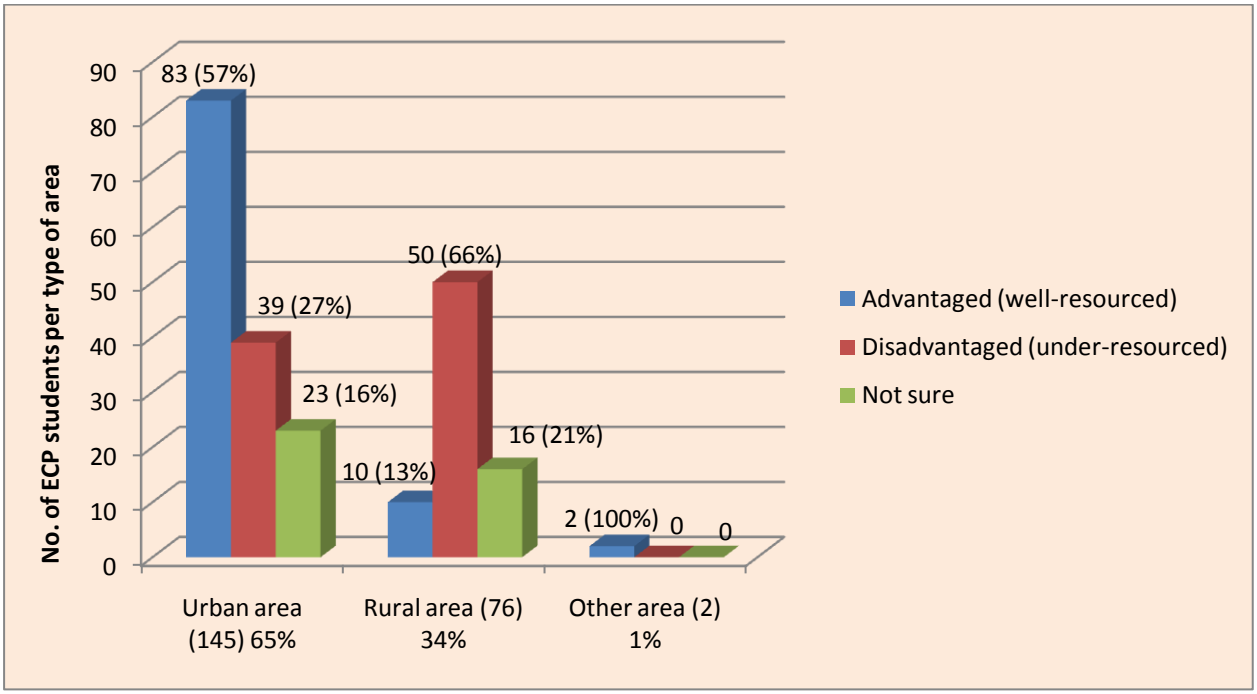
Figure 4.4 captures the type of secondary schools attended by respondents (that is, well-resourced or under-resourced) and the type of area in which the school was situated (that is urban, rural or other). One hundred and forty-five (145) (65%) of the respondents came from urban schools while 76 (34%) came from rural schools and only two (1%) from other types of

areas. Unfortunately while these respondents indicated 'other' they did not specify what the 'other' was. Four (4) respondents did not respond to this item. Fifty-seven percent (57%) of the respondents who came from urban schools believed that their schools were well-resourced. Thirteen percent (13%) of the rural school respondents believed that their schools were well- resourced. Sixty-six percent (66%) of rural school respondents indicated that their schools were under-resourced. These respondents formed 23% of the overall number of students surveyed. This is an indication that the information literacy class at DUT comprises of both students from well-resourced schools and students from under-resourced schools which must contribute to the digital divide experienced in the information literacy classroom. (Note that for ease of presentation percentages have been omitted for zero numbers in Figure 4.4).

Figure 4.4

[N=223]

Secondary education system



A total of 95 (43%) of the respondents claimed that they went to advantaged schools (refer to Figure 4.4). Table 4.3 captures type of secondary schooling, in terms of race, that ECP students were exposed to. The number of African respondents who claimed to have attended advantaged schools was 82 (37%) while 85 (38%) students claimed to have attended disadvantaged schools. It is interesting to note that a significant number of African students

were unsure whether they attended advantaged or disadvantaged schools. Also, interesting to note is that the single white student claimed to have been exposed to a disadvantaged schooling system. This indicates that the information literacy class is a diverse group of students, both from advantaged and disadvantaged backgrounds. The almost equal number of African students claiming to have been exposed to advantaged schools and disadvantaged schools also indicates that students from a historically disadvantaged background are not necessarily disadvantaged in post-apartheid South Africa.

Table 4.3

[N=223]

Secondary education system exposed to - represented by race

Response by the different race groups			Do you believe that with regard to funding and resources, the secondary education (high school) system that you were exposed to, was...			Total
			Advantaged (well-resourced)	Disadvantaged (under-resourced)	Not sure	
Race	African	**Frequency**	**82**	**85**	**35**	**202**
		% within Race	41%	42%	17%	100%
		% within: Type of school system exposed to	86%	96%	90%	91%
		% of Total	37%	38%	16%	91%
	Coloured	**Frequency**	**2**	**1**	**2**	**5**
		% within Race	40%	20%	40%	100%
		% within: Type of school system exposed to	2%	1%	5%	2%
		% of Total	1%	0.4%	1%	2%
	Indian	**Frequency**	**10**	**2**	**2**	**14**
		% within Race	71%	14%	14%	100%
		% within: Type of school system exposed to	11%	2%	5%	6%
		% of Total	5%	1%	1%	6%
	White	**Frequency**	**0**	**1**	**0**	**1**
		% within Race	0%	100%	0%	100%
		% within: Type of school system exposed to	0%	1%	0%	0.4%
		% of Total	0%	0.4%	0%	0.4%
	Other	**Frequency**	**1**	**0**	**0**	**1**
		% within Race	100%	0%	0%	100%
		% within: Type of school system exposed to	1%	0%	0%	0.4%
		% of Total	0.4%	0%	0%	0.4%
Total		**Frequency**	**95**	**89**	**39**	**223**
		% within Race	43%	40%	18%	100%

4.3.1.7 Level of ICT experience

Respondents were asked to indicate their level of experience with information and communication technologies when they first came to DUT. Table 4.4 captures the level of ICT experience according to the type of area in which ECP students attained their secondary school education. Of all the respondents (224; three did not respond to this question), a total of 37 (17%) indicated that they had no previous ICT experience. It is interesting to note that 22 (60%) of these respondents were from urban schools. A total of 76 (34%) of the 224 respondents indicated that they were very experienced regarding ICT. Three-quarters (75%) of this 76 were from urban schools and 25% from rural schools. Of the 224 students who indicated their level of ICT experience, a significant 148 (66%) students indicated that they had little or no ICT experience.

Table 4.4

[N=224]

Level of ICT experience

Response			What type of area did you attend high school in?			Total
			Urban	Rural	Other	
Level of ICT experience	**No experience**	**Count**	**22**	**15**	**0**	**37**
		% within: Level of ICT experience	60%	41%	0.0%	100%
		% within: Type of area	15%	19%	0.0%	17%
		% of Total	10%	7%	0.0%	17%
	Little experience	**Count**	**66**	**43**	**2**	**111**
		% within: Level of ICT experience	60%	39%	2%	100%
		% within: Type of area	46%	56%	100%	50%
		% of Total	29%	19%	1%	50%
	Very experienced	**Count**	**57**	**19**	**0**	**76**
		% within: Level of ICT experience	75%	25%	0.0%	100%
		% within: Type of area	39%	25%	0.0%	34%
		% of Total	25%	8%	0.0%	34%
Total		**Count**	**145**	**77**	**2**	**224**
		% within: Level of ICT experience	65%	34%	1%	100%

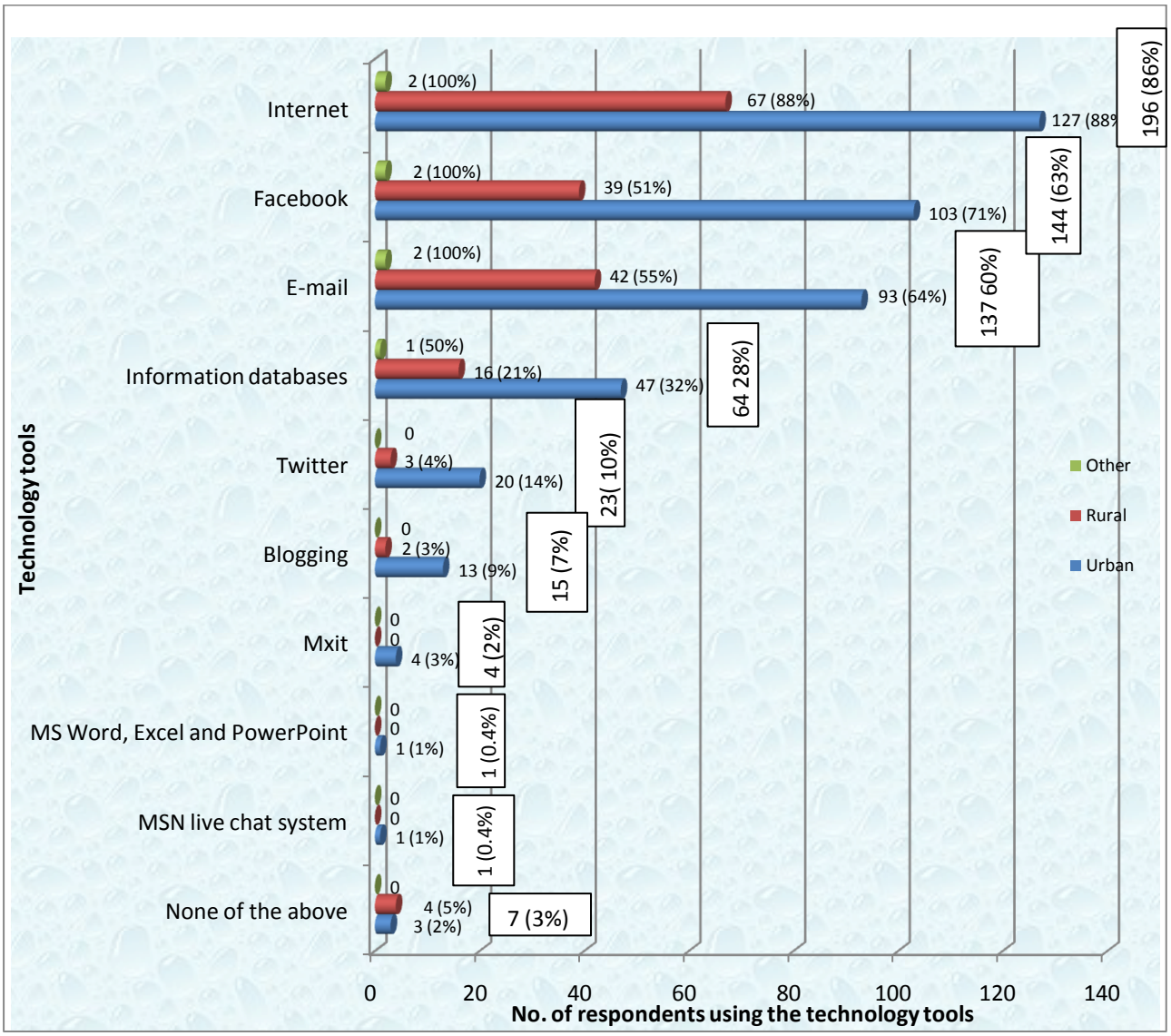
4.3.1.8 Technology tools used by ECP students

Respondents were asked which information and communication technologies (ICTs) they use. A large number of respondents indicated that they use the Internet, e-mail and Facebook. Students who went to schools in urban areas tend to use more ICT facilities than those who attended high school in rural areas. Figure 4.5 captures the type of secondary school (that is, rural, urban or other) that ECP students were exposed to and the various technology tools that they currently use. The findings indicate that seven (3%) of the 227 respondents do not use any of the technology tools listed in the questionnaire (refer to Appendix A, Question 10) while 196 (86%) of the respondents use the Internet, 144 (63%) use Facebook and 137 (60%) use e-mail. It can also be deduced that of the three social networks, that is, Facebook, Blogs and Twitter respondents are not using all the social networking tools that are available. A large 144 (63%) are using Facebook but Blogs and Twitter are still used by a relatively small group of students. Respondents also needed to indicate if there were other ICTs that they were using. Thus the 'other' is specified on the graph as 'Mxit'; 'MS Word, Excel and PowerPoint' and 'MSN live chat system'. For ease of presentation percentages have not been represented for 0 values in Figure 4.5.

Figure 4.5

[N=227]

Technology tools used by ECP students



4.3.1.9 Level of confidence when using new technology

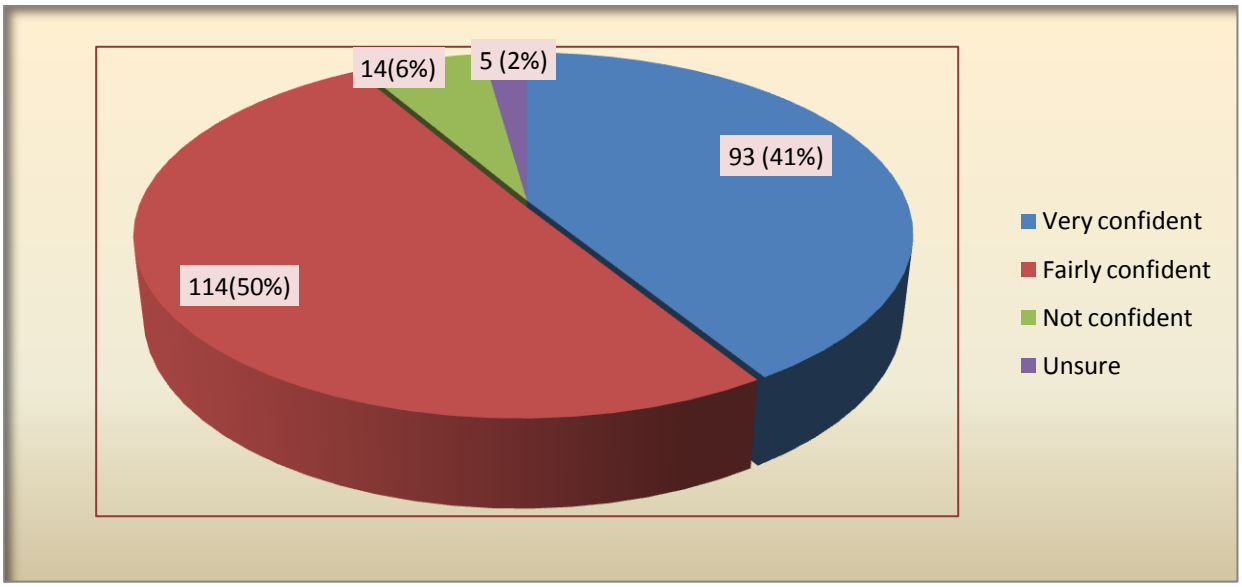
Respondents were asked to indicate their level of confidence when using new technology. It was interesting to note that an overwhelming majority of 207 (92%) respondents indicated that they were confident or fairly confident when using new technology while only 19 (8%) indicated that they were either unsure or not confident when using new technology. One respondent did not respond to this item of the questionnaire. The data presented in Figure 4.6,

however, conflicts with responses to other items relating to the ICT experience (refer to Table 4.4) where 145 (65%) respondents indicated that they had little or no experience with ICT. This could be attributed to respondents having a false sense of confidence without an equal level of ICT experience. Respondents could confidently approach new technology yet not know how to actually use new technology or it could also be that the item in the research instrument was not clear enough and thus it led to a degree of confusion.

Figure 4.6

[N=226]

Level of confidence when using new technology



4.3.1.10 Computer and Internet access

Respondents were firstly asked whether they have access to a computer at the place where they are living while attending university (refer to Appendix A - Question 12.1). Of the 226 respondents who responded to Question 12.1 of the questionnaire (one did not respond), 114 (50.4%) have access to a computer at the place where they are living while attending university while almost an equal number (49.6%) of respondents did not have such access. Respondents were then asked to indicate whether they have access to a computer with Internet connection outside of the DUT (refer to Appendix A - Question 12.2). Sixty-six (29%) responded that they have access to a computer with Internet connection outside of the

DUT while a significant 160 (71%) indicated that they did not have such access. One respondent did not respond to this item. Table 4.5 presents the frequency counts for Question 12.1 and Question 12.2 (Appendix A) while Figure 4.7 captures the location outside of the DUT where ECP students access the Internet.

Table 4.5

[N=226]

Computer and Internet access

Access to a computer at the place where student lives while attending university			
Frequency	Yes	No	Total
	114	112	**226**
Percentage	50.4%	49.6%	**100%**
Access to computer with Internet connection outside DUT			
Frequency	Yes	No	Total
	66	160	**226**
Percentage	29%	71%	**99%**

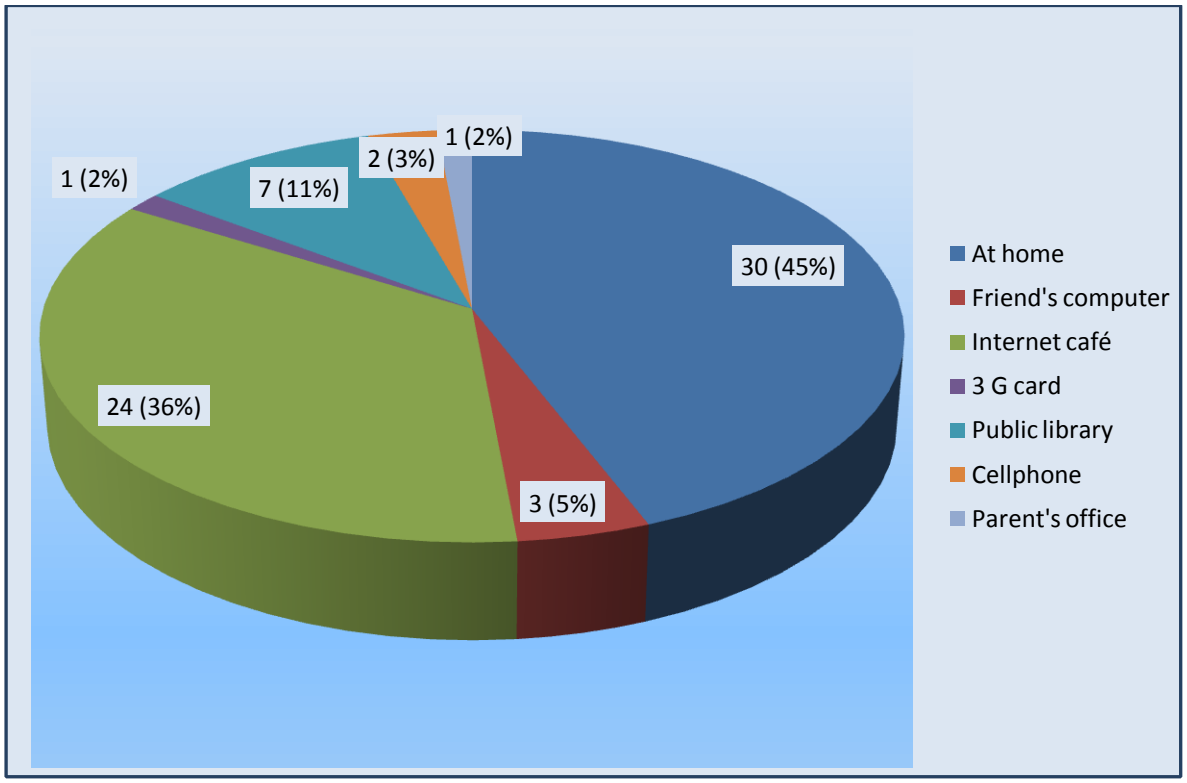
Students who responded that they have access to a computer with Internet connection outside of the DUT were asked to indicate where outside of the DUT they use the Internet. Those respondents who indicated that they access the Internet outside of the DUT seem to have various means of accessing the Internet (see Figure 4.7). Of those who responded in the affirmative (66 (29%)) to Question 12.2 (Appendix A), more than three-quarter of the respondents indicated that they have access to the Internet either at home (30 (45%)) or at an Internet café (24 (36%)). The number of respondents with access to the Internet outside of the

DUT is, however, relatively low (only 66 students) compared to 160 (71%) who do not have such access – a worrying situation, indeed, and an indication of the digital divide.

Figure 4.7

[N=66]

Internet access outside of the DUT



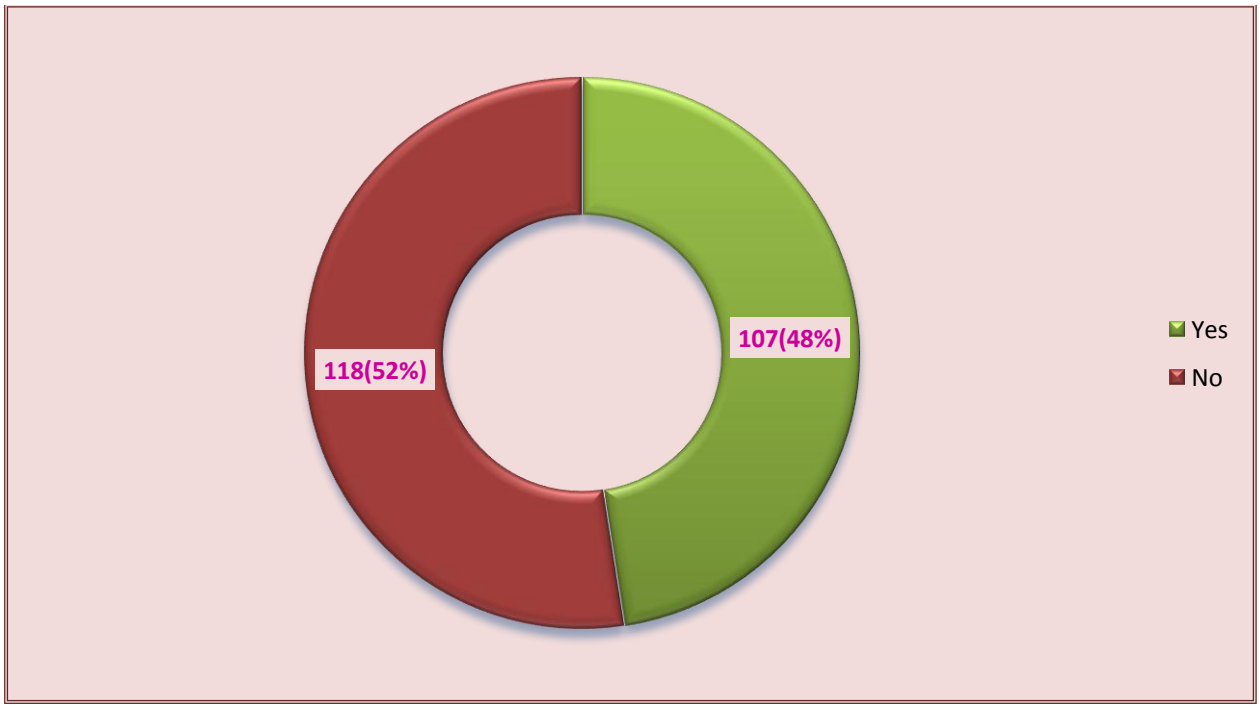
4.3.1.11 Use of Internet café

Respondents were asked to indicate whether they had used an Internet café prior to coming to the DUT. Figure 4.8 indicates that nearly half of the respondents 107 (48%) indicated that they had used an Internet café before registering at the DUT, but slightly more respondents - 118 (52%) indicated that they had not. Two respondents did not respond to this item.

Figure 4.8

[N=225]

Use of Internet café before registering at the DUT

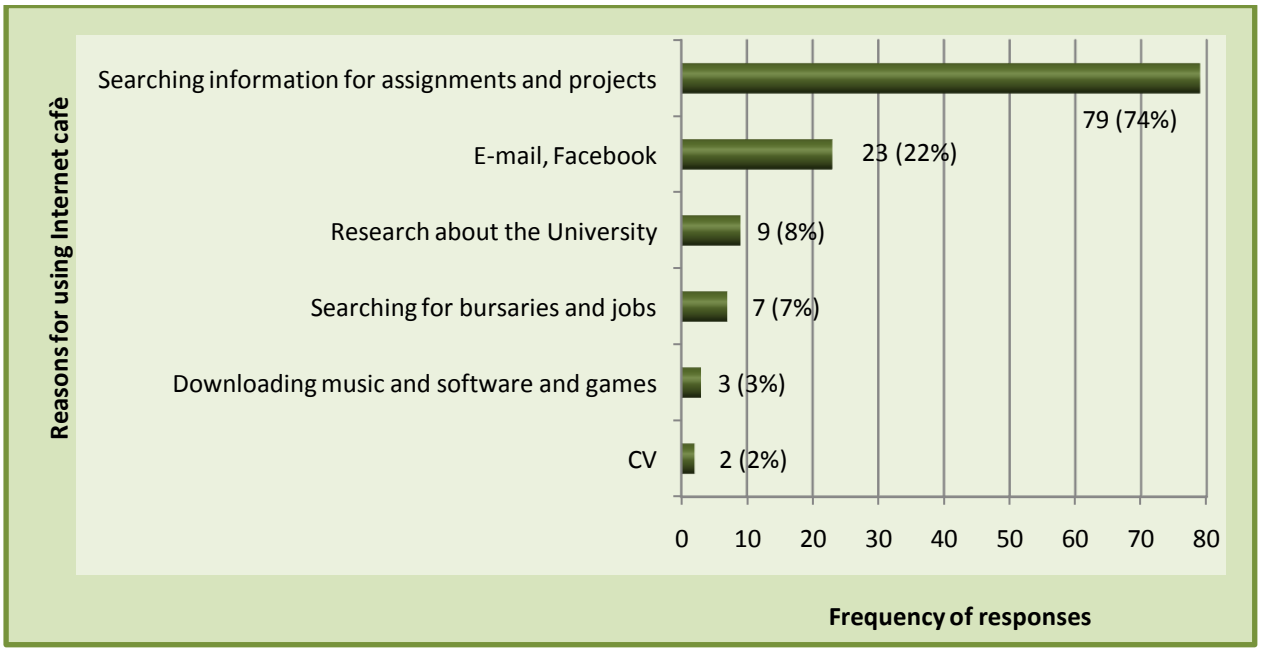


Those respondents who responded in the affirmative as to whether an Internet café was used before registering with the DUT were asked to indicate the reasons for using the Internet café. All 107 respondents provided reasons for using the Internet. Figure 4.9 illustrates some of the reasons students gave for using an Internet café. The most important reason for using an Internet café was for the purpose of searching for information for assignments and projects (a frequency total of 79 (74%) of 107 respondents who responded to this item). This indicates that students are accessing the Internet for academic purposes and not just for non-academic purposes. Two (2) respondents indicated the reason for using an Internet café as 'CV'. It can only be assumed that the respondents used an Internet café to gather information on CV writing or to obtain a prescribed format for CV writing. It was unfortunate that the researcher did not have the opportunity to further interrogate this response. Many respondents gave more than one reason for searching the Internet.

