Analysing electronic theses and dissertations (ETDs) in South Africa.

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Abstract

The knowledge and experience contained within theses and dissertations (TDs) of academics is generally available in paperbound formats, and obtaining these formats is often a lengthy and sometimes expensive process, leading to restrictive access, especially for institutions with limited research budgets.

The emergence of electronic publishing and the global trend toward accessing and sharing digital content on the Internet has led to a greater electronic dissemination of post-graduate academic TDs. These electronic theses and dissertations (ETDs) provide a reservoir of knowledge which can easily be accessed by the international research community and diffused across all fields of research.

Seventy three percent (73%) of the study's e-survey participants found obtaining research material online more efficient than using paperbound sources. Fifty one percent (51%) were familiar with the concept of ETDs. Eighty seven percent (87%) of the sample agreed that adding theses and dissertations to an online database would improve the accessibility and use of this research, while sixty five percent (65%) indicated that they would not have any reservations with adding their TD to an online database. Forty eight percent (48%) thought that ETDs should be introduced to their tertiary institutions.

1. Introduction

According to Figueres (2003:xi), the information revolution has globally affected the manner in which institutions and organizations do business and the daily lives of those with access to information and communication technologies (ICTs). He acknowledges that ICTs offer a remarkable opportunity and set of tools for achieving progress in the broad spectrum of development challenges facing Africa, including the promotion of its intellectual resources, which Ubogu (2003:70) addresses as having been a problem for many years.

The website titled: Africa on the Internet. Starting Points for Policy Information (2004) addresses this by stating that within tertiary institutions, organizations and countries; failure to make use of the Internet [in all aspects of communication] may result in accelerated and increased marginalization within the 21st century. The Global e-Schools community initiative website (2004) states that in a learning environment, spreading ICTs required for digital information processing may improve the productivity of teachers and administrators, extend education and research to hard-to-reach places and provide students with access to content and tools that enhance learning - more efficiently and at a lower cost than existing traditional methods (Global e-Schools community: 2004).

For academic researchers, an essential component is the dissemination of findings arising from their research. This communication of information is hoped to benefit all individuals to whom the research is addressed whilst giving intellectual recognition to the researcher through publication. Traditional dissemination of academic research has primarily been through paper bound theses and dissertations (TDs), and the publication of peer-reviewed manuscripts in journals. Unfortunately, according to Schweig et al (2001), this process often delays the release of important information for several months, often even years, and access to full articles is restricted to journal subscribers, thereby reaching a relatively limited audience. In tackling this, many scientific organizations send out newsletters or use other mechanisms to fast-track important news events or time-based results (Schweig et al: 2001).

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2. Problem Statement and motivation

The wealth of knowledge and experience contained within theses and dissertations (TDs) of academics is generally available in paperbound formats or as microfilm or microfiche.
Obtaining these formats takes time and money, leading to limited access, especially in institutions with fewer resources available to researchers.

In Mersham *et al's* (1995:55) graphic communication model, one of the vital processes occurs when the communicator places his or her ideas in the model's central position (see fig. 1), viz. the message. In order for the communicator to transfer thoughts, information, feelings and attitudes, Mersham argues that he/she needs to manifest them in some concrete form, without which they remain 'inner thoughts' and not shared communication perceptible though some or other medium. He also argues, following McLuhan, that the medium shapes the message. Thus the centrality of the message and its form (the medium in which it is encoded) are important considerations in the communication of research.

Lawrence (2001) states that improvements in the accessibility of scientific literature, such as allowing scientists to locate relevant research within certain timeframes, has the potential to dramatically improve communication and progress in science. Through the World Wide Web, present-day scientists have increasingly convenient access to an expanding amount of literature that previously required trips to the library, was subject to inter-library loan delays, or required substantial effort in source location (Lawrence: 2001).

According to Kling and McKim (1999:2) electronic publishing opportunities exist today in a variety of electronic journals and Web based collections.

Bowers (2003) observes that there is not a single aspect of communication that has not been significantly affected by the Internet, including the ease of information access, the reduced cost of access, the increased number of interactions across space and time between people, and the overall potential scale of communication.

Fox (2001: 14) contends that preparing ETDs would allow a new generation of post-graduates to present their research results in a manner most suitable to them in form, structure, and content, all of which would continuously be re-defined as technology and student knowledge evolve.

The emergence of electronic publishing, the global trend towards accessing and sharing digital content on the Internet, and the growth in the number of technologically literate people, has led to a greater electronic dissemination of post-graduate academic theses and dissertations. Hosted in digital libraries, ETDs provide a reservoir of knowledge which provide easy access for the international research community and are diffused across all fields of research. The question this poses is: "Which South African tertiary institutions are participating in this global trend, and what is the nature and extent of this participation?" The information and communication aspects of this question form the basis of this research.

3. Review of related studies

3.1 What is an ETD

According to Fox (2001:12), there are two types of ETDs. He describes the first as created using software applications such as Microsoft Word or Star Office, formats which are then converted to Portable Document Format (PDF) or Extensible Markup Language (XML); documents whose standards allow for easy preservation, archiving and accessibility. Metadata consisting of the title, year, author, abstract, and descriptors is catalogued, indexed and hosted in digital libraries for those interested in browsing and locating full text based electronic documents and/or possible multimedia components such as images, video, music or websites (Fox; 2001:12).

The second type of ETD, according to Fox (2001:12), is compiled using scanned electronic images of paper theses or dissertations. These are less desirable than the former, as full text searches are not possible, and more storage space is necessary to host large image formats. However, they can still be accessed through networks at low cost and printed for those interested in reading them. As before, Metadata may also be catalogued, indexed and hosted in digital libraries for those interested in browsing and locating scanned thesis' or dissertations (Fox; 2001:12).