Figure 4.9

[N=107]

Reasons for using an Internet café

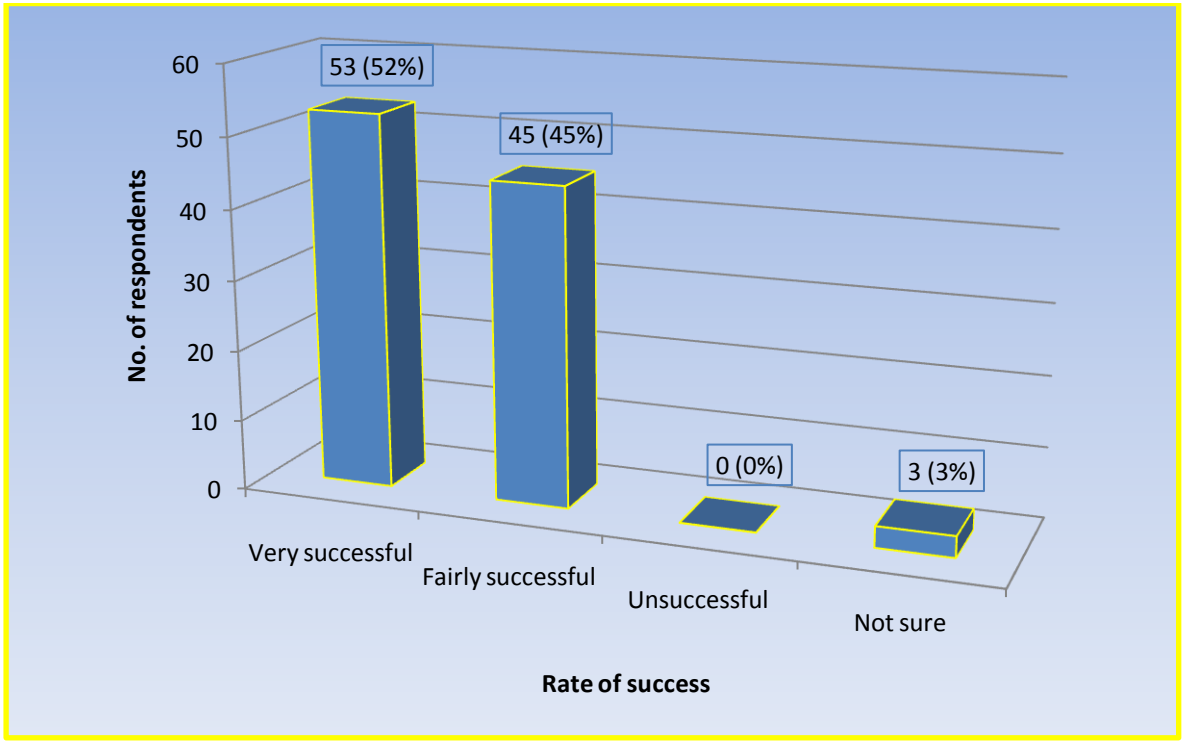


Only respondents who answered in the affirmative as to whether they had used an Internet café before registering at university were asked to indicate the level of success in finding what they searched for. Only 101 of the 107 respondents indicated this level of success. None of the respondents indicated that they were unsuccessful in finding what they searched for. Respondents' success rate for tasks using an Internet café is captured in Figure 4.10. Fifty three (52%) of the respondents indicated being very successful and 45 (45%) indicated that they were fairly successful. It would seem that those who had access to Internet cafés before registering at university were able to do their searching confidently. But it is important to remember that this group is less than half of the total ECP population surveyed. The greater number of this population (118) had not used an Internet café before registering at the DUT. Again, this is an indication of the digital divide in the IL classroom.

Figure 4.10

[N=101]]

Success rate in using the Internet café



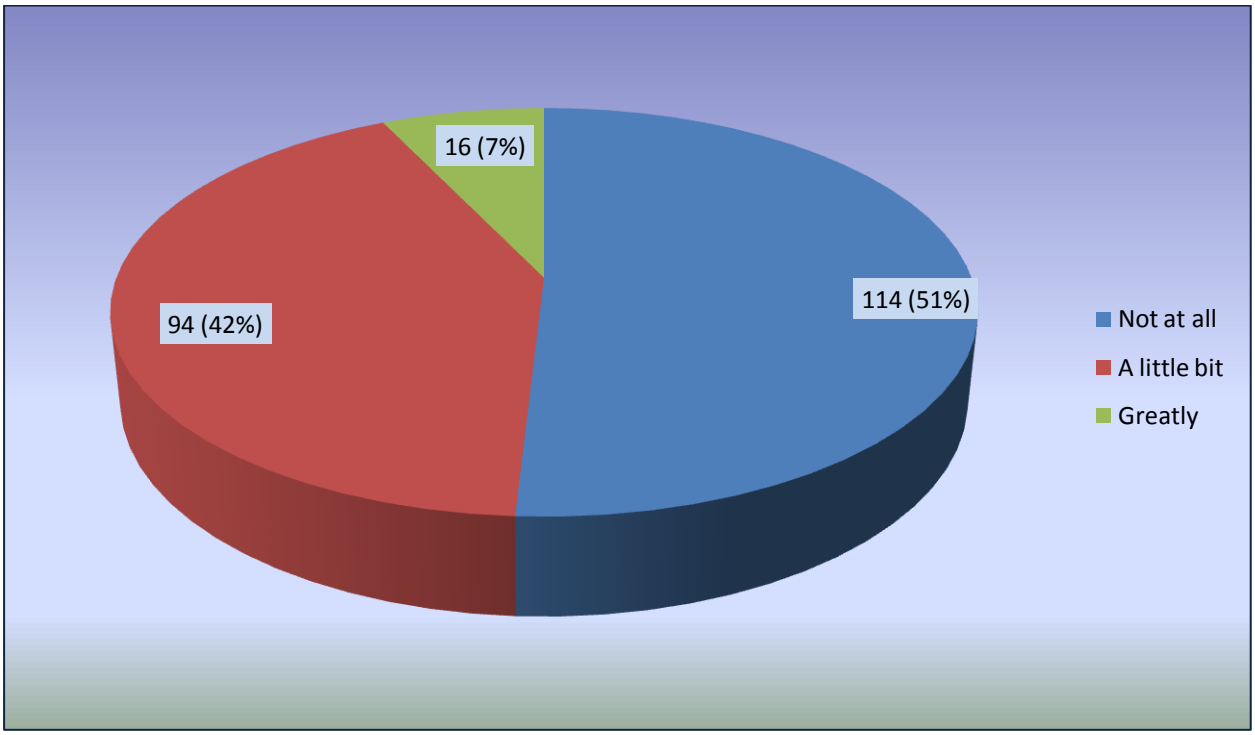
4.3.1.12 Feelings of being disadvantaged in the information literacy classroom

Respondents were asked whether they felt disadvantaged by the technology used in the IL classroom when they initially began the information literacy (IL) module at the DUT. Two hundred and twenty four (224) respondents responded to this item while three respondents did not. It is interesting to note that 51% of the 224 ECP students did not feel disadvantaged at all. Only 7% of the respondents felt greatly disadvantaged with respect to the technology used in the IL module. A significant 42% of the 224 respondents, however, indicated that they felt 'a little bit' disadvantaged because of the technology used in the IL classroom. Figure 4.11 captures these responses which, yet again, are an indication of the digital divide in the IL classroom.

Figure 4.11

[N=224]

Feelings of being disadvantaged in the information literacy classroom



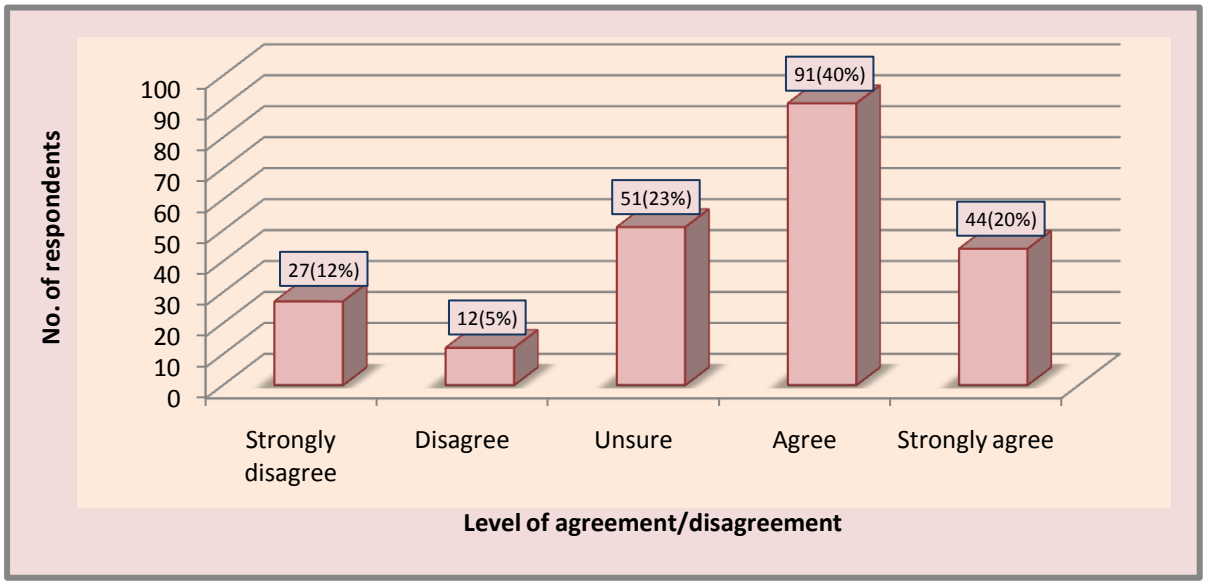
4.3.1.13 Impact of the digital divide on IL training

Respondents were asked to indicate whether the digital divide has an impact on IL training at a higher education institution. Two hundred and twenty five (225) students responded to this item while two students did not. A total of 135 respondents (60%) seem to agree with the statement that the lack of access for some people to information and communication technologies (e.g. e-mail, Internet, Facebook and other social networking applications, information databases, etc.) has an impact on the information literacy training at a higher education institution while collectively 39 respondents (17%) disagree. It is interesting to note that a significant number of 51 respondents (23%) were unsure of the impact of the digital divide on IL training. These findings are illustrated in Figure 4.12.

Figure 4.12

[N=225]

Impact of the digital divide on IL training



Respondents were asked to elaborate on their responses to the previous question as to whether they agreed that the digital divide had an impact the IL training at higher education institutions. Findings are presented in Table 4.6. One hundred and eighty-three (81%) of the 225 respondents provided this elaboration while 42 (19%) of the respondents did not. The students presented a wide variety of responses; however, the reason with the highest frequency (79) was the lack of access to computers.

Table 4.6

[N=183]

Responses presented for believing or not believing that the lack of access to technology has an impact on IL training

Responses presented for believing or not believing that the lack of access to technology has an impact on IL training	Frequency	Percentage
Not all students have access to computers and it may be difficult when using one.	79	43%
More knowledge is gained by using these facilities.	29	16%
Due to the number of assignments given, knowledge of Internet use is essential.	21	12%
Unsure.	15	8%
Computer knowledge becomes difficult at tertiary level especially with networks.	12	7%
Use of technology is very convenient.	8	4%
Internet may be used for the wrong reasons and not for research purposes e.g. Facebook.	4	2%
Knowledge regarding technology is essential to use e-mail.	4	2%
No knowledge of how to find a textbook in the library, create e-mail and receive mail.	3	2%
Information literacy is a waste of time and energy, resulting in non-attendance as nothing is learnt.	3	2%
Internet is not difficult to use even if used for the first time.	2	1%
Networking has nothing to do with studies and completing assignments.	2	1%
Some students need more time to grasp concepts than others.	2	1%
Difficult to do research and make use of diverse resources.	1	0.5%
No experience of the impact of a lack of access to technology on IL training as yet.	1	0.5%

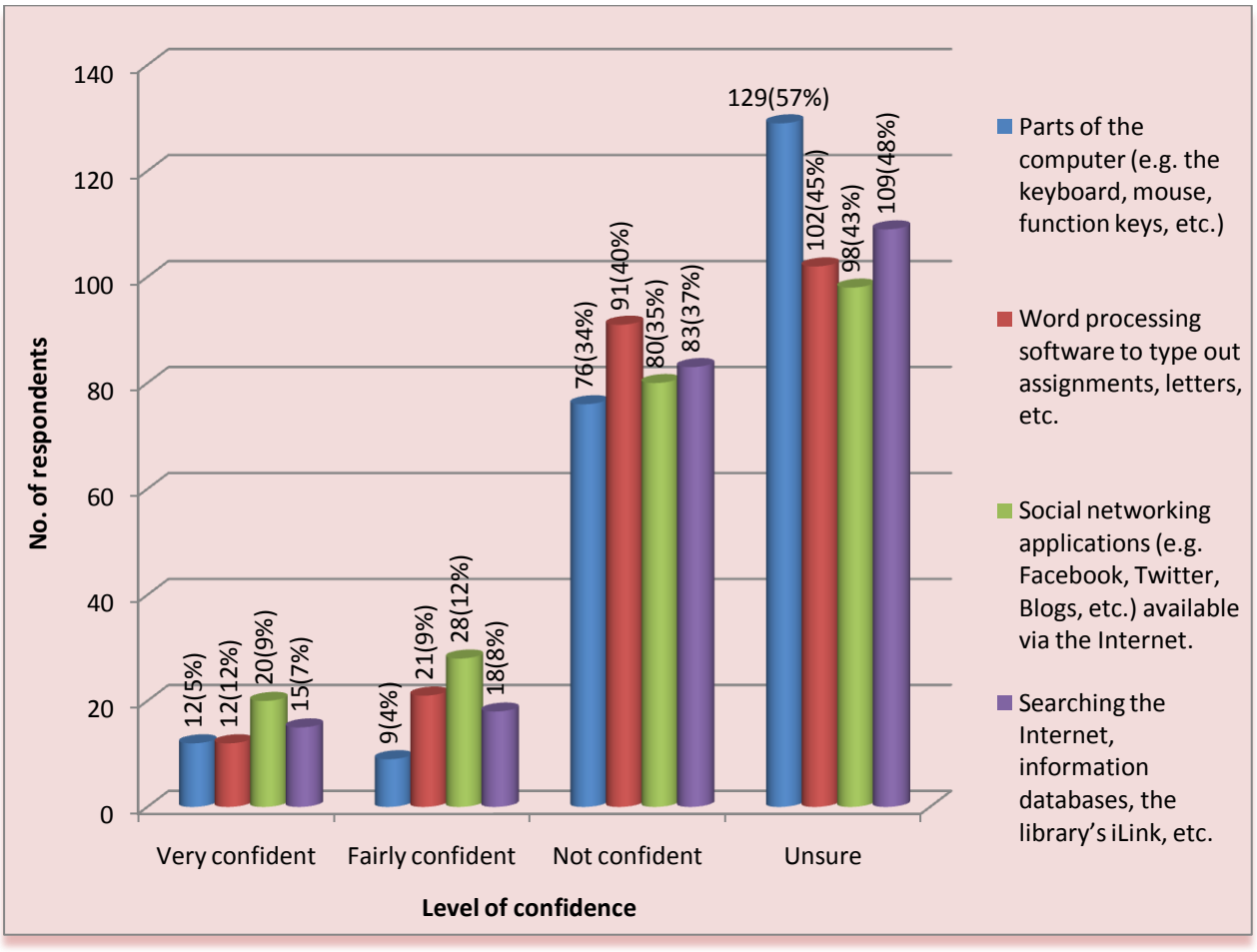
4.3.1.14 Level of confidence in using different aspects of the computer and other ICT applications

Respondents were required to indicate their level of confidence in using different aspects of the computer and other ICT applications. This item was responded to by 226 of the 227 respondents. On average, 37% of respondents were not confident and a significant average of 48% of respondents indicated that they were unsure of their level of confidence in using different aspects of the computer and other ICT applications. An average of only seven percent (7%) of students indicated that they were very confident in using various aspects of the computer and other ICT applications. Only 21 respondents (9%) indicated being confident or fairly confident in using different parts of the computer while 205 respondents (91%) indicated not being confident or unsure of using parts of the computer. A relatively small number of respondents (33 (15%)) indicated being very confident or fairly confident in using word processing software while a large number of respondents (193 (85%)) indicated not being confident or unsure of using the word processing software. There seems to be a global interest in introducing social networking at academic institutions to communicate with students. However, this study revealed that only 48 (21%) respondents are very confident or fairly confident in using social networking applications and a larger number of 178 (79%) respondents are either not confident or unsure of using the social networking applications. Only 33 (15%) respondents are very confident or fairly confident in searching the Internet, information databases, the library's iLink, etc. while a weighty number of 192 (85%) respondents are not confident or are unsure of searching the Internet, information databases, the library's iLink, etc. Figure 4.13 presents details of responses regarding the level of confidence that respondents experienced with using different aspects of the computer and other ICT applications. The trends revealed in these findings are clearly indicative a lack of confidence on the part of a greater number of ECP students in using the computer and other ICT applications.

Figure 4.13

[N=226]

Level of confidence in using different aspects of the computer and other ICT applications



4.3.1.15 Ways in which the digital divide impacts on IL training

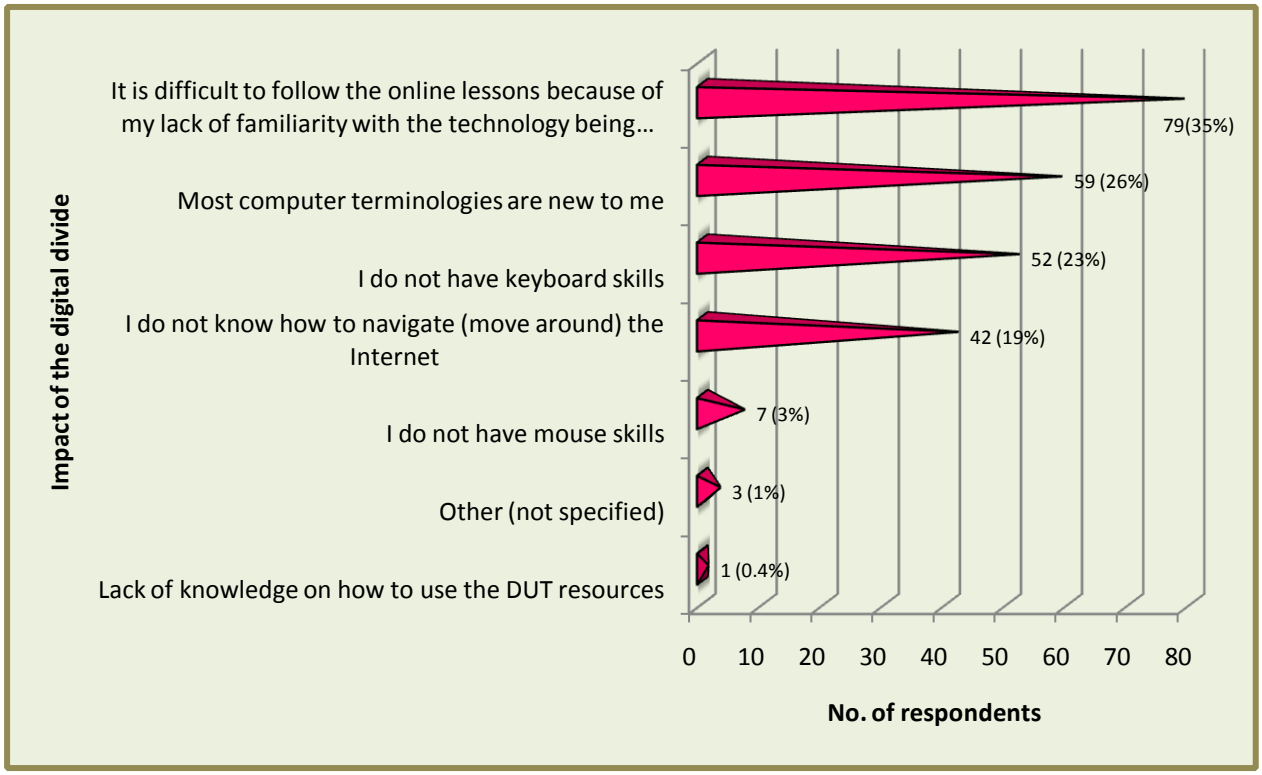
Respondents were requested to indicate the different ways that the digital divide (that is, the lack of access for some to ICTs) impacts on the information literacy training that they were exposed to. Of a population of 227, only one respondent did not respond to this item (see Figure 4.14). Twenty-three percent (23%) of ECP students surveyed indicated that they did not have keyboard skills and three percent did not have mouse skills. This is indeed worrying as these skills are core to computer usage. Thirty-five percent (35%) of the respondents find it difficult to follow the online lessons (the IL module at the DUT comprises a substantial amount of online lessons). Fifty-nine (26%) of respondents indicated that most computer terminologies are new to them. This, again, is a worrying factor as, as mentioned before the

IL module comprises a substantial amount of online lessons which could confuse and lose students in the teaching and learning environment. It is therefore evident that the digital divide does impact on IL training. It would seem that though ECP students may have some knowledge of ICT and related technologies, the technology being used at DUT presents challenges to students. These findings are consistent with the responses that were given to the question as to whether respondents felt disadvantaged in the IL module because of the technology used where a significant 42% of the surveyed students felt disadvantaged.

Figure 4.14

[N=226]

Ways in which the digital divide impacts on IL training



4.3.1.16 Attendance of computer training offered to ECP students at the DUT

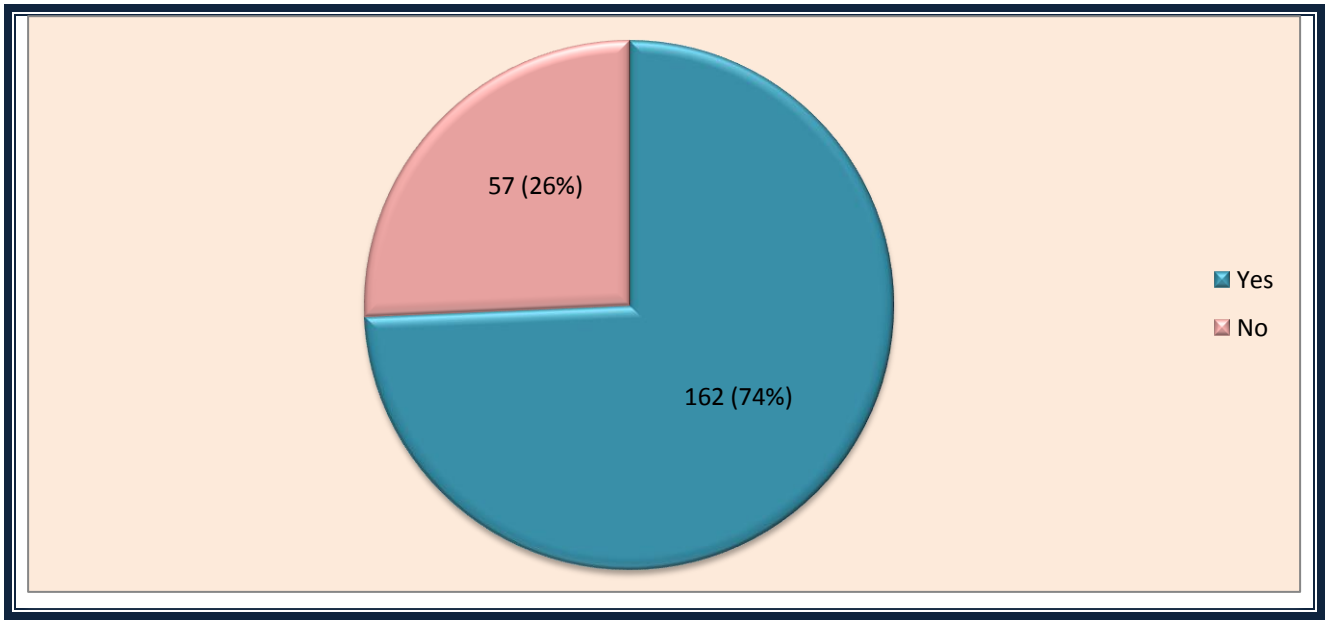
Respondents were asked to indicate whether they had attended the computer training course that is offered to ECP students. Only 219 of the 227 students responded to this question and their responses are captured in Figure 4.15. Nearly three-quarters (162 (74%)) of the

respondents indicated that they had attended the computer training course offered while 57 (26%) claimed that they did not attend the training. In hindsight, the researcher regrets not probing how useful ECP students found this training in terms of their information literacy skills and with those who did not attend the computer training did they believe that this has disadvantaged them with regard to their information literacy training.

Figure 4.15

[N=219]

Attendance of computer training offered to ECP students at the DUT



4.3.1.17 Timing of computer literacy training

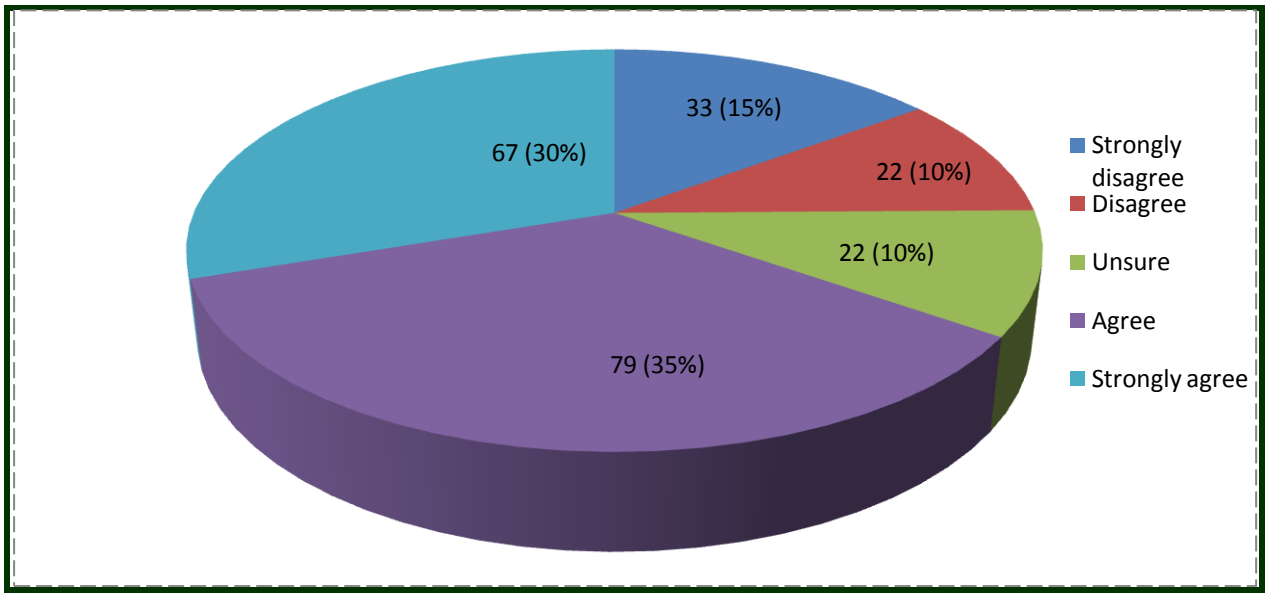
Respondents were asked to indicate whether they would recommend that technologically disadvantaged students (those with little or no previous access to ICTs) be exposed to the computer literacy module of the ECP **before** attending the information literacy module. Of the 227 respondents only four respondents did not respond to this item. The responses are represented in Figure 4.16. A majority of 146 (65%) of the 223 respondents responded affirmatively that computer literacy should be offered **before** the IL module while 55 (25%) of the respondents responded negatively. Twenty two (22) of the respondents (10%) were

unsure whether technologically disadvantaged students should be exposed to the computer literacy module of the ECP before attending the IL module.

Figure 4.16

[N=223]

Level of agreement or disagreement that digitally disadvantaged students receive computer literacy training before attending the IL module



Respondents were asked to explain their responses to this issue, that is, would they recommend that technologically disadvantaged students be exposed to the computer literacy module of the ECP **before** attending the IL training. Of the 223 respondents only 23 respondents did not explain their responses. It was assuring to note that some respondents presented more than one explanation for their responses. A breakdown of the frequency of responses is presented in the Table 4.7. It is interesting to note that the higher frequency responses are 32% for expanding computer skills and 23% for acquiring of basic knowledge of computers.

Table 4.7

[N=200]

Explanations for recommending or not recommending computer training before attending the IL module

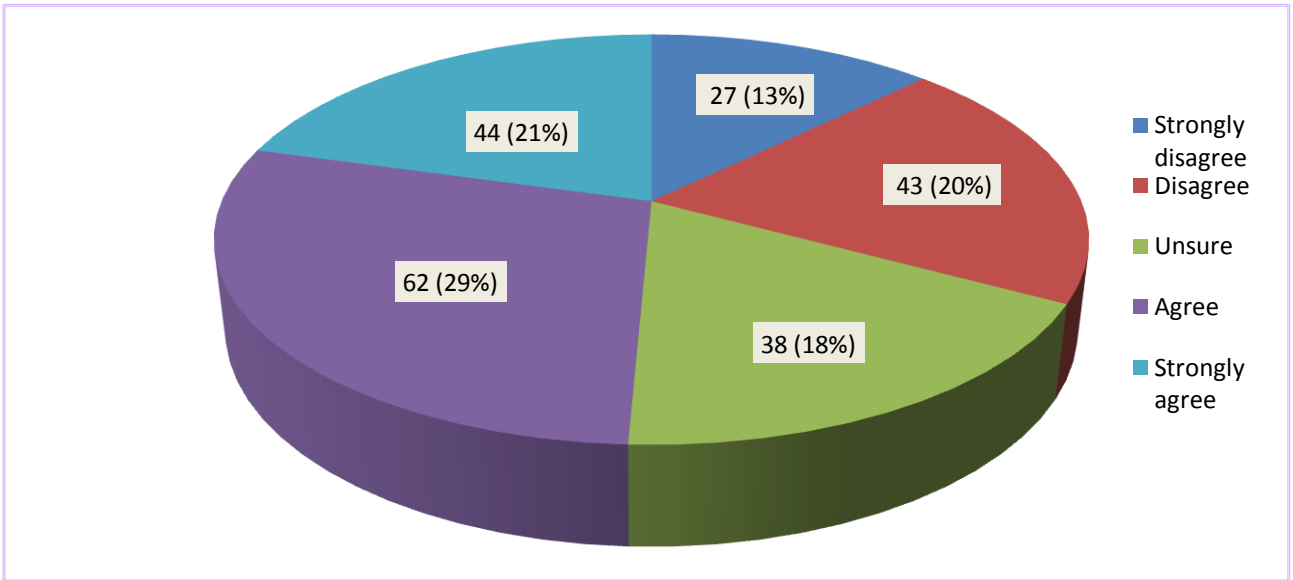
Explanations for recommending or not recommending computer training before attending the IL module	Frequency	Percentage
Expand computer skills to make it more useful e.g. use of Internet, complete assignments.	63	32%
So that the basic knowledge of computers are acquired.	46	23%
Information literacy and computer literacy should be linked modules as computer skills will assist in the IL lessons.	21	11%
Following the IL lessons would be difficult if a computer had not been used before.	19	10%
Computer literacy would give students a brief idea of what is expected of them.	11	6%
Students should acquaint themselves with ICTs as ICTs are extensively used.	6	3%
IL lecturer was very helpful as no-one had been exposed to computers.	5	3%
There is unnecessary teaching of basic information skills. Information literacy module would be better if the unnecessary aspects are left out.	4	2%
If students attend the computer literacy module and information literacy module concurrently they will be more confused.	3	2%
Computers are not as difficult as it seems if lectures are attended.	3	2%
Recommended for disadvantaged learners.	3	2%
Use of computers is easier and less time-consuming.	3	2%
Use of computers is most important in daily life.	3	2%
Computer literacy should be done before.	2	1%
Some students need more time to grasp concepts than others.	2	1%
Technology is constantly changing; it is essential that everyone keeps up with it.	2	1%
At some point students would have to work by themselves.	1	1%
Library course (IL) is essential to access sources and to do referencing.	1	1%
Some people (disadvantaged students) do not like to be treated differently.	1	1%
Unsure.	1	1%

Respondents were also asked whether they would recommend that technologically disadvantaged students (those with little or no previous access to ICTs) be exposed to the computer literacy module of the ECP **at the same time while** attending the information literacy module. Two hundred-and-fourteen (214) respondents responded while 13 did not (refer to Figure 4.17). Almost half of 214 respondents (49.5%) agreed with the statement whilst 33% disagreed.

Figure 4.17

[N=214]

Level of agreement or disagreement that digitally disadvantaged students receive computer literacy training at the same time while attending the IL module



Respondents were asked to explain why they would recommend or not recommend that the computer literacy training be done **at the same time while** attending the IL module. Of the 214 students who responded to this issue 180 provided explanations while 34 did not provide explanations for their response about computer literacy training being done **at the same time while** attending the IL module. A breakdown of the frequency of responses is presented in the Table 4.8. The highest frequency response of 33 (18%) was that students will gain more experience, knowledge and understanding when computer literacy and information literacy are done concurrently. More respondents (146) agreed or strongly agreed that computer

training should be done **before** information literacy compared to the 106 respondents who agreed or strongly agreed that computer training be done **at the same time while** attending the IL module. Twenty-two (22) respondents indicated being unsure about whether computer training should be offered **before** information literacy while 38 respondents indicated being unsure about whether computer training should be done **at the same time while** attending the IL module. Further, the explanations in Tables 4.7 and 4.8 seem to be weighted in favour of students receiving computer training before information literacy training.

Table 4.8

[N=180]

Explanations for recommending or not recommending computer training at the same time while attending the IL module

Explanations for recommending or not recommending computer training at the same time while attending the IL module	Frequency	Percentage
Students will gain more experience and knowledge and better understanding when done concurrently.	33	18%
It would be an advantage as students would improve on their research skills.	30	17%
Will confuse the students due to heavy work load should both computer literacy and information literacy be done concurrently.	28	16%
Computer literacy and information literacy should be linked modules complementing each other.	18	10%
Some students had no access to computers in high school therefore it would be difficult to do information literacy and computer literacy concurrently.	15	8%
Information literacy should come after computer literacy.	11	6%
Saves time doing it together.	9	5%
Computer literacy gives background information and information on how to use the facilities if done before information literacy.	5	3%
Students will learn better if learning is put into practice.	4	2%
Information literacy is a waste of time and energy.	4	2%
Unsure.	4	2%
Social networks assist with interacting with different people and one can learn from them.	3	2%
Some students need more time to grasp concepts than others.	3	2%
Students need as much information as they can get.	3	2%
IL lecturer was very helpful as no-one had been exposed to computers.	2	1%
Students need to ask for assistance from their peers.	1	1%
A student with a degree should have computer knowledge.	1	1%
Whether computer literacy is offered before or at the same time while information literacy attending IL training should be the student's choice to make.	1	1%
Computer literacy is recommended for disadvantaged learners.	1	1%
Use of computers is most important in daily life.	1	1%

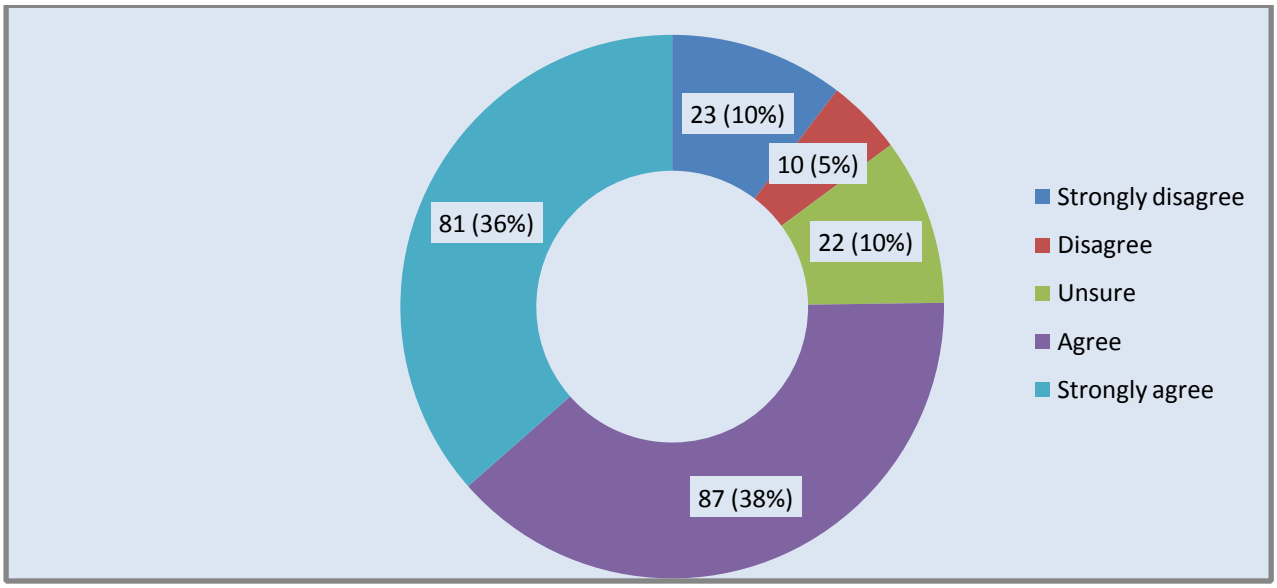
4.3.1.18 Creative teaching and learning methods

Respondents were asked whether they thought that librarians should use creative teaching and learning methods in delivering information literacy training in order to accommodate both technologically advantaged and technologically disadvantaged students attending the information literacy module of the ECP. A response rate of 223 out of 227 was received for this item with four students not responding to this item. Almost 75% of the respondents agreed with the statement and 25% disagreed or was unsure. This is a clear indication that respondents favour creative methods in the delivery of IL training. Figure 4.18 illustrates the responses.

Figure 4.18

[N=223]

Creative teaching and learning methods



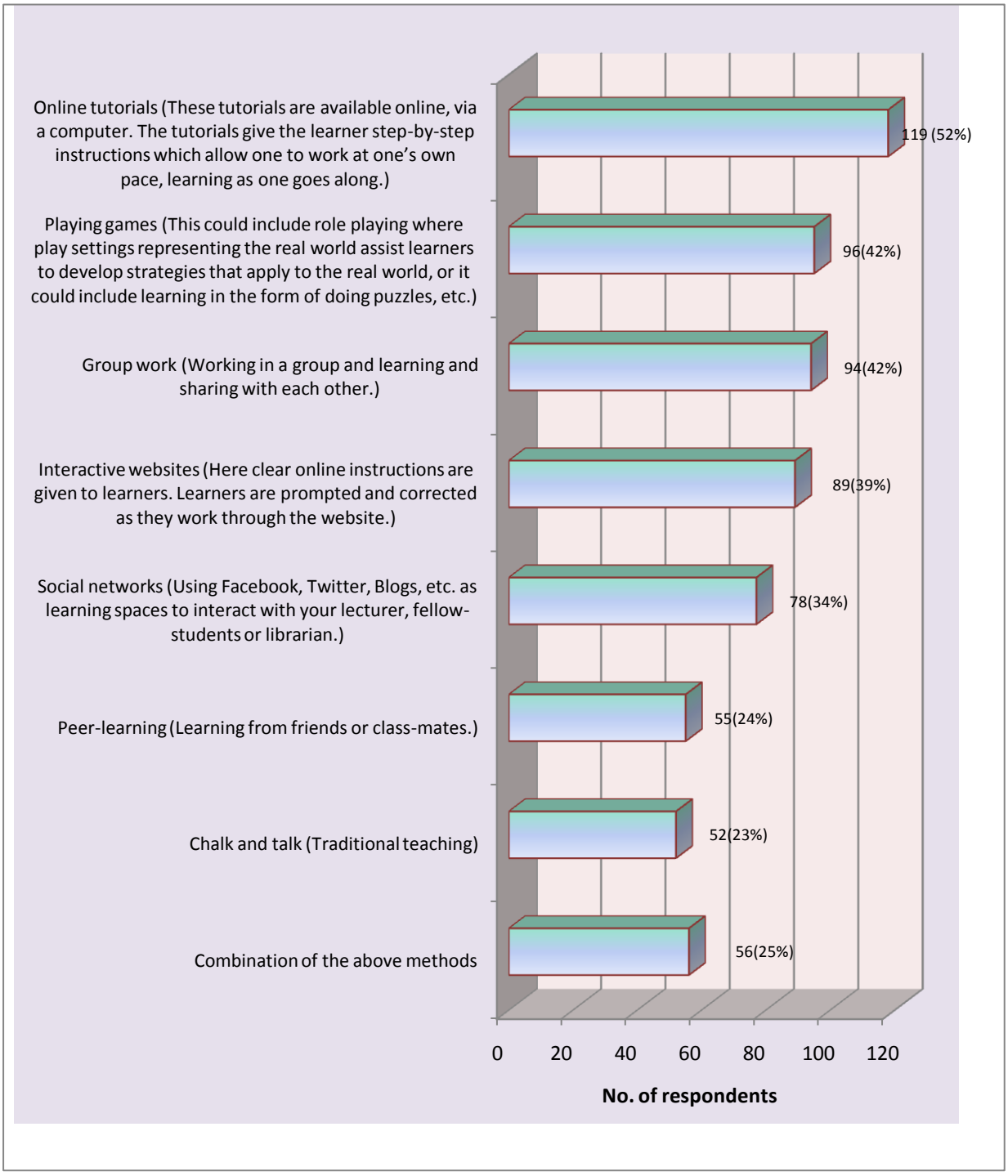
Respondents were asked to select (from a list provided – see Appendix A, Question 21.1) teaching and learning methods that they preferred for the information literacy module. There was a 100% (227 respondents) response rate to this item. Figure 4.19 illustrates that the most common preferences were for online tutorials (119 (52%)), using games 96 (42%), group work 94 (42%) and interactive websites 89 (39%). The least favoured methods were chalk

and talk (52 (23%)) and peer learning (55 (24%)). None of the respondents selected the option 'other' that was provided in the questionnaire.

Figure 4.19

[N=227]

Preferred teaching and learning method/s for the information literacy module



Respondents were asked to explain their preferences for the methods that they had selected as preferred methods for teaching and learning of the IL module. Two hundred and two (202) respondents provided reasons for choosing particular teaching and learning methods while the other 25 students did not. A frequency response of 57 (28%) was arrived at for group work as a teaching and learning method which seems to be the most popular method chosen and motivated for. Table 4.9 presents the reasons respondents chose particular teaching and learning methods. Here too, as in Figure 4.19, interactive websites, group work and games feature among the top in the list, with the difference being that chalk and talk featured higher up on the list in Table 4.9 as a recommended teaching and learning method to accommodate both digitally advantaged and digitally disadvantaged students but least favoured in Figure 4.19. This indicates some uncertainty regarding the role of chalk and talk as a teaching and learning method in IL training.

Table 4.9

[N=202]

Reasons for choosing particular teaching and learning methods

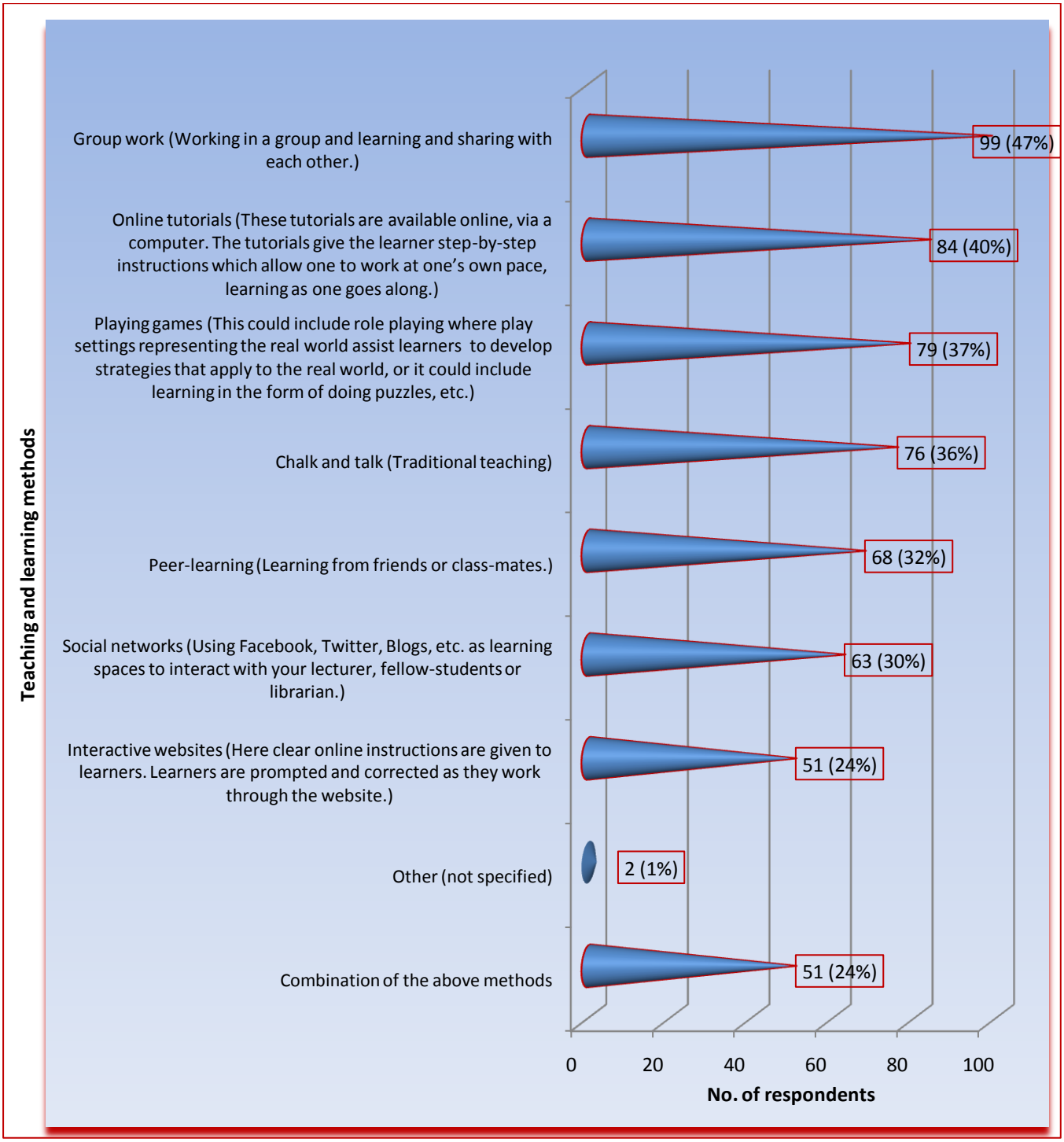
Reasons for choosing teaching and learning methods	Frequency	Percentage
Group work: more knowledge is gained when learning from others especially at your level.	57	28%
Playing games: makes learning easier and more fun.	42	21%
Interactive websites: Interactive websites could be used at one's own pace which results in improving computer skills.	23	11%
Combination of methods: different methods accommodate different students.	21	10%
Chalk and talk: understand better when lecturer explains with examples on the board and questions can be asked.	20	10%
Chalk and talk: easier for disadvantaged learner to understand - accommodates all students.	15	7%
Chalk and talk and playing games: these give students confidence and motivation to do well.	10	5%
Playing games, online tutorials and social networks: Students need as much information as they can get.	5	2%
Peer learning: students with less computer knowledge may feel intimidated while others with more skills could be disruptive due to boredom in the classroom. Thus pairing students with no or little skills with students with more skills or expertise would assist.	3	1%
Playing games: learning and playing is equal and helpful.	1	0.4%

Respondents were also asked to indicate which teaching and learning methods (from the list provided – see Appendix A, Question 22) they thought would accommodate both technologically advantaged and the technologically disadvantaged students attending information literacy training. Of the population of 227, 16 respondents did not respond to this item. Group work, online tutorials and games were the highly recommended methods of delivery that would accommodate both technologically advantaged and technologically disadvantaged students attending information literacy training. In the previous item (refer to Appendix A – Question 21.1) respondents were asked to indicate their preferred teaching and learning method/s. The top three teaching and learning methods that respondents preferred were online tutorial (119 (52%)), playing games (96 (42%)) and group work (94 (42%)) while the top three teaching and learning methods that respondents recommended to accommodate both technologically advantaged and technologically disadvantaged students again were group work (99 (47%)), online tutorials (84 (40%)) and playing games (79 (37%)). Only 25% (56) respondents selected a combination of methods as a preferred teaching and learning method (Figure 4.19) while a closely correlating 24% (51) recommended a combination of methods to accommodate both technologically advantaged and technologically disadvantaged students (Figure 4.20). Indeed, there is a high degree of correlation between the findings captured in Figures 4.19 and 4.20, but with the odd exceptions.

Figure 4.20

[N=211)

Teaching and learning methods recommended to accommodate both technologically advantaged and technologically disadvantaged students



4.3.2 Presentation of findings of interviews with Subject Librarians

Data was collected from the DUT Subject Librarians who teach IL to ECP students. The section that follows presents the findings of the interviews (refer to Appendix C). The open-ended responses were contextually analysed and data was grouped into themes or concepts, where possible. Frequency counts are also presented, where relevant.

4.3.2.1 Job designation of respondents

Respondents were asked to indicate their current job designation. This was necessary because a number of professional librarians were seconded into other professional library posts. However, all five respondents indicated that they were Subject Librarians. At the time of the study one of the DUT librarians who was seconded to the post of Subject Librarian and was teaching IL to ECP students was excluded from the study as it was felt that she would not have substantial data to contribute to the study. Table 4.10 captures the population response.

Table 4.10

[N=5]

Job designation

Designation	Frequency
Subject Librarian	5

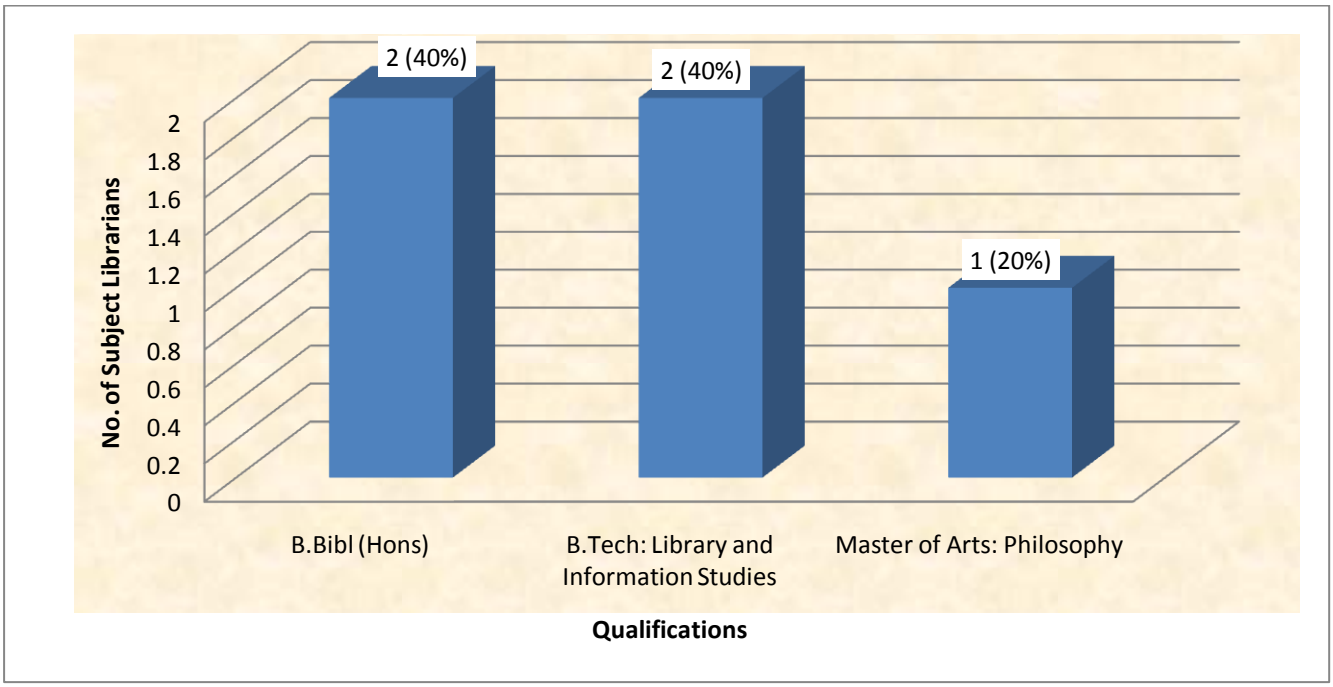
4.3.2.2 Highest academic qualifications

Respondents were asked to indicate their highest qualifications. Of the five Subject Librarians the highest qualification was a Master of Arts: Philosophy and the lowest qualification was a B.Tech: Library and Information Studies. Figure 4.21 presents the highest academic qualifications of the respondents as well as the frequency counts per qualification.

Figure 4.21

[N=5]

Highest academic qualifications



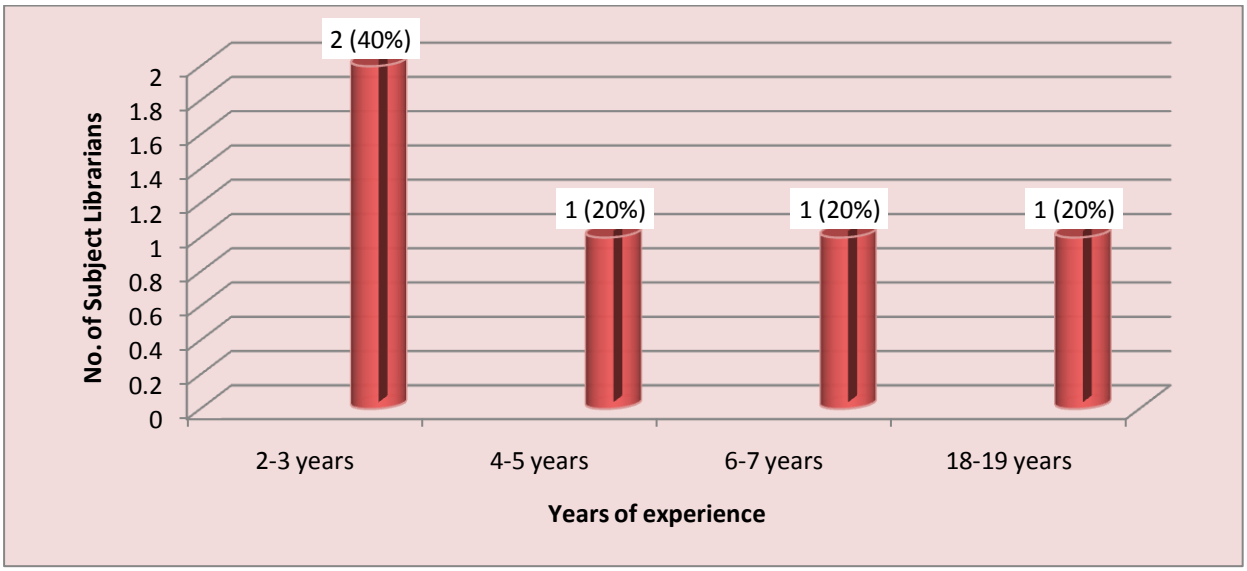
4.3.2.3 Years of experience as a Subject Librarian

Interviewees were asked how many years of experience they had as Subject Librarians at the DUT or elsewhere. Figure 4.22 illustrates the years of experience and the frequency counts. The accumulative total of experience that the respondents had as Subject Librarians was 34 years and six months.

Figure 4.22

[N=5]

Years of experience as a Subject Librarian



4.3.2.4 Years of ECP involvement

Respondents were asked to indicate the number of years that they had been involved with the ECP at the DUT. Table 4.11 indicates the years of ECP involvement and the frequency counts. The ECP programme is relatively young and thus the accumulative number of years of ECP involvement is only nine years and six months.

Table 4.11

[N=5]

Years of ECP involvement

Years or months of ECP involvement	Frequency
6 months	1
2 years	3
3 years	1

4.3.2.5 Understanding of the concept of the digital divide

Subject Librarians were asked to explain their understanding of the digital divide. The majority (60%) of respondents described it as "access to computers". The responses have been grouped into themes and the frequency counts are presented. Table 4.12 presents the responses that were provided. Some Subject Librarians provided multiple explanations.

Table 4.12

[N=5]

Concept of the digital divide

Explanations	Frequency	Percentage
Access to computers.	3	60%
Use of digital information based on capabilities and knowledge.	2	40%
Different backgrounds with different levels of competence when using the computer.	2	40%
The gap between experienced and inexperienced students who have never touched a computer before; the first encounter is in the IL classroom.	2	40%
Influence of electronic information.	1	20%
The digital divide is between those who have grown up with technology and those who have not.	1	20%
It could be the divide between those who prefer the manual system and those who prefer technology.	1	20%

4.3.2.6 The South African school education system

Interviewees were asked to indicate whether they believed that the South African education system has created a digital divide that impacts on students' performance at tertiary level.

Hundred percent (100%) of the interviewees responded in the affirmative to this question. Their explanations for believing this are presented in Table 4.13.

Table 4.13

[N=5]

The South African school education system

Explanations	Frequency	Percentage
Students from rural areas have never encountered a computer before attending a university.	1	20%
There are also students from advantaged backgrounds who have experience and are competent with social networks, e-mail, etc. in the same classroom as disadvantaged students.	1	20%
The impact is due to psychosocial and economic backgrounds.	1	20%
The digital divide is very noticeable and affects the throughput rate at tertiary institutions.	1	20%
Some students have no or little digital experience.	1	20%
The long term impact is that the teachers, tutors and lecturers have to assist students individually and there is the need to nurture the disadvantaged.	1	20%
Students from advantaged schools with all the facilities and technology attend the same tertiary education institutions as disadvantaged students from schools with little or no resources. This impacts hugely on students' performance at the tertiary education level.	2	40%
Under-prepared students are admitted to tertiary institutions.	1	20%
Historical nature of schools: 'white' schools were well equipped while historically 'black' schools do not have resources or teachers with technological or digital knowledge.	2	40%
Not all schools have equitable access to information which has an impact on preparedness of students for tertiary education.	1	20

4.3.2.7 Impact of the digital divide on IL training at the tertiary level

Subject Librarians were asked whether they believed that the digital divide had an impact on IL training at tertiary level. Again, five (100%) of the respondents believed that it did have an impact on IL training. Respondents were then asked to elaborate on this in terms of their experience of the digital divide in the classroom. The responses that were provided are presented in Table 4.14 together with frequency counts. All five Subject Librarians (100%) indicated that they believed that one of the impacts of the digital divide is that it is difficult to complete the IL lessons, resulting in aspects of the IL module being excluded. Another impact experienced in the classroom by four (80%) of the respondents is that disadvantaged students need to be taught basic computer skills which is not included in the IL module. ECP students are exposed to a computer literacy module but this is not always done prior to the IL module.

Table 4.14

[N=5]

Impact of the digital divide on IL training at the tertiary level

Impact of the digital divide on IL training at the tertiary level	Frequency	Percentage
Lessons are incomplete and aspects of the IL module are left out, for example, social networks, as disadvantaged students are not at a level to understand aspects of the IL module.	5	100%
Disadvantaged students have never touched a computer before and need to be taught basic computer skills, for example, keyboard and mouse skills before IL skills are taught.	4	80%
The beginning of the year is difficult and the workload is heavy because of introducing ICTs to digitally disadvantaged students.	3	60%
Students have different levels of computer expertise and thus the lesson does not progress smoothly.	2	40%
Lessons have to be repeated for disadvantaged students.	2	40%
To prevent advantaged students from getting bored they are asked to assist disadvantaged students.	2	40%
Because IL is linked to online resources and almost everything is linked to computers now, for example, banking, home affairs, etc.	1	20%
Disadvantaged students have to catch up on how to use a computer before accessing information.	1	20%
Disadvantaged students are cautious when using computers while advantaged students tend to fiddle with everything and often go onto the social networking sites.	1	20%
English second language students have more to overcome.	1	20%
One disadvantaged student was moving the mouse on the screen due to lack of prior computer experience.	1	20%
Digitally advantaged students perceive IL as ‘wasted time’.	1	20%

4.3.2.8 The delivery of IL to accommodate the digital divide

Subject Librarians were asked whether they believed that the IL module should be delivered differently from the way it is currently being delivered at DUT to accommodate the digital divide. The responses are presented in Table 4.15. The majority (60%) indicated that the IL should be delivered differently to accommodate the digital divide while one Subject Librarian indicated that she was unsure although elaboration of her response leaned towards preference for a different delivery method. Although respondents were not requested to elaborate their explanations gave the researcher valuable insight into their experiences of the impact of the digital divide on the IL module and the change that they would like to see in the delivery of the IL module - this is captured in Table 4.16. One respondent, however, indicated that there should be no change in the delivery. This Subject Librarian explained that currently there is no compulsory aspect of IL and thus some aspects of technology are not taught during the IL lesson due to lack of students' ICT skills which slows down the lessons.

Table 4.15

[N=5]

Should IL be delivered differently to accommodate the digital divide?

Responses	Yes	No	Unsure
Frequency	3	1	1
Percentage	60%	20%	20%

Table 4.16

[N=5]

Change that respondents would like to see in the delivery of the IL module

Change in the delivery of IL module	Frequency	Percentage
Students need to be exposed to a basic computer course before the IL module is undertaken.	5	100%
Programme is very rushed and thus not all students grasp everything. To remedy this situation more time is needed. Module needs to be more interactive to have a positive impact.	4	80%
There is a lack of sufficient equipment, for example, computers. The institution needs to ensure that sufficient resources are provided.	1	20%
The IL module must be credit bearing.	1	20%
In adhering to the IL module Subject Librarians are faced with the digital divide.	1	20%

4.3.2.9 Objective of IL training

Interviewees were given an outline of the objective of IL training (see Item 9, Appendix C) and were asked whether they believe that the objective of IL training was being met in a situation where the IL classroom consists of a heterogeneous group which includes both digitally advantaged students and digitally disadvantaged students. Four (80%) of the five Subject Librarians indicated that the objectives of IL training was being met while one (20%) Subject Librarian indicated that the objective of the IL training was not being met. The explanations for the responses are outlined in Table 4.17.

Table 4.17

[N=5]

Objective of IL training

Responses	Explanations for responses	Frequency	Percentage
Yes	Some students take longer than the normal time to reach the outcome but eventually do. Computer skills have to be taught before IL skills are understood.	4	80%
	Not all the students learn the skills.	2	40%
	Some disadvantaged students make individual appointments to bridge the gap that exists between them and advantaged students.	2	40%
	Objective is not met 100% due to differing levels of understanding.	1	20%
	Level of practical exercises differs from advanced to basic to meet differing skills level of students.	1	20%
	All students reach a level of basic understanding.	1	20%
No	Repetition is necessary to meet the objective of the IL training.	1	20%

4.3.2.10 Active student-centred learning

Subject Librarians were asked whether the current emphasis in higher education on active student-centred learning is a realistic goal in the context of the heterogeneous student population participating in IL training. Three (60%) of the respondents indicated that it is a realistic goal and two (40%) indicated that it is an unrealistic goal. It must also be noted that frequency counts would not necessarily add up to five because Subject Librarians provided

more than one reason for believing that active student-centred learning is a realistic goal or not (a similar trend applies to other findings from Subject Librarians). Table 4.18 presents the explanations that respondents gave for responding in the affirmative or in the negative.

Table 4.18

[N=5]

Active student-centred learning in IL training

Responses	Explanations	Frequency	Percentage
Yes	Students eventually learn the skills that they are supposed to learn.	1	20%
	Small groups help librarians develop a personal relationship with students thus they get to know students' capabilities and potentials.	2	40%
	Students with expertise assist students who do not have such expertise.	1	20%
	Peer learning is encouraged.	1	20%
	Computer literacy levels should be addressed before IL.	1	20%
No	Insufficient equipment, for example, computer facilities to implement student-centred learning.	1	20%
	Lecturers are reluctant to release students for IL classes.	1	20%
	Big numbers in the class make it difficult to implement student-centred learning.	1	20%

4.3.2.11 Impact of the digital divide on IL training that includes online training

Many of the lesson plans in the IL module include online training. Subject Librarians were asked to summarise their experience of the impact of the digital divide on IL training in the lessons that include online training. All five (100%) respondents indicated that having a heterogeneous group of students in a single class slows down the lessons. Subject Librarians seem to experience the digital divide in different ways. Table 4.19 presents the Subject Librarians' experiences of the impact of the digital divide on IL training in the lessons that include online training.

Table 4.19

[N=5]

Impact of the digital divide on IL training that includes online training

Responses	Frequency	Percentage
It helps to group advantaged students with disadvantaged students so that advantaged students could help disadvantaged students.	3	60%
Advantaged students often learn new knowledge that they thought they knew.	2	40%
Advantaged students are more willing to experiment and use information tools whilst disadvantaged students are cautious and will only try what they have been instructed to do.	2	40%
Disadvantaged students need more interventions to bridge the divide.	2	40%
Disadvantaged students have lots to learn while advantaged students find it easier to follow the online lessons.	2	40%
Advantaged students go onto social networking sites.	1	20%
Disadvantaged students lack basic skills, for example, mouse and keyboard skills.	1	20%

4.3.2.12 Incorporation of more technology into IL training

Subject Librarians were asked whether they would recommend that the library incorporate more technology (online tutorials, computer-aided learning, etc.) into IL training rather than having the current situation where the majority of lessons are chalk and talk. All five (100%) Subject Librarians indicated that they would recommend that more technology be incorporated into the IL training. However, two (40%) of the respondents disagreed that the majority of lessons are chalk and talk. The explanations presented for recommending that the library incorporate more technology into the IL training are presented in Table 4.20.

Table 4.20

[N=5]

Incorporation of more technology into IL training

Response	Explanations for recommending incorporation of more technology into IL training	Frequency	Percentage
Yes, would recommend that more technology be incorporated into the IL training	A balance of the different methods is needed. Blended learning is important for teaching and learning.	4	80%
	Once disadvantaged students adapt to technology, they find it exciting and interesting.	3	60%
	To keep up with international trends requires the use of technology.	2	40%
	With the current information explosion one also needs to use technology.	1	20%
	Advantaged students will benefit but the disadvantaged students will not benefit initially.	1	20%
	Chalk and talk helps teach the disadvantaged students.	1	20%
	There are insufficient computer laboratories and facilities.	1	20%
	It is valuable for students to use computer-aided learning and online tutorials to assist learning.	1	20%

4.3.2.13 Timing of computer literacy training

Subject Librarians were asked whether digitally disadvantaged, first-year students should be exposed to the computer literacy course **concurrently** while doing the IL training or should they be exposed to the computer literacy training **before** the IL training. Four (80%) Subject Librarians believed that disadvantaged, first-year students should do the computer literacy course before the IL module while one (20%) Subject Librarian indicated that she was not sure whether the computer literacy course should be done before or concurrently with the IL training. None of the respondents indicated that the computer literacy course was unnecessary. The explanations for responses are included in Table 4.21.

Table 4.21

[N=5]

Timing of computer literacy training

	Explanations	Frequency	Percentage
Explanations for suggesting that digitally disadvantaged first-year students should receive computer literacy training **before** IL training	Disadvantaged students will feel more comfortable when computers are encountered in the lessons.	3	60%
	All students will benefit from the computer literacy course.	2	40%
	This would have a huge benefit on the IL training.	2	40%
	It will assist students effectively participate in the IL module equally with the advantaged students.	2	40%
Explanations for being **unsure** about whether digitally disadvantaged first-year students should receive computer literacy training before or after IL training	**Explanations**	**Frequency**	**Percentage**
	It works when they do it concurrently but could be better if the computer literacy course is done before.	1	20%
	Basic computer course could be done before and advanced course could be done later.	1	20%

4.3.2.14 Teaching and learning methods recommended for the IL module of the ECP at the DUT

Respondents were asked to recommend teaching and learning methods from a list provided (see Item 14 Appendix C) for the IL module of the ECP at the DUT, considering the heterogeneous nature of the IL classroom. Respondents were asked to explain why such methods would be recommended or not recommended. The findings are presented individually by the teaching and learning method. The explanations and the frequencies for recommending the different methods are illustrated in the sections that follow.

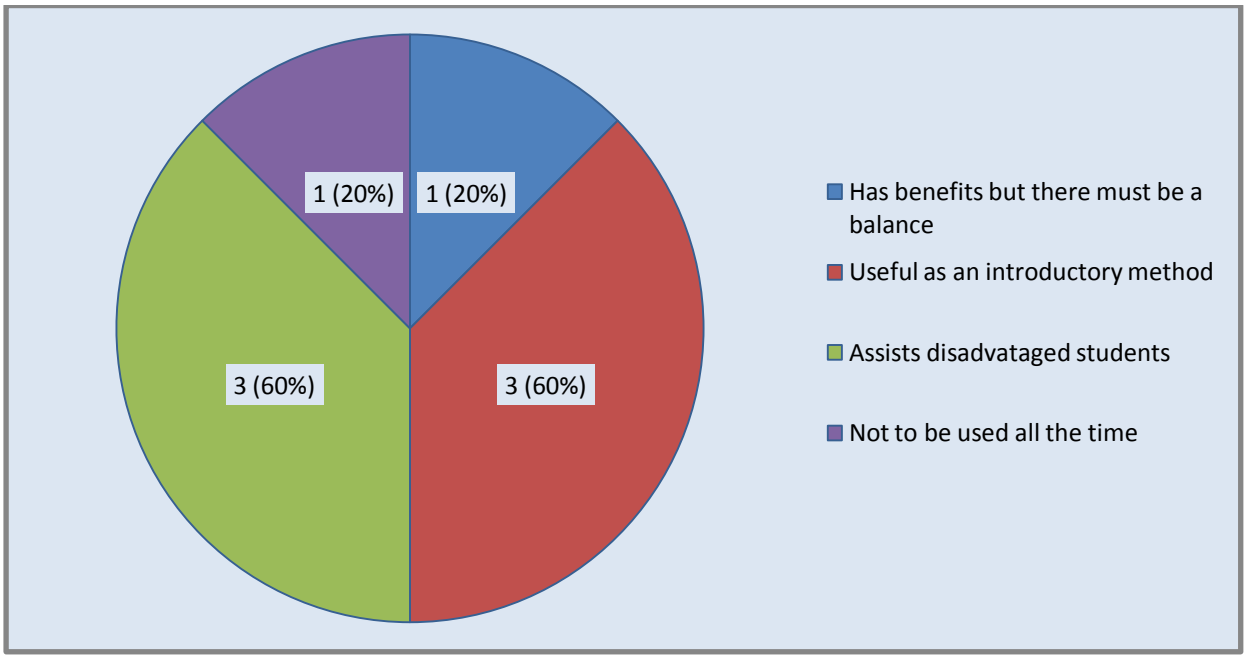
4.3.2.14.1 Chalk and talk

Subject Librarians indicated that chalk and talk as a method of teaching and learning has a place but must be used together with other methods. This method of teaching and learning is helpful as an introductory method to any IL module but respondents emphasised that maintaining a balance amongst the various teaching and learning methods is very important. Figure 4.23 captures the frequency counts and the reasons for recommending chalk and talk as a teaching and learning method. Again, it is important to point out that here and elsewhere the frequency counts would not necessarily add up to five because some respondents provided more than one explanation for a particular teaching and learning method.

Figure 4.23

[N=5]

Chalk and talk



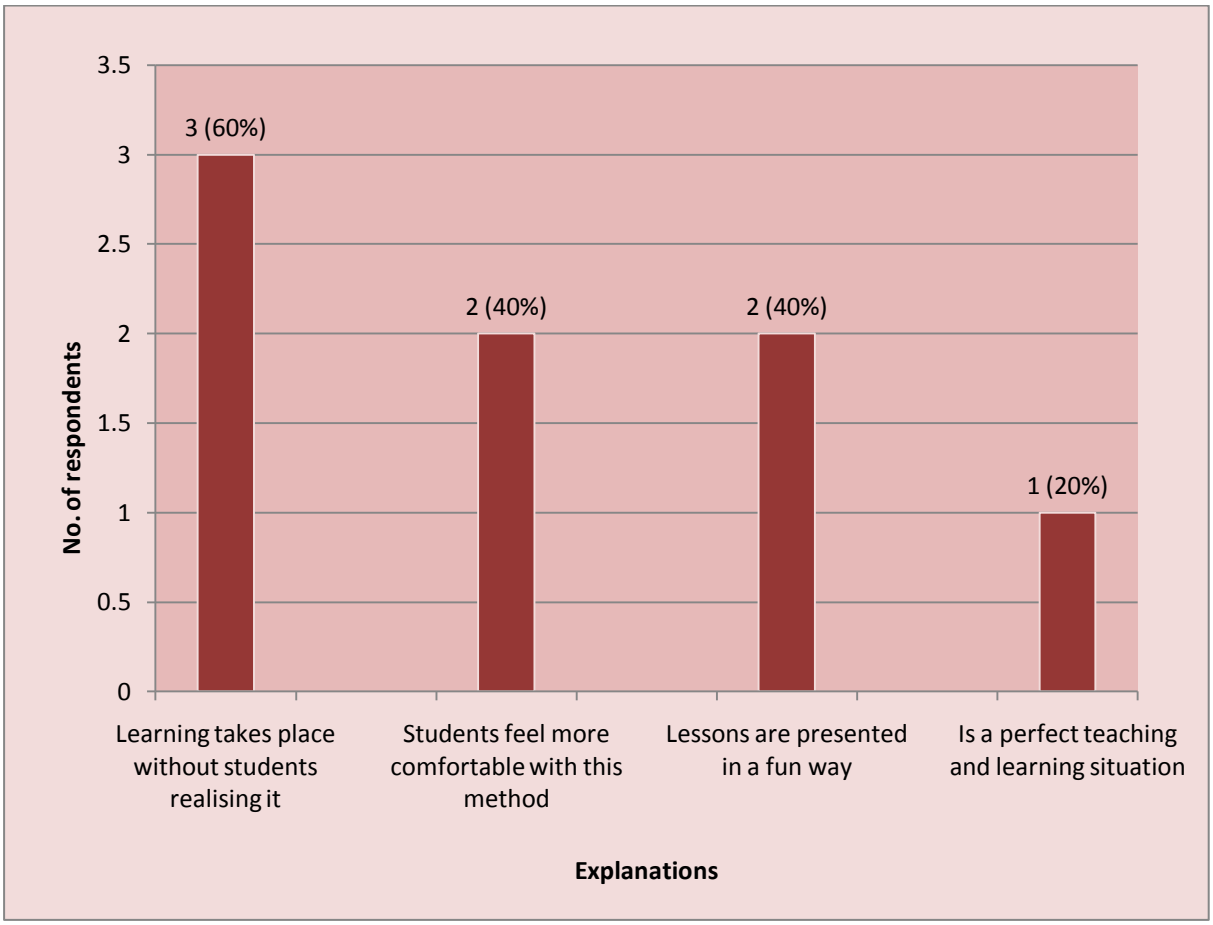
4.3.2.14.2 Playing games

This method of teaching and learning seemed to be a popular choice among interviewees. Subject Librarians explained that this method of teaching and learning makes students feel comfortable and learning takes place without students realising it, in a fun way. Figure 4.24 presents the frequency counts and the explanations for recommending playing games as a method of teaching and learning in IL training.

Figure 4.24

[N=5]

Playing games



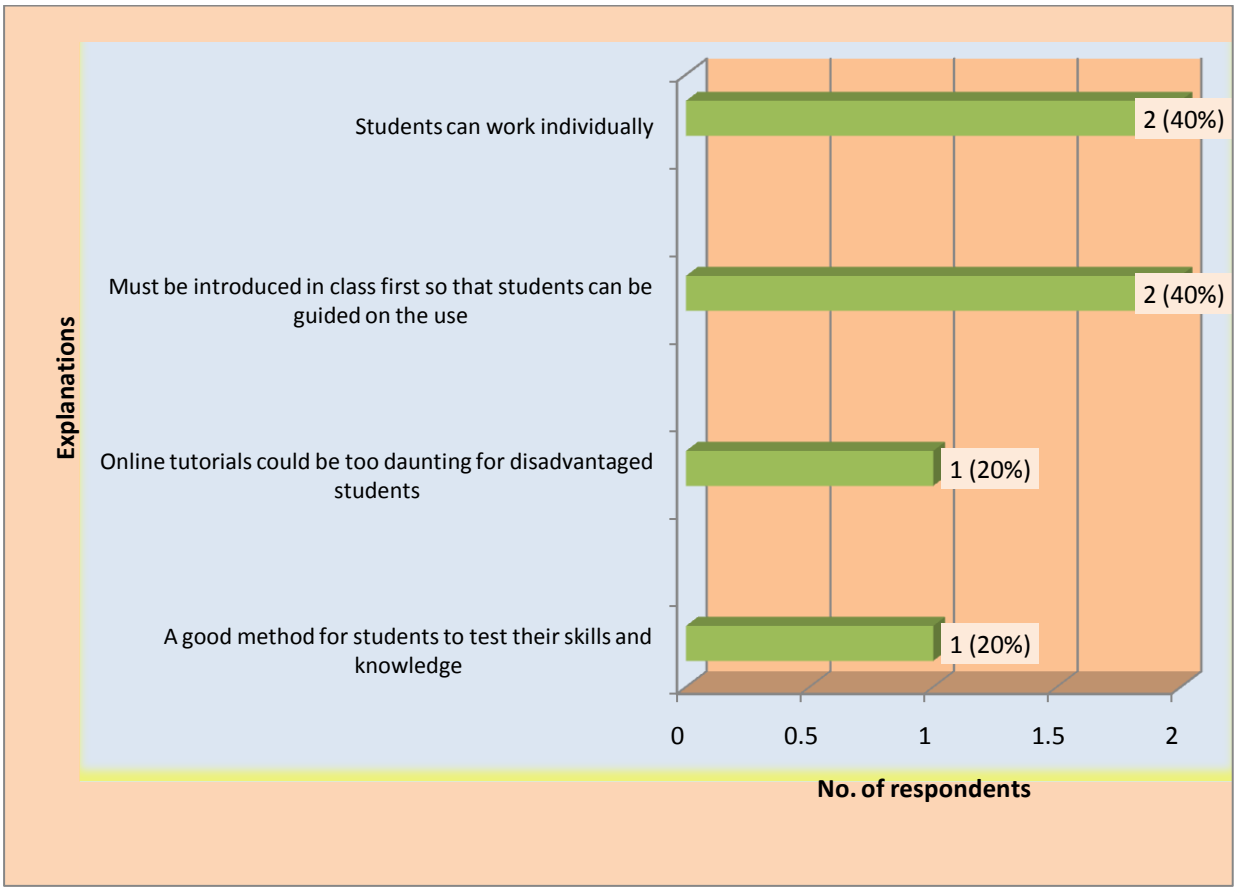
4.3.2.14.3 Online tutorials

Subject Librarians indicated that this method would serve the teaching and learning needs of both advantaged students and disadvantaged students. Figure 4.25 captures the reasons for recommending online tutorials in IL training as well as the frequency counts.

Figure 4.25

[N=5]

Online tutorials



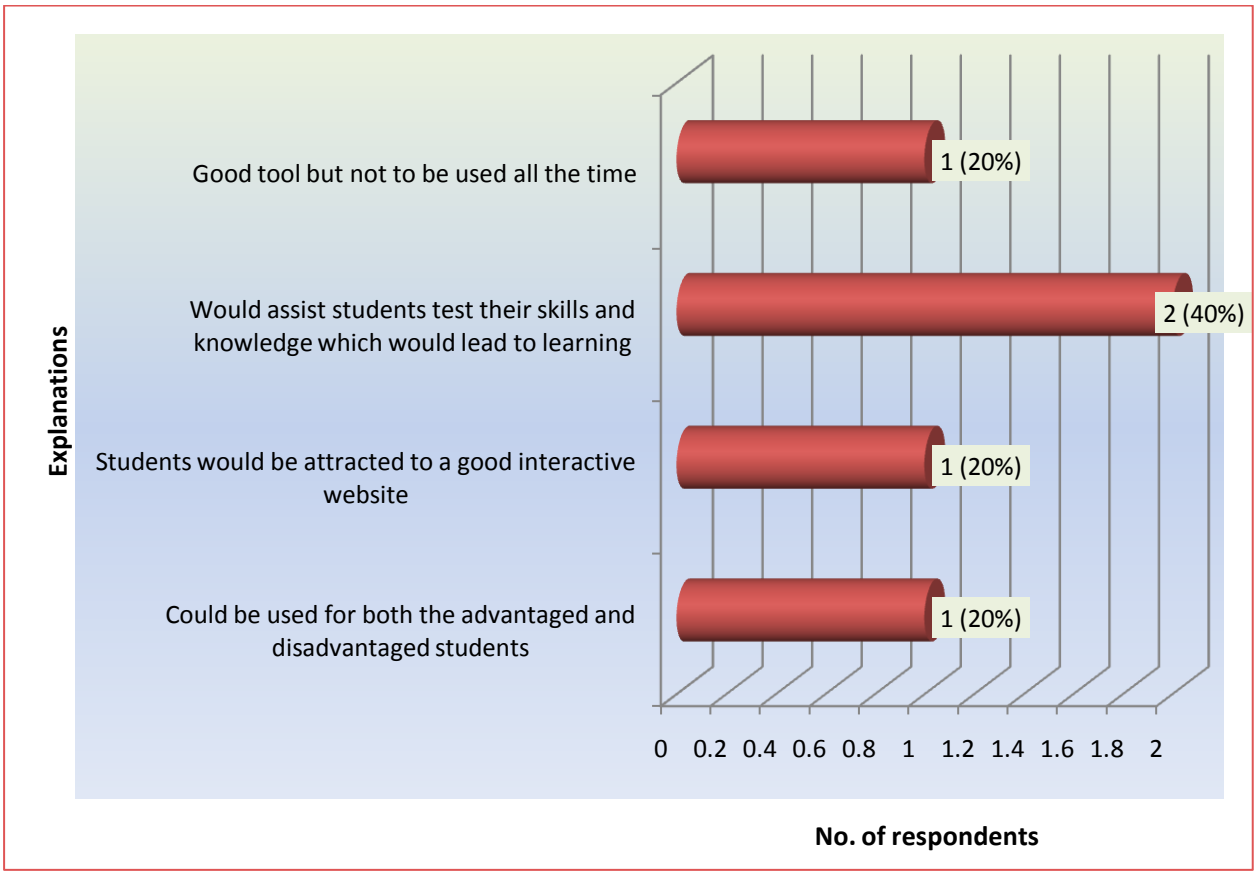
4.3.2.14.4 Interactive websites

Subject Librarians did not respond too favourably to this method of teaching and learning. They had some reservations about using this method for disadvantaged students. Figure 4.26 captures their responses.

Figure 4.26

[N=5]

Interactive websites



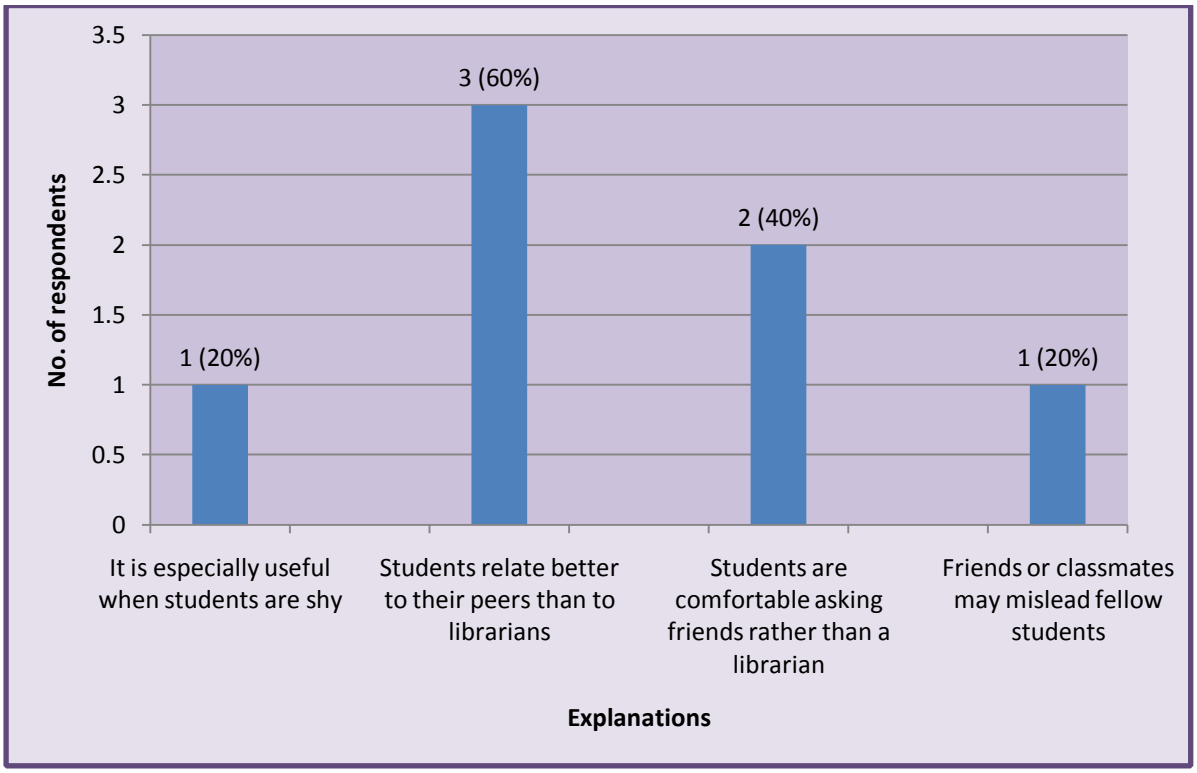
4.3.2.14.5 Peer-learning

There were mixed opinions on the use of peer-learning. Although all respondents indicated that this method could be useful, there was, however, the concern that peer-learning could lead to communication of incorrect information. Figure 4.27 presents the explanations of the Subject Librarians for recommending peer-learning in IL training.

Figure 4.27

[N=5]

Peer-learning



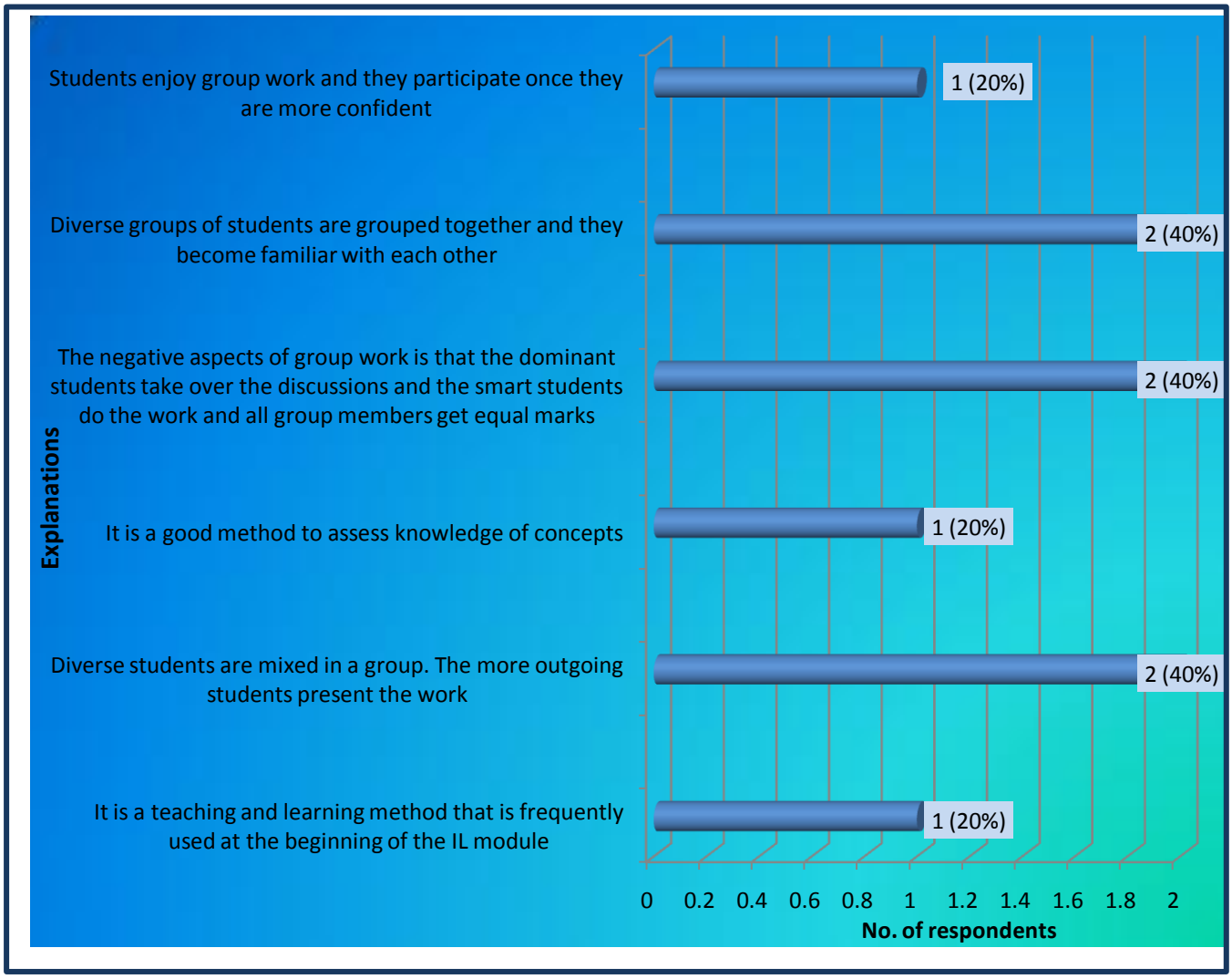
4.3.2.14.6 Group work

Subject Librarians had different explanations for recommending group work. Two Subject Librarians indicated that group work could be beneficial where extroverts assist introverts in a group or advantaged students could assist disadvantaged students. However, respondents also indicated that it is important to ensure that the groups include a diverse mixture of students. Figure 4.28 presents the explanations and frequency counts for the various explanations.

Figure 4.28

[N=5]

Group work



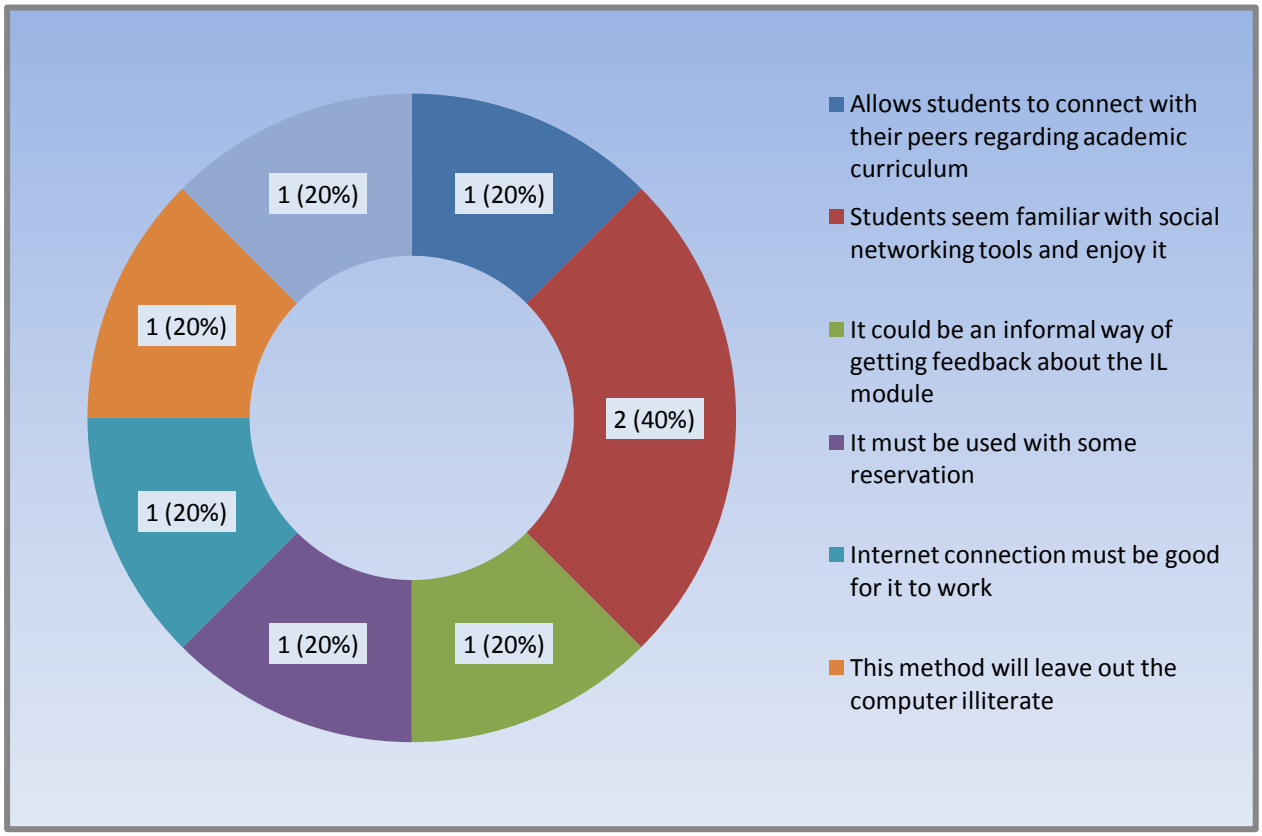
4.3.2.14.7 Social networks

Subject Librarians indicated in their explanations that they had reservations in using this method in the teaching and learning environment. There were a number of reasons presented which are captured in Figure 4.29 together with frequency counts.

Figure 4.29

[N=5]

Social networks



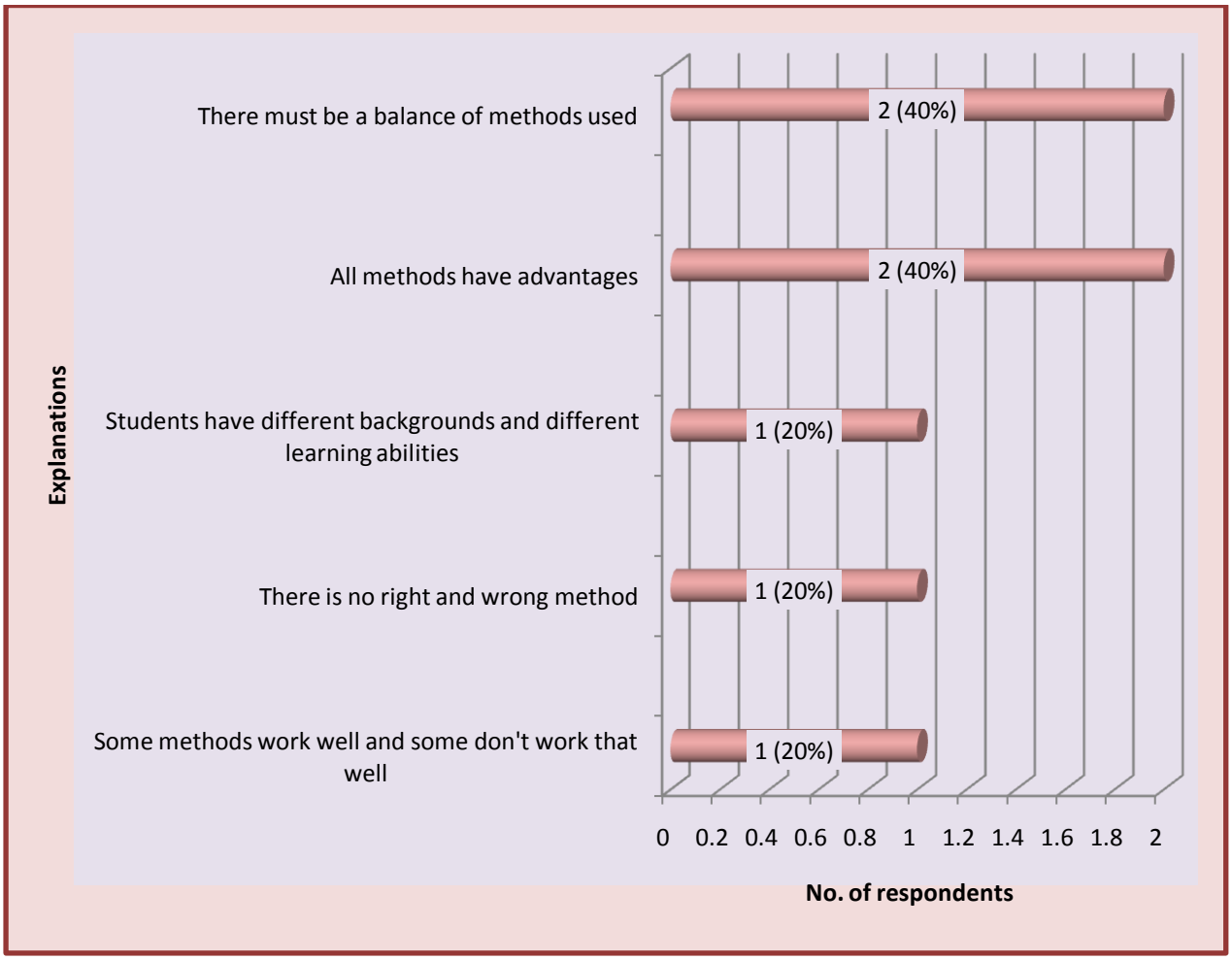
4.3.2.14.8 Combination of methods

Subject Librarians indicated that a combination of methods would serve the needs of the diverse group of students in the IL classroom. It was clear that respondents felt that all methods had a place in the teaching and learning environment depending on the lesson. Figure 4.30 captures the explanations for recommending a combination of teaching and learning methods in IL training.

Figure 4.30

[N=5]

Combination of teaching and learning methods



4.3.2.14.9 Other teaching and learning methods

Subject Librarians were asked whether there were other teaching and learning methods that they would recommend. One (20%) Subject Librarian responded to this item and specified that excursions would be a good alternative to the classroom where students could view electronic devices that are available in industry.

4.3.2.15 Recommendations to improve IL offering with regard to the digital divide

Subject Librarians were asked whether they had recommendations to make to improve the IL module with regard to the digital divide. Four (80%) Subject Librarians indicated that the IL module cannot be taught the way it was intended due to the digital divide. Basic computer skills often need to be taught. Table 4.22 presents the recommendations that Subject Librarians made to improve the IL offering with regard to the digital divide.

Table 4.22

[N=5]

Recommendations to improve IL offering with regard to the digital divide

Recommendations	Frequency	Percentage
Better teaching and learning environment is needed, for example, more computer facilities.	2	40%
Take the digital divide and computer literacy levels into account when planning IL lessons.	2	40%
Students should have a basic computer skills intervention which would allow IL lesson to continue more smoothly.	4	80%
A physiological test is necessary to assess the motor skills required when using a computer.	1	20%

4.3.2.16 Additional comments with regard to issues raised in the interview

Subject Librarians were asked whether they had any other comments that they would like to make with regard to the issues raised in the interview. While most Subject Librarians

indicated that all issues were adequately covered in the interview, there were a few additional comments made:

- All students should be exposed to the ECP kind of information literacy intervention as ECP students benefit largely from IL intervention;
- Gaps in students' learning are encountered in the IL classroom; and
- Students should do a computer literacy module before the IL module to assist with computer skills.

4.3.3 Presentation of findings of interview with the DUT ECP Coordinator

This section presents the findings of the interview with the DUT ECP Coordinator (refer to Appendix D). The open-ended responses were contextually analysed and data was grouped into themes or concepts, where possible.

4.3.3.1 Current designation

The interviewee was asked what her designation was. The respondent indicated this to be ECP Coordinator at the DUT.

4.3.3.2 Academic qualifications relating to role of ECP Coordinator

The interviewee was asked to outline her academic qualifications that were relevant to the role of ECP Coordinator. The respondent indicated that she had an education qualification (NHD: Post School Education) and was currently (2010) registered for a MED: Higher Education.

4.3.3.3 Year in which respondent became ECP Coordinator

The interviewee was asked to provide the year of assuming the role of ECP Coordinator at the DUT. The respondent indicated that she became the ECP Coordinator in 2008. This effectively gave her two years in this position (at the time of the study).

4.3.3.4 Other experience relating to ECP coordination

The interviewee was asked whether, outside her current role as ECP Coordinator, had she any other experience relating to ECP coordination. The respondent explained that while she had no other experience relating to ECP coordination she does have experience in teaching the academic literacy module to ECP students in the Faculty of Commerce (now known as the Faculty of Accounting and Informatics and the Faculty of Management Sciences) and in the Faculty of Health at the DUT.

These biographical details of the ECP Coordinator confirmed her to be a useful source of data for this study in terms of her experience and her academic qualifications.

4.3.3.5 Understanding of the concept of the digital divide

The ECP Coordinator was asked for her understanding of the digital divide. The respondent indicated that it is the capacity to use technology or the fear of using technology. She also indicated that current (2010) students have the potential to use technology but they do not know how to use computers. Disadvantaged students, according to the ECP Coordinator, do not have prior experience with computers because the schools they attended did not have these resources.

4.3.3.6 South African school education system

The respondent was asked whether the South African school education system created a digital divide that impacts on the students' performance at tertiary level. The response is presented in Table 4.23.

Table 4.23

[N=1]

South African school education system

Yes/No	Explanation
Yes	Due to poor resources at disadvantaged schools.
	Not all schools have computers and thus students coming from some schools are disadvantaged and thus have difficulty using computers or accessing the Internet for information.
	There are also teachers in some schools without computer literacy.
	The advantaged students have the ability and knowledge with regard to computers and most have done computer literacy at school.

4.3.3.7 Impact of the digital divide on IL training at the tertiary level

The ECP Coordinator was asked whether in terms of her experience with the digital divide in the Extended Curriculum Programme, the digital divide has an impact in information literacy (IL) training at tertiary level. The respondent initially indicated that there was no impact but believed that there was a problem with the integration of the IL module into the academic programme. However, the Coordinator then indicated that the digital divide was a problem in terms of teaching because of students with different abilities in the same classroom.

4.3.3.8 The delivery of IL to accommodate the digital divide

The interviewee was asked whether IL should be delivered differently from the way it is being currently delivered to accommodate the digital divide. The respondent recommended an integrated approach to the academic curriculum and suggested that increased collaboration with academic departments could also make the IL module more successful, as is the case with the Faculty of Health Sciences and the Faculty of Arts and Design.

4.3.3.9 Objective of IL training

The ECP Coordinator was asked whether the objective of IL training (provided – see Item 9 of Appendix D) is being met with a heterogeneous mix of both digitally advantaged students and digitally disadvantaged students in one classroom. The respondent indicated that the objective is being met. Her reasons for believing that the objective is being met are presented in Table 4.24. It is indeed interesting to observe that the second reason provided leans in the direction that there is a degree of difficulty in meeting the objective of IL training or that the objective of IL might not be met at all, even though the Coordinator indicated that the objective is being met. These contradictions (see also Section 4.3.3.7) are perhaps an indication of some defensiveness on the part of the interviewee – afterall she is the coordinator of the Extended Curriculum Programme and might see any failures as an indictment on her efforts. If this is the case, then it is a pity because a more open and robust attitude on the part of the ECP Coordinator would go a long way in strengthening the ECP programme for future students.

Table 4.24

[N=1]

Objective of IL training

	Reasons
Yes, the objective of IL training is being met	Because of the improvement in the students' ability to reference correctly and evaluate resources.
	It is easier for advantaged students to retrieve information while disadvantaged students find it difficult to find information which is exacerbated due to the lack of resources at home and at school.

4.3.3.10 Active student-centred learning

The current emphasis in higher education is on active student-centred learning. The respondent was asked whether, with the current heterogeneous student population participating in information literacy training, this goal is realistic. The ECP Coordinator's response is presented in Table 4.25.

Table 4.25

[N=1]

Active student-centred learning

	Explanations
Yes, this is a realistic goal	The different capabilities of the ECP students need to be used.
	Digitally advantaged students need to be used to help digitally disadvantaged students.
	The abilities of advantaged students need to be tapped into or they would get bored.
	Disadvantaged students need assistance with technology or they will feel challenged as basic skills are lacking.

4.3.3.11 Incorporation of more technology into IL training

The ECP Coordinator was asked whether she would recommend the incorporation of more technology (online tutorial, computer-aided learning, etc.) into the IL training. Her response is captured in Table 4.26.

Table 4.26

[N=1]

Incorporation of more technology into IL training

	Reasons
Yes, more technology should be incorporated into IL training	A balance of methods is important to accommodate the heterogeneous group in the same classroom.
	The use of chalk and talk will assist the disadvantaged students while online material would keep the advantaged students interested in the course.

4.3.3.12 Timing of computer literacy training

The ECP Coordinator was asked whether all digitally disadvantaged, first-year students should be exposed to a computer literacy course **before** the IL module or **concurrently** with the IL module. The ECP Coordinator's response is presented in Table 4.27.

Table 4.27

[N=1]

Timing of computer literacy training

	Explanations
Computer literacy training should be done **before** the IL module	A basic course which could include keyboard and mouse skills, how to switch on the computer and other basic skills, should be offered before the IL module.
	However, there is a concern with regard to the determination of who would be considered as digitally disadvantaged and how the process of determining whether students are digitally disadvantaged or not, would take place.

4.3.3.13 Teaching and learning methods recommended for the IL module of the ECP at the DUT

There are many innovative methods that may be used in the teaching and learning of IL. The ECP Coordinator was asked to draw from her experience with ECP and recommend teaching and learning methods that would bridge the digital divide in a heterogeneous IL classroom. The respondent reiterated her earlier point that she does not perceive the digital divide as a problem in the classroom but that the IL programme needed better integration into the academic curriculum. The respondent, nevertheless, recommended various methods to help bridge the digital divide, which are presented in Table 4.28.

Table 4.28

[N=1]

Teaching and learning methods recommended for the IL module of the ECP at the DUT

Teaching and learning methods	Explanations
Amazing race	• Amazing race is a fun way of finding and discovering things, knowledge, ideas, etc. by hunting around a given area. • This could be used to find resources within the library. • Students should be divided into groups of digitally advantaged and digitally disadvantaged students.
Team based projects	• Teams must comprise of mixed levels of abilities.
Peer learning	• There is no stigma attached to this method. • Students learn from each other. • Students teach each other and thus gain more experience.
Interactive websites	• This method is a good idea. • Must be introduced once students have basic computer skills.
Educational games	• This is a very good method. Playing games could reinforce IL skills.
Online tutorials	• This could be a problem for the digitally disadvantaged students. • This method could be brought in at a later stage when the digitally disadvantaged students have some technological skills.
Social networks	• IL lessons should be set up on the social network sites. • Students must set up the social network on their own to gain experience. • This could lead to increased confidence in using technology. • However, there must be a strict code of conduct in corresponding via social networks.

4.3.3.14 Pedagogical approaches recommended in the delivery of IL training

In view of the diversity of students attending the IL module of the ECP arising from the digital divide, the ECP Coordinator was asked whether there are particular pedagogical

approaches that she would recommend, to deliver IL training. Her response is presented in Table 4.29.

Table 4.29

[N=1]

Pedagogical approaches recommended in the delivery of IL training

Yes/No	Pedagogical approach	Explanation
Yes	**Team work**	• It is the social aspect of getting students to work in a team. • Once again the teams must comprise of mixed abilities where the disadvantaged students can benefit from the advantaged students. • Mixed teams are important for there to be an impact.

It is interesting that in this study the ECP students surveyed also placed group work or team work in IL training high up in their list of preferred teaching and learning methods. Subject Librarians too, like the ECP Coordinator emphasised the need for 'mixed-ability groups'.

4.3.3.15 Additional comments with regard to issues raised in the interview

The interviewee was asked whether she had any other comments to make with regard to issues raised in the interview. The ECP Coordinator responded that there were none.

4.4 Summary

Chapter 4 presented the finding of the study. The findings were based on the data collected from ECP students who were engaged in the IL module at the DUT in 2010, Subject Librarians who were teaching the IL module to ECP students and the DUT ECP Coordinator. Data was collected by means of a self-administered questionnaire from ECP students and by means of interviews with Subject Librarians teaching IL to ECP students and the ECP Coordinator. Chapter 5 discusses the main findings of the study in relation to the objective and sub-objectives of the study and the literature that was reviewed for the study. Based on this discussion, conclusions are drawn and recommendations are made.

Chapter 5: Discussion of findings, conclusions and recommendations of the study

5.1 Introduction

Chapter 4 presented the findings based on the data that was collected from the survey questionnaire and the two sets of interview schedules. The Extended Curriculum Programme (ECP) students of 2010 participated in the survey questionnaire while Subject Librarians at DUT teaching information literacy (IL) to ECP students and the Durban University of Technology (DUT) ECP Coordinator were interviewed. This chapter discusses the core findings relevant to the objective and sub-objectives of the study, in the context of literature reviewed for this study.

The objective of the study was:

To investigate what impact the digital divide has on the information literacy training of ECP students at the DUT and to recommend guidelines for teaching and learning of information literacy that would accommodate both the digitally advantaged and the digitally disadvantaged.

The sub-objectives of the study were:

- to identify in what ways the digital divide impacts on the IL training of ECP students;
- to identify innovative teaching and learning methods to accommodate the diversity of students in the IL classroom; and
- to recommend guidelines for teaching and learning of IL in the Extended Curriculum Programme that accommodates the digital divide among participating students.

5.2 Discussion of findings

Core findings are discussed in terms of sub-objectives outlined above.

5.2.1 Identify ways in which the digital divide impacts on the IL training of ECP students

Findings that relate to this sub-objective are discussed under broad themes.

5.2.1.1 Secondary education system in South Africa

Sixty-five percent (65%) of respondents in the questionnaire survey claimed that they came from urban-schools, of which only 57% believed that these schools were well-resourced while 34% came from rural schools and only 13% of these respondents believed that the rural schools were well resourced; an overwhelming 66% felt that the rural schools that they attended were under-resourced (see Section 4.3.1.6). It is indeed interesting to note that 13% of respondents who attended rural schools believed that their schools were well resourced. Singh (2004: 4) confirms that the differential school system that existed during the apartheid era, that is, the provision of "inferior education" with lack of adequate learning resources contributed to the digital divide.

Although South Africa is almost seventeen years into democracy the economic situation of the democratic South Africa does not allow the government to right all the wrongs that the apartheid government created. Darch and Underwood (1999: 285) point out that higher education (HE) and libraries in third world countries are forced to "straddle" this divide. Thus, many students entering higher education institutions are students who had been exposed in some way to "apartheid designed education" (Swartz and Foley 1996: 34) – here again this scenario remains unchanged fifteen years later due to the socio-economic situation of South Africa. A report released on 20 May 2011 by the Department of Basic Education (2011) reveals that of 5931 schools in KwaZulu-Natal, only 4732 schools have libraries and 4939 schools do not have access to computers. This report supports the findings of this study that many students entering higher education institutions in South Africa are likely not to have prior computer skills or experience.

A scenario thus exists where an information literacy class comprises of students who come from under-resourced schools as well as well-resourced schools which contribute to the different digital abilities of ECP students in a single IL classroom. This most certainly contributes to the impact of the digital divide on information literacy training. ECP students who come from well-resourced schools are familiar with computers and other technology while students who come from under-resourced schools are often confronted with computers and other digital technology for the first time at higher education level. Information literacy training involves a fair amount of digital technology. How then, can disadvantaged students be expected to cope in a digital environment when they have no prior knowledge or experience with digital technology?

All five Subject Librarians and the ECP Coordinator interviewed believed that the South African school education system has created a digital divide that impacts on students' performance at tertiary level. The explanations that were provided in support of this are presented in Section 4.3.2.6 (see Table 4.13) and Section 4.3.3.6 (see Table 4.23). Singh (2004: 5) correctly points out that this situation would take a long time to right itself. The secondary education system of South Africa has indeed created a digital divide that impacts on students' performance at tertiary level.

5.2.1.2 Level of ICT experience

ECP students who participated in the questionnaire survey were asked to indicate their level of ICT experience when they first came to the DUT. Of the 224 ECP students who indicated their level of ICT experience 148 (66%) had little or no ICT experience (see Section 4.3.1.7). It is obvious that a significant majority of ECP students who came to the Durban University of Technology with little or no ICT experience would experience problems understanding and participating in the information literacy classroom. Brown (2002: 6) asserts that students who come from disadvantaged backgrounds face huge challenges when entering tertiary institutions, especially with regard to web-based environments where they are expected to use ICTs. This is most certainly the case in the information literacy classroom where students are expected to use online retrieval tools, search databases, use the library online system (iLink) and use other ICTs that they may have never used before. Brown (2002: 6) also points out

that “computer anxiety” may be experienced by students who lack ICT skills. Students with little or no ICT skills face pressure to develop ICT skills to function in a web-based environment and also to begin to compete effectively with students who are from an advantaged background. It can therefore be seen that students with little or no ICT experience contribute to the digital divide in the information literacy classroom.

5.2.1.3 Computer and Internet access

There was almost an equal number of students with access to a computer (50.4%) at the place where they live while attending university and those with no such access (49.6%) at the place where they live while attending university (see Section 4.3.1.10). This inequitable computer access most certainly would impact on students’ abilities to function efficiently in an online environment. In a single information literacy class one would find students who are proficient in the use of computers and may get bored with basic computer instructions given to those with no access to computers at the place where they live while attending university. Students with no such access often need basic computer training which does not form part of the IL module. One Subject Librarian (20%) indicated that disadvantaged students need individual assistance and need to be nurtured in the IL classroom which leads to an incomplete syllabus (see Table 4.13). Four (80%) Subject Librarians also indicated that the programme is very rushed due to the digital divide and thus recommended that more time be allocated to the IL training offered to ECP students. Here again, the impact of having digitally advantaged students and digitally disadvantaged students in the same classroom is seen. The ECP Coordinator also confirmed that having students with diverse digital expertise in the same classroom could pose a problem to teaching IL, especially when the lesson includes online lessons. This digital divide could lead to advantaged students becoming bored in the IL class while digitally disadvantaged students may experience a degree of anxiety or feelings of inadequacy in a digital environment, especially with being seated with their digitally advantaged peers. Another problem commonly experienced is that digitally advantaged students (through boredom) tend to navigate the Internet and play on the social networking tools while the lecturer is assisting disadvantaged students with basic computer skills.

ECP students were also asked whether they had access outside of DUT to a computer with Internet access. A substantial number (160 (71%)) of ECP students did not have such access while only 66 (29%) had access. A significant part of IL lessons requires knowledge of the Internet. The library system, databases and online journals are all available via the Internet. How can students then be expected to retrieve sources via the Internet when many of them have never used the Internet or have had limited access or exposure to the Internet? Some students accessed the Internet at home (45%), on a friend's computer (5%), at an Internet café (36%), anywhere with the use of a 3G card (2%), at public libraries (11%), on cellular phones (3%) or at parents' offices (2%) while others could only access the Internet at the DUT (see Section 4.3.1.10 and Table 4.5). Students who have limited Internet access may feel inadequate in the IL classroom, especially when those students who have access to the Internet outside of the DUT have more Internet experience and thus may display impatient behaviour in the IL classroom due to the inexperience of those ECP students with limited Internet exposure.

5.2.1.4 Use of Internet café

Forty-eight percent (48%) of ECP students indicated that they had used an Internet café prior to coming to the DUT while 52% indicated that they did not (see Section 4.3.1.11 – Figure 4.8). Again the disparate experience and exposure to the Internet prior to coming to the DUT could be seen. Subject Librarians indicated that ECP students needed to be taught basic computer skills which are not included in the IL module even before lessons requiring the use of the Internet could be taught (see Section 4.3.2.7). According to one Subject Librarian, one of the impacts of having such a situation (having both students with Internet expertise and students who lack such expertise in a single learning space) is that students with Internet expertise often tend to go onto the social networking sites (see Table 4.13) while ECP students with no such expertise need 'hand-holding' to assist them navigate the Internet. This 'hand-holding' often slows down the IL lessons often resulting in an incomplete IL syllabus. Singh (2004: 1) correctly points out that factors such as poverty, illiteracy, lack of infrastructure and inadequate government interest have widened the digital divide further.

5.2.1.5 Level of confidence in using different aspects of the computer and other ICT applications

De Jager and Nassimbeni (2003: 109) confirm that South African students have major disadvantages that might not be experienced in other parts of the developed world. This study revealed that a significant 37% of the 226 ECP students indicated that they were not confident in using the different aspects of the computer and other ICT applications and an average of 48% was unsure of their level of confidence (see Section 4.3.1.14). The use of computers is core to the IL module and yet the majority of ECP students were not confident in using different aspects of computers and other ICT applications. It is evident that in the IL classroom disadvantaged students are not confident when using different parts of the computer and other ICT applications. A Subject Librarian who participated in the study pointed out that disadvantaged students lack basic computer skills, for example, mouse and keyboard skills. How can students who lack basic computer skills be expected to have retrieval skills? This is a worrying factor.

Two hundred and five ECP students (91%) indicated that they were either not confident or unsure of how to use different parts of the computer (see Section 4.3.1.14). How can students be expected to perform on par with their advantaged peers without confidence or being unsure of using different parts of the computer? The researcher believes that if students lack confidence in using technology that is being currently used at higher education institutions then surely they are being further disadvantaged if appropriate action is not taken at the very onset of the training experience. Salinas (2003: 132) defines the digital divide as the disparity that exists between those who can use electronic information and ICT applications, such as the Internet, and those who cannot. This definition is instructive in illustrating the current digital divide that is experienced in the IL classroom at the DUT.

Only a small number of ECP students (21(9%)) indicated feeling confident or fairly confident in using the different aspects of the computer and other ICT applications (see Section 4.3.1.14). Communication via social networking tools is currently being exploited in all spheres of life. Initially social networking tools were thought of as tools just for social interaction but today it is a tool that is being used in learning environments as well. However,

only 48 (21%) of the ECP students are confident or fairly confident in using social networking applications and a significant number of ECP students were not confident or unsure of using social networking applications (see Section 4.3.1.14). Should social networking applications be used as a communication tool in the learning environment then surely these students would be further marginalised. A small number of ECP students (33(15%)) indicated that they are confident or fairly confident in searching the Internet, information databases, the library's iLink, etc. and a considerably higher number of respondents (192(85%)) indicated that they are not confident or are unsure of searching the Internet, information databases, the library's iLink, etc. (see Section 4.3.1.14 and Figure 4.13 for more details). Here again it is evident that there are students with different abilities in using the Internet, information databases and the library's iLink - skills that are vital to sourcing information for assignments, projects and other academic activities. These findings reveal that a large number of ECP students lack confidence in using different aspects of the computer and other ICT applications which widens the digital divide.

5.2.1.6 Feelings of being disadvantaged in the information literacy classroom

De Jager and Nassimbeni (2003: 108) highlight the educational scenario at higher education institutions where students bring with them "previous experiences, beliefs and disciplinary traditions" to university that may either hinder or assist their progress in the learning environment. De Jager and Nassimbeni (2003: 108) further emphasise the importance of acknowledging the disparate experiences of students when developing information literacy activities. The survey of ECP students in the current study revealed that 51% of ECP students did not feel disadvantaged at all by the technology being used in information literacy classrooms but a significant 42% of them felt 'a little bit' disadvantaged by the technology used in IL classrooms (see Section 4.3.1.12 and Figure 4.11). Salinas (2003: 134) correctly asserts that providing access to computers does not ensure equitable technological experience if a person lacks computer skills. When one indicates feeling disadvantaged it immediately means that help is needed to remedy the situation. It can therefore be assumed that the digital or technological experiences of ECP students attending the information literacy module are by no means equal. Kennedy et al. (2008: 109) also highlight the different technological

experiences of students and the common mistaken assumption that students entering university are a homogeneous group of 'digital natives'.

5.2.1.7 Experiences of having both the digitally advantaged and digitally disadvantaged in the same IL classroom

The impact of the digital divide is experienced in different ways in the IL classroom. Twenty-three percent (23%) of ECP students indicated they did not have keyboard skills and three percent (3%) did not have mouse skills. Information retrieval, searching the library system or searching databases require keyboard and mouse skills (see Section 4.3.1.15 - Figure 4.14). It is also emphasised that the information literacy module teaches one how to access, retrieve and evaluate information, which include electronic sources as well (Rader 2000: 378). Hence students who lack these basic skills are immediately disadvantaged in the IL classroom.

Responses from ECP students regarding whether lack of access to technology has an impact of IL training have been presented in Chapter 4 (see Table 4.6). A majority 134 ECP students (60%) agreed that the lack of access for some people to information and communication technologies (e.g. e-mail, Internet, Facebook and other social networking applications, information databases, etc.) has an impact on information literacy training at a higher education institution while 39 respondents (17.5%) disagreed. Five (83%) of the interviewees (Subject Librarians and ECP Coordinator) believed that the digital divide impacted on IL training while one (17%) believed that the digital divide did not impact on IL training but paradoxically explained that it could have an impact with regard to teaching due to different abilities in the same classroom – this is tantamount to admitting that the digital divide does have an impact on IL training at the tertiary level.

Subject Librarians experience the impact of the digital divide in different ways in the IL classroom (see Table 4.19). It is evident from reasons provided by Subject Librarians that basic computer skills and knowledge are lacking on the part of ECP students and findings here reveal that there are also those students who are familiar with social networking tools and have vast experience with available ICTs. Subject librarians (four (80%)) also pointed

out that some students take longer to reach the expected outcome of the IL lesson but eventually do. It can be concluded that this is due to the lack of computer skills as it was suggested by Subject Librarians that computer skills have to be taught before IL skills are understood.

Fifty-one percent (51%) of ECP students indicated that they did not feel disadvantaged when they initially started the IL module at the Durban University of Technology (DUT); however, a significant 42% felt disadvantaged in the IL classroom. This highlights that there is roughly an equal proportion of students who did not feel advantaged or disadvantaged in the IL classroom. This is a sure sign that the digital divide does exist and that it impacts on the information literacy training at the DUT. The psychological effect of feeling disadvantaged in any classroom is sufficient to impact on any form of training.

Students (35%) also find it difficult to follow online lessons and 59% indicated that computer terminologies are new to them (see Section 4.3.1.15 and Figure 4.14). Salinas (2003: 135) describes the ability to use information tools effectively as "information fluency". It is sad to note that the majority of ECP students engaged in the IL module at the DUT cannot be described as "information fluent". This is a serious situation in terms of ensuring that students become information literate. This is analogous to an English speaking student sitting in a lecture that is delivered in a foreign language. The student would be expected to make sense of the content although it is delivered in a language that is not understood by the student. If computer terminologies and basic technologies are not understood by ECP students how then can librarians teaching IL expect students to understand the content of IL? The digital divide thus does impact on the IL training in various ways.

These findings once again reveal that basic computer skills are essential even before ECP students embark on attending IL training to ensure that they are not disadvantaged in any way. This is supported by the finding relating to whether students felt disadvantaged in the IL course because of the technology used, where 42% of students that were surveyed felt disadvantaged (see section 4.3.1.12 and Figure 4.11). An overwhelming majority of

respondents from all three populations collectively believe that the digital divide does have an impact on IL training.

5.2.1.8 Attendance and timing of computer literacy training offered to ECP students at the DUT

It is interesting to note that 74% of respondents who participated in the ECP student survey had attended computer literacy training while only 26% claimed that they did not attend computer literacy training. The concern that arises is whether students who have problems with keyboard skills and mouse skills are those who did not attend computer literacy training that is offered to ECP students? Unfortunately this aspect was not probed by the research instruments and thus a correlation of this nature cannot be drawn. However, a majority (146 (65%)) of ECP students indicated that computer training should be offered to digitally disadvantaged students **before** attending the IL module (see Section 4.3.1.17 – Figure 4.16).

ECP students offered explanations as to why they believed that computer training should be offered to digitally disadvantaged students **before** attending the IL module (see Chapter 4 - Table 4.7). A study done by Blignaut, Venter and Cranfield (2000: 228) demonstrates that a method of bridging the digital divide would be to offer computer literacy to students at the outset. These findings and evidence from the literature reflect that there is a need for basic computer skills to be gained **before** attending the IL module and that the lack of these basic skills adds to the impact of the digital divide in the IL classroom.

Only 49.5% of 214 ECP students indicated that computer training be offered to digitally disadvantaged students **at the same time while** attending the information literacy module while 33% disagreed. Hundred and forty-six (146 (65%)) ECP students agreed or strongly agreed that computer training be done **before** attending the IL module while 106 respondents (49.5%) agreed or strongly agreed that computer training should be done **concurrently** while attending the IL module. Findings from the interviews with Subject Librarians and the DUT ECP Coordinator also mirror that digitally disadvantaged students should receive computer training **before** attending the IL module. Four Subject Librarians (80%) indicated that

computer training should be offered to digitally disadvantaged students **before** attending the IL module while only one Subject Librarian (20%) was unsure whether computer training should be offered **before** or **at the same time while** attending the IL module. The ECP Coordinator also indicated that it would be beneficial for digitally disadvantaged students to attend computer training **before** attending the IL module. However, an important concern raised at the interview with the ECP Coordinator was the method or process of deciding whether students are digitally disadvantaged or not. The process could create divisions among participating students or create a stigma for certain students which could have a negative effect in the IL classroom. This is an area that needs further investigation.

5.2.2 Identify innovative teaching and learning methods to accommodate the diversity of students in the IL classroom

Discussions of findings that relate to the above sub-objective are discussed under the broad theme of creative teaching and learning methods.

5.2.2.1 Creative teaching and learning methods

A vast majority (75% (168)) of ECP students agreed that creative teaching and learning methods should be used by librarians in the delivery of the IL module to accommodate both digitally advantaged and digitally disadvantaged students attending the IL module of the Extended Curriculum Programme (ECP). These findings are supported by Lippincott (2005: 3) who suggests that librarians "repackage" the IL lessons by updating teaching and learning methods. Students showed a preference for some teaching and learning methods compared to others. All methods from a list provided (see Appendix A, Question 21.1) were selected. However, there were some teaching and learning methods that were more popular than others. The most popular teaching and learning methods were online tutorials where 119 (52%) ECP students preferred this method, games was the second preferred method by 96 (42%) ECP students, group work was selected by 94 (42%) as well, and lastly interactive websites was selected by 89 (39%) of ECP students who participated in this study.

The least favoured teaching and learning methods by ECP students were the traditional chalk and talk (52(23%)) and peer-learning (55(24%)) but Subject Librarians indicated that chalk and talk as a teaching and learning method is useful for introductory lessons. All interviewees placed games as a preferred method of teaching and learning in IL. Games were described as a method that could benefit both digitally advantaged and digitally disadvantaged ECP students, making students feel comfortable. Playing games, according to Subject Librarians and the ECP Coordinator could also reinforce IL skills that students need to acquire. Although interest in social networking has increased globally there seems to be a degree of reservation by all three population sets in the use of social networks as a teaching and learning method. It is assumed that students enjoy social networking tools as many of them are caught using social networking tools during IL lessons or in the library at times when they are barred from using it. However, only 30% (63) students recommended it as a teaching and learning method to accommodate digitally advantaged and digitally disadvantaged ECP students. Obviously students tend to favour it for non-learning purposes. Two concerns raised by the ECP Coordinator in this study were: the code of conduct when using social networking tools and the willingness of students to want to use social networking tools for academic purposes. These two concerns are valid concerns as students would have to use social networking tools in a formal manner when communicating with librarians and not in an informal manner.

In summary findings reveal that online tutorials, games, group work and interactive websites are teaching and learning methods that have been identified by respondents to accommodate both digitally advantaged students and digitally disadvantaged students engaged in the Extended Curriculum Programme. Here interactive websites were only recommended by 24% of ECP students although a substantial 39% of ECP students preferred this method (see Figure 4.19 and Figure 4.20). Chalk and talk (by 36%) while high on the list of recommended teaching and learning methods to accommodate the digital divide was one of the least favoured teaching and learning methods by ECP students indicating uncertainty about this method. It must also be remembered that this method is not likely to hold the interest and attention of digitally advantaged students. A combination of these methods did not feature high on the list of preferred teaching and learning methods of ECP students but 24% recommended this method to bridge the digital divide. Subject Librarians, however, indicated that a combination of methods would serve the needs of all students. It could also be argued

that the use of a combination of teaching and learning methods would alleviate the boredom that could set in during IL lessons. Although chalk and talk was one of the recommended teaching and learning methods to accommodate both digitally advantaged and digitally disadvantaged students, it can hardly be described as a creative teaching and learning method. Social networks (while treated with caution by Subject Librarians and the ECP Coordinator) featured higher on the list of recommended methods by ECP students to accommodate both digitally advantaged and digitally disadvantaged students than interactive websites. Sixty percent (60%) of Subject Librarians prescribed the use of chalk and talk as an introductory teaching and learning method notwithstanding some inconsistencies in the findings regarding the different teaching and learning methods, the creative and active student-centred teaching and learning methods appear to be: group work, games, online tutorials and interactive websites. Advantaged students could work on interactive IL exercises while disadvantaged students are given more attention. Literature reviewed also support an interactive environment to encourage interest and ensure active participation by digitally advantaged students. However, as the findings of this study indicate all teaching and learning methods have a role to play and the above creative and active student-centred teaching and learning methods need to be used in combination with other tried and tested methods.

5.2.3 Recommend guidelines for teaching and learning of IL in the Extended Curriculum Programme that accommodates the digital divide among participating students

Findings that relate to this sub-objective are discussed under teaching and learning methods and approaches.

5.2.3.1 Group work, online tutorials, games, and interactive websites

The survey of ECP students revealed that the preferred teaching and learning methods were the almost the same teaching and learning methods recommended to accommodate both digitally advantaged students and digitally disadvantaged students. Manual (2002: 195) highlights the teaching and learning preferences of digitally advantaged students as being a very interactive environment where students “figure” things out for themselves. In this study

too, the teaching and learning methods that featured significantly were: group work, online tutorials, games and sometimes interactive websites. Three (60%) Subject Librarians indicated that active student-centred learning is a realistic goal. The teaching and learning methods (group work, online tutorials, games and interactive websites) that have been recommended to accommodate digitally advantaged students and digitally disadvantaged students are all active student-centred learning methods, notwithstanding that chalk and talk was also recommended to accommodate both digitally advantaged and digitally disadvantaged students. Tickle (2009: 7) supports this by asserting that students need to be engaged in the learning process as they are not "passive receptors of knowledge". It can be concluded that to accommodate both digitally advantaged and digitally disadvantaged students active student-centred learning methods must be embraced, albeit in combination with other teaching and learning methods.

5.2.3.1.1 Group work

According to ECP students surveyed, group work affords them a learning space free of intimidation, allowing students to communicate freely with their fellow classmates. Ninety-four (42%) of ECP students indicated group work as a preferred teaching and learning method while 99 (47%) ECP students recommended group work to accommodate both technologically advantaged and technologically disadvantaged students (see Section 4.3.1.18 – Figure 4.19 and Figure 4.20). Both Subject Librarians and the ECP Coordinator recommended group work but highlighted the importance of having groups comprised of 'mixed abilities' (see Section 4.3.2.14.6 – Figure 4.28 and Table 4.28). Group work as a pedagogical approach allows Subject Librarians teaching IL to ECP students to form groups with mixed abilities – ensuring that groups comprise both digitally advantaged and digitally disadvantaged students. Facilitators of group work must also ensure that everybody participates in the group activity and that the group is not dominated by a single individual or by just a few individuals.

5.2.3.1.2 Online tutorials

Online tutorials could be used by digitally advantaged students to learn certain IL skills and assess their knowledge while online tutorials could be used by digitally disadvantaged ECP students to revise and reinforce IL skills taught in the IL classroom. Hundred and nineteen (52%) ECP students preferred online tutorials while 84 (40%) recommended this method to bridge the digital divide. All five Subject Librarians (100%) indicated that online tutorials could serve the needs of both the digitally advantaged and digitally disadvantaged students (see Section 4.3.2.14.3 – Figure 4.25). However, the ECP Coordinator recommended that this method could be brought in at a later stage when digitally disadvantaged students have the necessary technological skills (see Table 4.28). The researcher agrees with the ECP Coordinator's recommendation that this method should only be used when all students in the IL classroom have technological skills otherwise disadvantaged students would feel further marginalised. Lippincott (2005: 4) suggests that librarians develop online tutorials, exercises and guides to reinforce IL skills. These activities could include information seeking skills, retrieval and other important IL skills, which would allow students to figure things out for themselves.

5.2.3.1.3 Games

Games are generally described as a teaching and learning method that is fun-packed and enjoyable and learning could take place without students knowing that learning has taken place. Ninety-six (42%) ECP students preferred using games while 79 (37%) recommended games as a teaching and learning method to accommodate both technologically advantaged and technologically disadvantaged students. All five Subject Librarians and the ECP Coordinator recommended games as a teaching and learning method (see Section 4.3.2.14.2 – Figure 4.24 and Table 4.28). Subject Librarians indicated that playing games makes students comfortable and learning takes place without realising it. The ECP Coordinator suggested that games could be used to reinforce IL skills. Lippincott (2005: 3) reaffirms that "gaming technology" needs to be introduced to accommodate students who are visual learners. Games involve active learning which Manual (2002: 207) supports by highlighting the importance of introducing active learning methods to reduce boredom in the IL classroom. Games then

should be introduced as a method of teaching and learning to accommodate the digital divide in the IL classroom.

5.2.3.1.4 Interactive websites

Interactive websites could be used as a teaching and learning method that would allow students to work at their own pace, developing IL skills as they proceed. On-line instructions are given to learners where learners are prompted and corrected as learners work through the interactive websites. Eighty-nine (39%) ECP students indicated interactive websites as a preferred method while 51 (24%) recommended this method to bridge the digital divide (see Section 4.3.1.18 – Figure 4.19 and Figure 4.20). Subject Librarians were not totally optimistic about interactive websites being used as a teaching and learning method to accommodate both the digitally advantaged and digitally disadvantaged students. However, Lippincott (2005: 5) suggests that librarians develop interactive tutorials on the different aspects of the IL module. Manual (2002: 201) reiterates Lippincott's suggestion that the teaching and learning environment change from chalk and talk to online interaction. Perhaps then Subject Librarians and ECP students need to investigate the value of this learning tool for IL training.

The researcher is of the view that despite some inconsistencies in the findings regarding the popularity of this teaching and learning method interactive websites could be used by the digitally advantaged students to alleviate the problem of boredom in the classroom and it could also be used once disadvantaged students gain the technological skills that are required to use interactive websites. Manual (2002: 203) also explains that learners today are "visual learners" and thus the mode of teaching and learning must hold the attention of the learner. Lippincott (2005: 3) also highlights the importance of using "visually oriented instruction aids" to facilitate the teaching and learning process. The ECP Coordinator, however, suggested that this method be used later in the module when digitally disadvantaged students are better equipped with skills to work with interactive websites.

The researcher, once again, supports the ECP Coordinator's suggestion that interactive websites be used when all students have basic computer and other ICT skills. Disadvantaged students will feel further frustrated if they are expected to work on interactive websites when they lack the necessary skills. In this regard Manual (2002: 196) highlights the importance for librarians to match the instructional style in teaching IL with their student populations. Manual (2002: 196) further points out that students learn better when they are taught in a preferred teaching and learning style. Although interactive websites as a teaching and learning method did not feature highly as a recommended teaching and learning method to bridge the digital divide in the IL classroom it featured highly as a preferred teaching and learning method. Manual (2002: 207) also emphasises the importance of introducing interactive tutorials and peer-learning as a more productive method of teaching and learning. This study thus supports the notion that students must be taught in the preferred teaching and learning methods to facilitate the teaching and learning process and therefore chose to place emphasis on the preferred teaching and learning methods by ECP students. All teaching and learning methods have a place in the IL classroom, however, the inclusion of student-centred learning is highlighted in this study.

5.3 Conclusions of the study

The objective of the study was to investigate what impact the digital divide has on the information literacy training of ECP students at the DUT and to recommend guidelines for teaching and learning of information literacy that would accommodate both the digitally advantaged and the digitally disadvantaged. Based on the discussion of findings the study draws the following conclusions:

- The provision of inadequate resources at secondary schools in South Africa has resulted in under-prepared students arriving at higher education institutions which contribute to the digital divide. Under-prepared students often feel further marginalised due to lack of prior technological experience and skills;
- A significant number of students who enter higher education institutions have little or no ICT experience, which impacts on their participation in IL classrooms – thereby contributing to the digital divide. A majority of students entering higher education institutions in South Africa have little or no ICT experience;

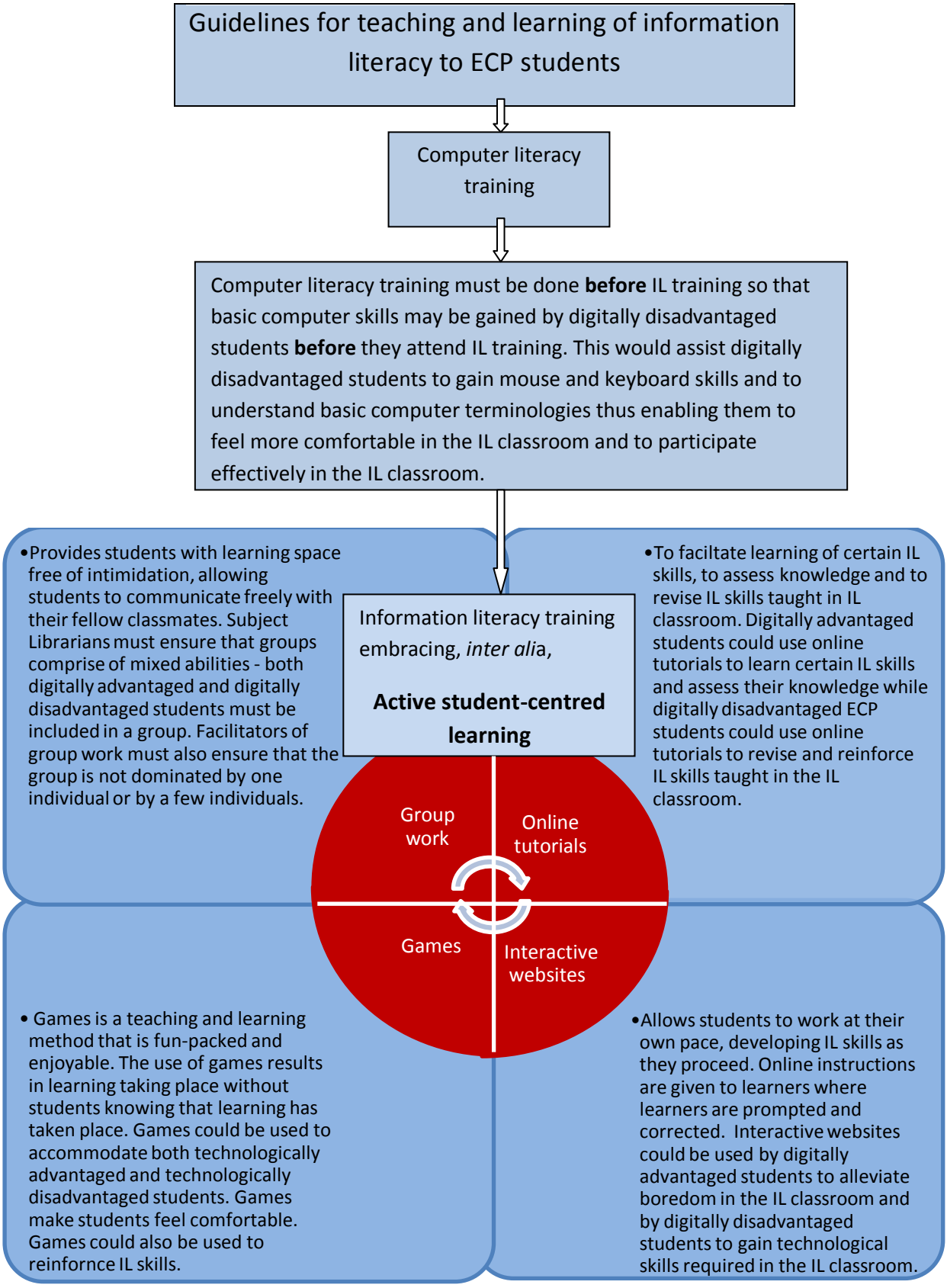
- The inequitable access to computers at the place where students live while attending university also contributes to differential computer skills and abilities in the IL classroom. Disadvantaged students are faced with a web-based environment where they are expected to exploit available ICTs. Disadvantaged students are either not confident with or unsure of the use of different aspects of computers and other ICT applications which impacts on their participation in the IL classroom. Computer terminologies are new to disadvantaged students resulting in them finding it difficult to follow online lessons;
- The disparate experience and use of the Internet by students prior to attending university contributes to the digital divide in the IL classroom. In a single IL class there are those who are very experienced and those who have had little or no prior experience of the Internet;
- A significant number of students feel disadvantaged by technology that is used in the IL classroom which impacts on the IL training. IL lessons often include the library automated system, online databases and electronic journals which require students to use web-based technology. Students who feel disadvantaged by the technology used would naturally feel further intimidated in a digital environment;
- Having both the digitally advantaged and the digitally disadvantaged in the same IL classroom impacts on the IL training of ECP students. The IL module is often not completed due to the presence in the same IL classroom of both digitally advantaged and digitally disadvantaged students who require more nurturing and assistance;
- Computer literacy training is vital to acquaint students with basic computer terminologies, and mouse and keyboard skills. However, the timing of the computer literacy training is very important. Computer literacy training should be offered to students before the IL module;
- Active student-centred teaching and learning methods, such as, group work, online tutorials, games, peer-learning and interactive websites should be used to accommodate both digitally advantaged and digitally disadvantaged students, albeit in combination with other tried and tested methods such as chalk and talk. These active student-centred methods could alleviate boredom on the part of digitally advantaged students and at the same time help digitally disadvantaged students to learn from their advantaged peers or revise and reinforce lessons covered in the IL classroom; and,

- Librarians must ensure that the method of delivery of IL lessons matches the preferred teaching and learning methods of students. Using the preferred teaching and learning methods could result in better and more effective participation in the IL classroom.

5.4 Recommendations of the study

Based on discussions and conclusions, the study makes recommendations that are captured in Figure 5.1. The guidelines recommended by this study for teaching of IL to ECP students to accommodate the digital divide in the IL classroom, addresses the third sub-objective of this study: to recommend guidelines for teaching and learning of IL in the Extended Curriculum Programme that accommodates the digital divide among participating students. Active student-centred learning must be adopted to keep students interested in the IL module and to encourage participation in the IL classroom. This study recommends embracing group work, online tutorials, games and interactive websites as active student-centred teaching and learning methods in IL training but in combination with other teaching and learning methods. Another important recommendation of this study is that computer literacy training must precede information literacy training.

Figure 5.1


Guidelines for teaching and learning of information literacy to ECP students
Computer literacy training
Computer literacy training must be done **before** IL training so that basic computer skills may be gained by digitally disadvantaged students **before** they attend IL training. This would assist digitally disadvantaged students to gain mouse and keyboard skills and to understand basic computer terminologies thus enabling them to feel more comfortable in the IL classroom and to participate effectively in the IL classroom.
•Provides students with learning space free of intimidation, allowing students to communicate freely with their fellow classmates. Subject Librarians must ensure that groups comprise of mixed abilities - both digitally advantaged and digitally disadvantaged students must be included in a group. Facilitators of group work must also ensure that the group is not dominated by one individual or by a few individuals.
Information literacy training embracing, *inter alia*,
Active student-centred learning
•To faciltate learning of certain IL skills, to assess knowledge and to revise IL skills taught in IL classroom. Digitally advantaged students could use online tutorials to learn certain IL skills and assess their knowledge while digitally disadvantaged ECP students could use online tutorials to revise and reinforce IL skills taught in the IL classroom.
Group work
Online tutorials
Games
Interactive websites
• Games is a teaching and learning method that is fun-packed and enjoyable. The use of games results in learning taking place without students knowing that learning has taken place. Games could be used to accommodate both technologically advantaged and technologically disadvantaged students. Games make students feel comfortable. Games could also be used to reinfornce IL skills.
•Allows students to work at their own pace, developing IL skills as they proceed. Online instructions are given to learners where learners are prompted and corrected. Interactive websites could be used by digitally advantaged students to alleviate boredom in the IL classroom and by digitally disadvantaged students to gain technological skills required in the IL classroom.

5.5 Summary and conclusions

The core findings in relation to the objective and sub-objectives were discussed in this chapter. Based on these discussions, conclusions were drawn and recommendations made.

The researcher is confident that the objective of the study has been adequately addressed by addressing the sub-objectives, which were: to identify in what ways the digital divide impacts on the IL training of ECP students; to identify innovative teaching and learning methods to accommodate the diversity of students in the IL classroom; and, to recommend guidelines for teaching and learning of IL in the Extended Curriculum Programme that accommodates the digital divide among participating students.

In addressing the objective the researcher is satisfied that this study has contributed to addressing the main issue of this study, that is, the impact of the digital divide on the information literacy training of ECP students. The researcher is of the opinion that the findings and recommendations of this study, while emanating from DUT as a research site, could apply to IL training at other higher education institutions as well. Further, although the study was confined to teaching and learning of information literacy at DUT, the issues and trends discussed in this study could be applicable to other IT related programmes in higher education. South African higher education student populations are not homogeneous groupings but groupings of students with mixed abilities which definitely impact on the teaching and learning environment. Hence this study and its findings have value for DUT as well as for higher education institutions in South Africa generally.

Literature cited

Andretta, S. 2005. *Information literacy: a practitioner's guide.* Oxford: Chandos Publishing.

Aqili, S.V. 2008. Bridging the digital divide: the role of librarians and information professionals in the third millennium. *The electronic library*, 26(2): 226-237 [Online]. Available WWW: wwwemeralsinsight.com/0264-0473.htm. (Accessed 16 February 2009).

Attewell, P. 2001. Comment: the first and second digital divides. *Sociology of education,* 74(3): 252-259 [Online]. Available WWW: http://www.jstor.org/stable/2673277. (Accessed 13 August 2010).

Babbie, E. and Mouton, J. 2001. *The practice of social research*. Cape Town: Oxford University Press Southern Africa.

Behr, A.L. 1984. *New perspectives in South African education: a review of education in South Africa, 1652-1984.* Durban: Butterworths.

Berkeley Electronic Press. 1999. *Digital commons* [Online]. Available WWW: http://www.bepress.com/ir/. (Accessed 28 October 2010).

Bland, J.M. and Altman, D.G. 1997. Statistics notes: Cronbach's alpha. *British medical journal* [Online], 314(7080): 572. Available WWW: http://www.jstor.org/stable/25173851. (Accessed 15 April 2011).

Bless, C., Higson-Smith, C. and Kagee, A. 2006. *Fundamentals of social research methods: an African perspective.* 4th ed. Lusaka: Juta.

Blignaut, R.J., Venter, I.M. and Cranfield, D.J. 2000. Fast tracking students from disadvantaged backgrounds into main stream Computer Science. *South African computer journal/Suid Afrikaanse rekenaartydskrif*, 26: 228-231 [Online]. Available WWW: http://search.sabinet.co.za. (Accessed 26 August 2008).

Bloomberg, L.D. and Volpe, M. 2008. *Completing your qualitative dissertation: a roadmap from beginning to end*. Los Ageles: SAGE.

Brown, I.T.J. 2002. Individual and technological factors affecting perceived ease of web-based learning technologies in developing countries. *The electronic journal on information systems in developing countries*, 9(5): 1-15 [Online]. Available WWW: http://www.ejisdc.org. (Accessed 01 August 2008).

Bruce, C. 2002. The U.S. National Commission on Libraries and Information Science: information literacy as a catalyst for educational change: a background paper. Prague: Czech Republic [Online]. Available WWW: http://www.nclis.gov/libinter/infolitconf&meet/paper/bruce-fullpaper.pdf. (Accessed 28 May 2009).

Callison, D. and Preddy, L. 2006. *The blue book on information age inquiry, instruction, and literacy*. Westport, Conn.: Libraries Unlimited.

Cape Peninsula University of Technology. 2008a. Extended Curriculum Programme [Online]. Available WWW: http://www.cput.ac.za/fundani/functions/curriculum/foundation.php. (Accessed 16 February 2009).

Cape Peninsula University of Technology. 2008b. Fundani: Extended Curriculum Programme: resources for Extended Curriculum Programme [Online]. Available WWW: http://www.cput.ac.za/fundani/functions/curriculum/foundation.php. (Accessed 16 February 2009).

Cresswell, J.W. and Clark, V.L.P. 2007. *Designing and conducting mixed methods research*. London: SAGE.

Cullen, R. 2001. Addressing the digital divide. *Online information review*, 25(5): 311-320 [Online]. Available WWW: http://www.emerald-library.com/ft. (Accessed 26 September 2007).

Dane, F.C. 2011. *Evaluating research: methodology for people who need to read research*. Los Angeles: SAGE .

Darch, C. and Underwood, P.G. 1999. Dirt road or yellow brick superhighway? Information and communication technology in academic libraries of South Africa. *Library hi tech*, 17(3): 285-297 [Online]. Available WWW: http://www.emeraldinsight.com/2380170308.pdf. (Accessed 06 October 2007).

De Jager, K. and Nassimbeni, M. 2002. Institutionalizing information literacy in tertiary education: lessons learned from South African programs. *Library trends*, 51(2): 167-184 [Online]. Available WWW: http://search.epnet.com. (Accessed 26 March 2010).

De Jager, K. and Nassimbeni, M. 2003. An exploration of the current status of information literacy tuition in South African tertiary institutions and proposals for curriculum design. *South African journal of libraries and information science*, 69(2): 108-113 [Online]. Available WWW: http://search.sabinet.co.za/Web2/images/ejour/liasa/liasa_v69_n2_. (Accessed 19 July 2010).

De Jager, K. and Nassimbeni, M. 2005. Information literacy and quality assurance in South African higher education institutions. *Libri*, 55: 31-38 [Online]. Available WWW: http://www.librijournal.org/pdf/2005-1pp31-38-pdf. (Accessed 19 July 2010).

Denscombe, M. 2003. *The good research guide for small-scale social research projects.* 2nd ed. Philadelphia: Open University Press.

Denscombe, M. 2007. *The good research guide for small-scale social research projects.* 3rd ed. Philadelphia: Open University Press.

Department of Basic Education (South Africa). 2011. 2011 school infrastructure report [Online]. Available WWW: http://www.education.gov.za/LinkClick.aspx?fileticket=hHaBCAerGXc%3d&tabid=358&mid=1802. (Accessed 24 June 2011).

Department of Education (South Africa). 2004. Foundation Programme grants: 2004/05 to 2006/07. Communication between Department of Education and The Vice-Chancellor of Durban Institute of Technology (currently known as Durban University of Technology), Durban, 16 February 2004.

Dunn, K. 2002. Assessing information literacy skills in the California State University: a progress report. *The journal of academic librarianship,* 28(1): 26-35 [Online]. Available WWW: http://www.emerald-library.com. (Accessed 12 August 2009).

Eisenberg, M., Lowe, C.A. and Spitzer, K.L. 2004. *Information literacy: essential skills for the information age*. Westport, Conn.: Libraries Unlimited.

Felix, C. 2002. Models of Foundation Programmes. In: *Report of the academic development seminar,* Technikon SA, 22 April 2002 [Online]. Pretoria: Technikon SA. Available WWW: http://209.85.229.132. (Accessed 02 December 2009).

Fink, A. 2009. *How to conduct surveys: a step-by-step guide*. 4th ed. Los Angeles: SAGE.

Fink, L.D. 2003. *Creating significant learning experiences: an integrated approach to designing college courses.* San Francisco: John Wiley.

Fourie, I. and Bothma, T. 2006. Addressing the digital divide in teaching information retrieval: a theoretical view on taking students from ICT access to knowledge sharing. *The electronic library*, 24(4): 469-489 [Online]. Available WWW: www.emeraldinsight.com/0264-0473.htm. (Accessed 27 July 2009).

Fowler, F.J. 2009. *Survey research methods*. 4th ed. Los Angeles: SAGE.

Hay, H.R. and Marais, F. 2004. Bridging programmes: gain, pain or all in vain. *South African journal of higher education*, 18(2): 59-75 [Online]. Available WWW: http://search.sabinet.co.za/WebZ/images/ejour/high/high_v18_n2_a4.pdf?sessionid=01-34831-1675713346&format=F. (Accessed 12 August 2009).

Hepworth, M. 2009. Developing academic information literacy for undergraduates through inquiry based learning. *ITALICS*, 8(2): 2-13 [Online]. Available WWW: http://www.lboro.ac.uk/departments/dis/people/mhepworth.html. (Accessed 12 August 2009).

Hlengwa, M. 2005. DIT's Foundation Program report. Durban: Durban Institute of Technology, Centre for Higher Education Development.

Hlengwa, M. 2006. DIT's foundation program report. Durban: Durban Institute of Technology, Centre for Higher Education Development.

Ivankova, N.V., Creswell, J.W. and Clark, V.L.P. 2007. Foundations and approaches to mixed methods research. In Maree, K. ed. *First steps in research*. pp. 253-282. Pretoria: Van Schaik.

Kennedy, G.E., Judd, T.S., Churchward, A. and Gray, K. 2008. First year students' experiences with technology: are they really digital natives? *Australasian journal of educational technology*, 24(1): 108-122 [Online]. Available WWW: http://www.citeseerx.ist.psu.edu/viewdoc/download?=10.1.1.85. (Accessed 15 September 2010).

King, N. and Horrocks, C. 2010. *Interviews in qualitative research*. Los Angeles: SAGE.

Koosimilie, A.T. 2004. Teachers' experiences with an adapted IGCSE physics syllabus in Botswana. *International journal of educational development*, 25: 209-219 [Online]. Available WWW: http://www.sciencedirect.com. (Accessed 01 December 2009).

Kuhlthau, C.C., Maniotes, L.K. and Caspari, A.K. 2007. *Guided inquiry: learning in the 21st century*. Westport: Libraries Unlimited.

Kvale, S. 2007. *Doing interviews.* London: SAGE .

Lancaster University. 2009a. *Foundation Programmes - China* [Online]. Available WWW: http://www.lancs.ac.uk/users/international/entry/foundation-china.htm. (Accessed 01 December 2009).

Lancaster University. 2009b. *Foundation Programmes - India* [Online]. Available WWW: http://www.lancs.ac.uk/users/international/entry/foundation-India.htm. (Accessed 19 April 2010).

Lancaster University. 2009c. *Foundation Programmes - Nigeria* [Online]. Available WWW: http://www.lancs.ac.uk/users/international/entry/foundation-nigeria.htm. (Accessed 01 December 2009).

Lehmann, U. and Sanders, D. 1999. E-production of doctors. *South African health review*, 187-200 [Online]. Available WWW: http://hst.org.za/uploads/files/chapter15_99.pdf. (Accessed 21 January 2010).

Lippincott, J.K. 2005. Net generation student and libraries. *Educause review: transforming education through information technology*, 1-8 [Online]. Available WWW: http://www.educause.edu/educatingthenetgen. (Accessed 08 July 2009).

Lodge, J. 2010. Communicating with first year students; so many channels but is anyone listening?: a practice report. *The international journal of the first year in higher education*, 1(1): 100-105 [Online]. Available WWW: https://www.fyhe.com.au/journal/index/intjifyhe/article. (Accessed 15 September 2010).

Machika, P. 2007. Access to success: the value of bridging programmes in engineering at the University of Johannesburg. *Journal of engineering, design and technology*, 5(2): 120-128 [Online]. Available WWW: http://www.emeraldinsight.com/1726-0531.htm. (Accessed 10 July 2010).

Mangosuthu University of Technology. 2010. South African technology network [Online]. Available WWW: http://satnonline.net/index2.php?option=com_content$do.pdf. (Accessed 26 February 2010).

Manual, K. 2002. *Teaching information literacy to Generation Y*, 195-217 [Online]. Available WWW: http://www.informaworld.com. (Accessed 25 July 2009).

Maree, K. and Pietersen, J. 2007a. The quantitative research process. In Maree, K. ed. *First steps in research*. pp. 144-153. Pretoria: Van Schaik.

Maree, K. and Pietersen, J. 2007b. Surveys and the use of questionnaires. In Maree, K. ed. *First steps in research*. pp. 154-170. Pretoria: Van Schaik.

Maree, K. and Van der Westhuizen, C. 2007. Planning a research proposal. In Maree, K. ed. *First steps in research*. pp. 23-45. Pretoria: Van Schaik.

Marshall, C. and Rossman, G.B. 2006. *Designing qualitative research*. 4th ed. Thousand Oaks: SAGE.

Michigan State University. 2009. *Extended Curriculum Programme* [Online]. Available WWW: http://www.com.msu.edu/ss/extended/overview.html. (Accessed 08 August 2009).

Mouton, J. 2001. *How to succeed in your master's and doctoral studies: a South African guide and resource book.* Pretoria: Van Schaik.

Mutula, S.M. 2005. Peculiarities of the digital divide in sub-Saharan Africa. *Program: electronic library and information systems,* 39(2): 122-138 [Online]. Available WWW: http://www.emeraldinsight.com/0033-0337.htm. (Accessed 26 September 2007).

Nieuwenhuis, J. 2007. Introducing qualitative research. In Maree, J. ed. *First steps in research.* pp. 46-68. Pretoria: Van Schaik.

Ojedokun, A.A. 2007. *Information literacy for tertiary education students in Africa.* Ibadan: Third World Information Services.

Oxford College of Marketing. 2009. Oxford College of Marketing launches a Graduate Foundation Programme. *PR Hub* [Online]. Available WWW: http://blog.taragana.com/pr/oxford-college-of-marketing-launches-a-graduate-foundation-programme. (Accessed 19 April 2010).

Pajares, F. 2007. *Elements of a proposal* [Online]. Available WWW: http://des.emory.edu/mfp/proposal.html. (Accessed 07 January 2011).

Parry, J.P. 1971. *The provision of education in England and Wales: an introductory*. London: George Allen and Unwin.

Pavlich, G. and Orkin, M. 1993. *Diversity and quality: academic development at South African tertiary institutions.* Johannesburg: CASE.

Pearsall, J. And Trumble, B. 2002. *Oxford English reference dictionary*. 2nd ed. Oxford: Oxford University Press.

Pietersen, J. and Maree, K. 2007. Standardisation of a questionnaire. In Maree, K. ed. *First steps in research*. pp. 214-223. Pretoria: Van Schaik.

Prensky, M. 2001. Digital natives, digital immigrants: part 1. *On the horizon,* 9(5): 1-6 [Online]. Available WWW: http://www.emerald-library.com. (Accessed 08 August 2008).

Rader, H.R. 2000. Library instruction and information literacy – 1999. *Reference services review,* 28(4): 378-399 [Online]. Available WWW: http://www.emerald-library.com. (Accessed 10 August 2007).

Rambharos, S. 2009. Personal communication. Durban University of Technology, Durban, 19 February 2009.

Rambharos, S. 2010. Personal communication. Durban University of Technology, Durban, 10 June 2010.

Reynolds, J. 2008. Changing from separate to a semi-integrated Foundation Programme: curriculum implications. *Education as change*, 12(1): 81-93 [Online]. Available WWW: http:search.sabinet.co.za/web2/images/ejour/edchange/edchange_v12_n1_a7.pdf? Accessed (Accessed 10 July 2010).

Richards, L. 2009. *Handling qualitative data: a practical guide.* 2nd ed. Los Angeles: SAGE.

Rippey, R.E.M. and Ryan, T. 2007. Information literacy: using information effectively in education (ISTC 201). *Robin Rippey's online research portfolio* [Online]. Available WWW: http://tiger.towson.edu/~rrippe1/research/paper.htm. (Accessed 22 August 2009).

Salinas, R. 2003. Addressing the digital divide through collection development. *Collection building*, 22(3): 131-136 [Online]. Available WWW: http://www.emeraldinsight.com/0160-4953.htm (Accessed 16 January 2009).

Sapsford, R. 2007. *Survey research*. 2nd ed. London: SAGE.

Sayed, Y. 1998. *The segregated information highway.* Cape Town: University of Cape Town Press.

Scott, I., Yeld, N. and Hendry, J. 2007. *Higher education monitor no. 6: a case for improving teaching and learning in South African higher education: research paper prepared for the Council on Higher Education*: 1-86 [Online]. Pretoria: The Council for Higher Education. Available WWW: http://www.che.ac.za. (Accessed 10 March 2010).

Silverman, D. 2010. *Doing qualitative research*. 3rd ed. Los Angeles: SAGE.

Singh, A.M. 2004. Bridging the digital divide: the role of universities in getting South Africa closer to the global information society. *South African journal of information management*, 6(2): 1-6 [Online]. Available WWW: http://www.sabinet.co.za. (Accessed 20 June 2005).

Somi, N.G. and De Jager, K. 2005. The role of academic libraries in the enhancement of information literacy: a study of Fort Hare Library. *South African journal of libraries and information science*, 71(3): 259-267 [Online]. Available WWW: http://search.sabinet.co.za/webz/images/ejour/liasa_v71_n3. (Accessed 10 July 2010).

Springer, C.D. 2009. Avoiding a tragedy: information literacy and the tragedy of the digital commons. *Library philosophy and practice 2009* [Online]. Available WWW: http://www.webpages.uidaho.edu/~mbolin/springer.htm. (Accessed 12 February 2010).

Struwig, F.W. and Stead, G.B. 2001. *Planning, designing and reporting research.* Cape Town: Pearson Education South Africa.

Swartz, E. and Foley, P. 1996. Higher education in South Africa: the skills debate. *Education + training*, 38(9): 34-40 [Online]. Available WWW: http://www.emerald-library.com. (Accessed 29 January 2009).

Terre Blanche, M. and Durrheim, K. 2006. Histories of the present: social science research in context. In Terre Blanche, M., Durrheim, K. and Painter, D. eds. *Research in practice: applied methods for social sciences*. pp. 1-17. Cape Town: UCT Press.

Tickle, L. 2009. Academic libraries are undergoing a quiet revolution: being a librarian these days is all about technology and customer service; no time to stick your nose in a book. *The guardian*, 18 August 2009, p.7.

Tinio, V.L. 2002. *ICT in education* [Online]. New York: United Nations Development Programme. Available WWW: http://www.apdip.net/publications/iespprimers/eprimer-edu.pdf. (Accessed 31 January 2011).

University of Cape Town. 2002. Business Science extended curriculum programme pays off. *Newsroom and publications: Monday* paper, 21.25, 9 September 2002 [Online]. Available WWW: http://www.uct.ac.za/mondaypaper/archives/?id=3261. (Accessed 26 October 2009).

University of Kwazulu Natal. 2010. Faculty of Science and Agriculture [Online]. South Africa: University of Kwazulu-Natal. AvailableWWW: http://www.ukzn.ac.za/students/academic-support.aspx. (Accessed 04 September 2010).

University of Limpopo. 2006. Pathways to higher education: a Ford Foundation global initiative for promoting inclusiveness in higher education [Online]. South Africa: University of Limpopo. Available WWW: http://www.pathwaystohighereducation.org/institutions/i.php?id+128 (Accessed 20 November 2009).

Wisker, G. 2001. *The postgraduate research handbook: succeed with your MA, MPhil, EdD and PhD*. New York: Palgrave.

Wood, L.A. and Lithauer, P. 2005. The 'added value' of a Foundation Programme. *South African journal of higher education*, 19(5): 1002-1019 [Online]. Available WWW: search.sabinet.co.za/web2/images/ejour/high/high_v19_n5_all.pdf? (Accessed 26 February 2010).

Appendix A

The impact of the digital divide on information literacy training of Extended Curriculum Programme students at the Durban University of Technology

Survey questionnaire for Extended Curriculum Programme students

This survey is being undertaken towards the Master of Technology in Library and Information Studies at the Durban University of Technology. The study is entitled: **The impact of the digital divide on information literacy training of Extended Curriculum Programme students at the Durban University of Technology**. The purpose of the research is to investigate what impact the digital divide has on information literacy (IL) training of ECP students at the DUT and to develop guidelines for teaching and learning of IL that will accommodate both digitally advantaged and digitally disadvantaged students. This study would benefit current and future ECP students as universities would be made aware that information literacy training must cater for a diverse student population in the IL classroom.

Please answer all questions as completely as possible and where necessary indicate your option by placing a cross (X) in the box provided. Confidentiality is assured.

1. Please indicate the Faculty in which you are registered:

Faculty	**(X)**
Faculty of Engineering and the Built Environment	
Faculty of Health Sciences	
Faculty of Applied Sciences	
Faculty of Accounting and Informatics	
Faculty of Arts and Design	
Faculty of Management Sciences	

2. Please state the programme that you are registered for:

_____

(e.g. National Diploma: Internal Auditing)

3. Are you a registered Extended Curriculum Programme (ECP) student at DUT?

ECP registration	**(X)**
Yes	
No	

4. Which year of the Extended Curriculum Programme (ECP) are you in?

Year of ECP	**(X)**
First year	
Second year	

5. Please indicate your gender:

Gender	**(X)**
Male	
Female	

6. For the purpose of this study, please indicate your race (for statistical reasons):

Race	**(X)**
African	
Coloured	
Indian	
White	
Other	

7. What type of area did you attend high school in?

Type of area	**(X)**
Urban	
Rural	
Other (Please specify)	

8. Do you believe that with regard to funding and resources, the secondary education (high school) system that you were exposed to, was:

Secondary education	**(X)**
Advantaged (well-resourced)	
Disadvantaged (under-resourced)	
Not sure	

9. Please indicate your level of experience with information and communication technologies (e.g. use of e-mail, Internet web sites, information databases, the library's iLink computer system, etc.) when you first came to DUT:

Level of experience with ICTs	**(X)**
Very experienced	
Little experience	
No experience	

10. Which of the following information and communication technologies (ICTs) do you use?

You may select more than one option.

ICTs	**(X)**
E-mail	
Internet	
Facebook	
Twitter	
Blogging	
Information databases	
None of the above	
Other (Please specify)	

11. How confident do you feel in using new technology? Please select the option that best describes your experience with new technology (e.g. e-mail, Internet, Facebook and other social networking applications, information databases, the library's iLink, etc.)

Level of confidence with new technology	**(X)**
Very confident	
Fairly confident	
Not confident	
Unsure	

12.1. Do you have access to a computer at the place where you are living while attending university?

Access to a computer	**(X)**
Yes	
No	

12.2. Do you have access to a computer with Internet connection outside of the DUT?

Access to a computer	**(X)**
Yes	
No	

12.3. If your response to question 12.2 was **Yes**, please specify where?

_____

_____

13.1. Did you use an Internet café before registering at a higher education institution such as the DUT?

Use of Internet café	**(X)**
Yes	
No	

13.2. If your response to question 13.1 was **Yes**, for what purpose did you use the Internet café?

_____

13.3. If your response to question 13.1 was **Yes**, how successful were you in finding what you searched for?

Success rate with searching	**(X)**
Very successful	
Fairly successful	
Unsuccessful	
Not sure	

14. When you began the information literacy course at the DUT, did you feel disadvantaged because of the technology being used?

Rate of disadvantage	**(X)**
Greatly	
A little bit	
Not at all	

15.1. Do you believe that the digital divide, that is, the lack of access for some people to information and communication technologies (e.g. e-mail, Internet, Facebook and other social networking applications, information databases, etc.) has an impact on their information literacy training at a higher education institution?

Level of disagreement/agreement	**(X)**
Strongly disagree	
Disagree	
Unsure	
Agree	
Strongly agree	

15.2. Explain your response to question 15.1.

_____

_____

_____

16. How confident are you with using different aspects of the computer and other ICT applications:

Aspects of the computer/ICT applications	Level of confidence			
	Very confident	Fairly confident	Not confident	Unsure
Parts of the computer (e.g. the keyboard, mouse, function keys, etc.)				
Word processing software to type out assignments, letters, etc.				
Social networking applications (e.g. Facebook, Twitter, Blogs, etc.) available via the Internet.				
Searching the Internet, information databases, the library's iLink, etc.				

17. In what way does the digital divide (that is, the lack of access for some to ICTs) impact on the information literacy training that you receive? **You may select more than one option.**

Impact of the digital divide	**(X)**
It is difficult to follow the online lessons because of my lack of familiarity with the technology being used	
I do not know how to navigate (move around) the Internet	
I do not have keyboard skills	
I do not have mouse skills	
Most computer terminologies are new to me	
Not applicable	
Other (Please specify)	

18. Have you attended the computer training that is offered to ECP students?

Attendance	**(X)**
Yes	
No	

19.1. Would you recommend that technologically disadvantaged students (those with little or no previous access to ICTs) be exposed to the computer literacy module of the ECP **before** attending the information literacy module?

Level of disagreement/agreement	**(X)**
Strongly disagree	
Disagree	
Unsure	
Agree	
Strongly agree	

19.2. Explain your response to question 19.1.

_____

_____

_____

19.3. Would you recommend that technologically disadvantaged students (those with little or no previous access to ICTs) be exposed to the computer literacy module of the ECP **at the same time while** attending the information literacy module?

Level of disagreement/agreement	**(X)**
Strongly disagree	
Disagree	
Unsure	
Agree	
Strongly agree	

19.4. Explain your response to question 19.3.

_____
_____
_____

20. There are many creative teaching and learning methods that exist. Do you think that librarians should use these creative teaching and learning methods in delivering information literacy training in order to accommodate both technologically advantaged and technologically disadvantaged students attending the information literacy module of the ECP?

Level of disagreement/agreement	**(X)**
Strongly disagree	
Disagree	
Unsure	
Agree	
Strongly agree	

21.1. Which teaching and learning method/s would you prefer for the information literacy module? **You may select more than one option.**

Teaching and learning methods	**(X)**
Chalk and talk (Traditional teaching)	
Playing games (This could include role playing where play settings representing the real world assist learners to develop strategies that apply to the real world, or it could include learning in the form of doing puzzles, etc.)	
Online tutorials (These tutorials are available online, via a computer. The tutorials give the learner step-by-step instructions which allow one to work at one's own pace, learning as one goes along.)	
Interactive websites (Here clear online instructions are given to learners. Learners are prompted and corrected as they work through the website.)	
Peer-learning (Learning from friends or class-mates.)	
Group work (Working in a group and learning and sharing with each other.)	
Social networks (Using Facebook, Twitter, Blogs, etc. as learning spaces to interact with your lecturer, fellow-students or librarian.)	
Combination of the above methods	
Other (Please specify)	

21.2. Explain your preference for the methods you selected in Question 21.1.

_____

_____

_____

_____

22. Which of the following methods do you think accommodates both technologically advantaged and technologically disadvantaged students attending information literacy training? **You may select more than one option.**

Teaching and learning methods	**(X)**
Chalk and talk (Traditional teaching)	
Playing games (This could include role playing where play settings representing the real world assist learners to develop strategies that apply to the real world, or it could include learning in the form of doing puzzles, etc.)	
Online tutorials (These tutorials are available online, via a computer. The tutorials give the learner step-by-step instructions which allow one to work at one's own pace, learning as one goes along.)	
Interactive websites (Here clear online instructions are given to learners. Learners are prompted and corrected as they work through the website.)	
Peer-learning (Learning from friends or class-mates.)	
Group work (Working in a group and learning and sharing with each other.)	
Social networks (Using Facebook, Twitter, Blogs, etc. as learning spaces to interact with your lecturer, fellow-students or librarian.)	
Combination of the above methods	
Other (Please specify)	

Thank you for your time and effort in contributing to this study by completing this questionnaire. Please hand your completed questionnaire to the researcher when you have finished.

Segarani Naidoo (Mrs)
Subject Librarian: Health Sciences
DUT Libraries
Durban University of Technology
E-mail: naidoose@dut.ac.za
Tel.: 031 3732500

Appendix B

Consent Form

The impact of the digital divide on information literacy training of Extended Curriculum Programme (ECP) students at the Durban University of Technology

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

Dear Subject Librarian/ECP Coordinator
I am currently engaged in research towards my MTech: Library and Information Studies. My topic is: "The impact of the digital divide on information literacy (IL) training of ECP students at the Durban University of Technology". I have decided to use interview schedules to obtain the data needed for the above-mentioned research.

Having been asked to participate in this study, I, _____
give consent to Segarani Naidoo to Interview me during the period of May 2010. I understand that the research information gathered will be treated confidentially, anonymously and that participation is voluntary and maybe withdrawn at any time. I agree to participate by: answering questions and offering opinions regarding the above topic. I also give permission to record the data by the use of a Dictaphone to ensure that valuable data is not lost.

Yours sincerely

_____
Segarani Naidoo
E-mail: naidoose@dut.ac.za

Appendix C

The impact of the digital divide on information literacy training of Extended Curriculum Programme students at the Durban University of Technology

Subject Librarian Interview Schedule

1. What is your designation?

2. What is your highest academic qualification?

3. How many years of experience do you have as a Subject Librarian (both here at DUT and elsewhere)?

4. For how many years have you been involved with the Extended Curriculum Programme (ECP) at DUT?

5. What is your understanding of the concept of the 'digital divide'?

6. Do you believe that the South African school education system has created a digital divide that impacts on students' performance at tertiary level? Please explain.

7. Do you believe that the digital divide has an impact on information literacy (IL) training at the tertiary level? Please elaborate in terms of your experience with the digital divide in the classroom.
   Prompt: In what ways do the digital divide impact on IL training?

8. Do you think that IL should be delivered differently from the way it is currently being delivered at DUT in order to accommodate the digital divide?

9. **The objective of IL training is to ensure that students are able to recognise the need for information, locate and retrieve information, evaluate information and use information responsibly.**

   Currently students in the IL classroom form a heterogeneous group, including both digitally advantaged students and digitally disadvantaged students. Do you believe that in such a situation the objective of IL training (as explained) is being met? Please explain.

10. The current emphasis in higher education is on active student-centred learning. Do you think that with the current heterogeneous student population participating in information literacy training, this goal is realistic? Please explain.

11. Many of the current lesson plans in the IL module include online training. Please summarise your experience of the impact of the digital divide on IL training in the lessons that include online training.

12. Would you recommend that the library incorporate more technology (online tutorials, computer-aided learning, etc.) into IL training rather than having the current situation where the majority of lessons are chalk and talk? Please explain.

13. Would you suggest that all digitally disadvantaged, first year students be exposed to a computer literacy course before the IL module or concurrently with the IL module? Please explain.

14. Considering the heterogeneous nature of the IL classroom, which of the following methods of teaching and learning would you recommend for the IL module of the ECP at DUT? Please provide an explanation as to why you would recommend or not recommend each of the following:

Teaching and learning methods
Chalk and talk (Traditional teaching)
Playing games (This could include role playing where play settings representing the real world assist learners to develop strategies that apply to the real world, or it could include learning in the form of doing puzzles, etc.)
Online tutorials (These tutorials are available online, via a computer. The tutorials give the learner step-by-step instructions which allow one to work at one's own pace, learning as one goes along.)
Interactive websites (Here clear online instructions are given to learners. Learners are prompted and corrected as they work through the website.)
Peer-learning (Learning from friends or class-mates.)
Group work (Working in a group and learning and sharing with each other.)
Social networks (Using Facebook, Twitter, Blogs, etc. as learning spaces to interact with lecturers, fellow-students or librarian.)
Combination of the above methods
Other Please specify

Prompt: Are there any other teaching and learning methods you would like to recommend for the delivery of IL training to a diverse group of students?

15. Are there recommendations that you would like to make to improve the IL offering with regard to the digital divide?

16. Are there any other comments that you would like to make with regard to the issues raised in this interview?

Thank you for your time and effort in contributing to this study.

Appendix D

The impact of the digital divide on information literacy training of Extended Curriculum Programme students at the Durban University of Technology

Extended Curriculum Programme Coordinator Interview Schedule

1. What is your designation?

2. What are your academic qualifications relating to your role as an ECP Coordinator?

3. Since when (which year) have you been the ECP Coordinator at the DUT?

4. Outside of your current role as ECP Coordinator do you have other experience relating to ECP coordination?

5. What is your understanding of the concept of the 'digital divide'?

6. Do you believe that the South African school education system has created a digital divide that impacts on students' performance at tertiary level? Please explain.

7. Do you believe that the digital divide has an impact on information literacy (IL) training at the tertiary level? Please elaborate in terms of your experience with the digital divide in the Extended Curriculum Programme (ECP).
   Prompt: In what ways do the digital divide impact on IL training?

8. Do you think that IL should be delivered differently from the way it is currently being delivered at the DUT in order to accommodate the digital divide?

9. **The objective of IL training is to ensure that students are able to recognise the need for information, locate and retrieve information, evaluate information and use information responsibly.**

   Currently students in the IL classroom form a heterogeneous group, including both digitally advantaged students and digitally disadvantaged students. Do you believe that in such a situation the objective of IL training (as explained) is being met? Please explain.

10. The current emphasis in higher education is on active student-centred learning. Do you think that with the current heterogeneous student population participating in information literacy training, this goal is realistic? Please explain.

11. Would you recommend that the library incorporate more technology (online tutorials, computer-aided learning, etc.) into IL training rather than having the current situation where the majority of the lessons are chalk and talk? Please explain.

12. Would you suggest that all digitally disadvantaged, first year students be exposed to a computer literacy course before the IL module or concurrently with the IL module? Please explain.

13. There are many innovative methods that may be used in the teaching and learning of IL. Drawing from your experience with ECP, what methods would you recommend to bridge the digital divide in a heterogeneous IL classroom?
***(Prompt the respondent with methods (e.g. online tutorials, educational games, interactive websites, etc.) if these are not forthcoming and try to draw out her views on the use of each of these methods in IL training**.)*

14. In view of the diversity of students attending the IL module of the ECP arising from the digital divide, are there any particular pedagogical approaches that you would recommend in the delivery of IL training?

15. Are there any other comments that you would like to make with regard to the issues raised in this interview?

Thank you for your time and effort in contributing to this study.