3.2. Historical Overview

In his article, Fox (200 how the concept of ETDs was first discussed at a meeting in the United States in Michigan in 1987, arranged by the University of Microfilms (later known as UMI), and attended by representatives of Virginia Tech, University of Michigan, SoftQuad, and ArborText. The Southeastern Universities Research Association (SURA) funded the first pilot project in 1996, which was led by a team at Virginia Tech. As the idea of ETDs spread to other countries, the Networked Digital Library of Theses and Dissertations (NDLTD), an international non-profit educational organization, was established to co-ordinate and network collections of ETDs. According to Fox (2001:38-39), since the first annual meeting in 1998, the interest in ETDs has grown considerably. Currently there are two hundred and fifty six (256) institutional members, with four (4) South African entries, namely Rhodes University, University of Witwatersrand, University of the Free State and University of Pretoria (NDLTD website: 2005)

In Africa, the Association of African Universities (AAU) implemented the database of African theses and dissertations (DATAD) pilot project from February 2000 to September 2003 (DATAD; 2003:4).
According to the final report, the project aimed to expose the research output of higher education institutions in Africa to a global research community. The report further stated that graduate theses and dissertations completed in African institutions are rarely indexed in major databases and do not feature much in international literature. As a result, graduate research and findings have received little recognition (DATAD; 2003:5). A different scenario exists in developed countries, where graduate theses and dissertations are well preserved and indexed, and scholars and students worldwide have relatively easy access to them in both print and digital formats (DATAD; 2003:5). The AAU recognized that the digital communication revolution could provide an accessible, well-documented source of information on African theses and dissertations through the DATAD project. Subsequently its members have begun to come to terms with this challenge (DATAD; 2003:5).

According to its website, Rhodes University investigated the holding of electronic copies of theses and dissertations during the course of 1996. After considering several options the Senate, in April 1997, approved the option of requesting both print and digital copies of student theses. Rhodes was invited to join the Networked Digital Library of Theses and Dissertations (NDLTD) Initiative, which the University duly did in May 1997 (Rhodes University; 2005).

he University of Pretoria's website states that its UPeTD initiative was launched in July 2000, the objective being to create necessary infrastructure and obtain resources that presently allow post-graduate students to publish their theses or dissertations on the Internet in a well managed environment, enabling access to the international research community. UPeTD supports open access and also forms part of the Networked Digital Library of Theses and Dissertations (NDLTD) (University of Pretoria; 2005).

The University of the Witwatersrand held a national ETD workshop on the 16th and 17th of October, 2003 and examined various issues that could result in the successful implementation of institutional as well as national ETD programmes (ETD Pilot Project, Final Report: 2004). General Rules of the University now require every post-graduate student to submit two final, corrected copies of the dissertation, research report or thesis in print as well as a final, corrected copy in electronic format. The availability of Wits theses and dissertations electronically will undoubtedly lead to an increased visibility of the institution internationally (University of Witwatersrand; 2005).

3.3. Perceived Benefits of ETDs

Four perceived benefits of ETDs were identified in the literature reviewed:

1. Minimize duplication

One of the arguments of ETD advocates is that ETDs aid the process of searching for completed research and therefore prevent the duplication of unnecessary research efforts.
Garfield (1994) stresses that scientists should get into the habit of searching for literature in order to avoid the accidental duplication of research and the wasted time, effort, and expense this involves.

2. Improve accessibility and visibility

Fox (2001:32) states that access to ETDs may be the only option for those in developing countries who cannot: afford to make purchases of TDs, wait for the expensive delivery of copies through inter library

loans, attend numerous conferences demanding considerable travel expenses, and cannot subscribe to expensive journals that sometimes only have short summaries of thesis or dissertation results.

Sawyerr in Ubugo (2001:250) states that Africa needs to improve the accessibility and visibility of its intellectual dissertations.

3. Improvement of research publication timeframes

According to Sheth et al (1999), speed and distribution characterize every aspect of most business and organizational undertakings in this millennium. Organizations are challenged to deliver products and services at an increasing pace in the global market.
The question is therefore whether institutions of higher learning will or should respond to this need for faster research and distribution of research findings by incorporating ETDs.

Fox (2001:18) observes that ETDs can be managed through automated procedures, thus taking advantage of modern networked information systems. He (2001:18) observes that this speeds up submission checking and cataloging, eliminates moving and handling paper copies, and removes delays in binding. He adds that the time between submission and graduation may be reduced, and ETDs can be made available for access within days or weeks as opposed to months.

4. Cost benefits

Kling and McKim (1999:11) state that posting a document on an unrestricted site on the Web potentially expands the document's readership to millions of people at little or no marginal cost.

Fox (2001:16) predicts that with a globally accessible collection of ETDs, students could quickly search for information related to their interest from anywhere in the world, and in most cases, access and benefit from these studies without incurring any cost. He (2001:19) expands on these cost benefits when he states that ETD submission over networks has no cost, which compares favourably with high charges otherwise required to print, copy, or publish TDs using paper or other media forms.

3.4. Perceived Controversies of ETDs

Four perceived controversies of ETDs were identified in the literature reviewed:

1. ETD formats and content coding

Matthews and Wiggins (2001:41) state: "*Standards must address more than markup and metadata: they must address format issues. Otherwise, a future scholar might retrieve a thesis via virtual interlibrary loan only to find that none of the content can be deciphered due to format obsolescence*."

Mersham's (1992) graphic communication model, employed in this study, draws attention to the process of coding and decoding the content or message incurred during the communication process.
Coding can be differentiated according to two levels. The first level constitutes linguistic codes or languages such as English, Afrikaans or Zulu. The second level involves technical encoding. This brings into focus the type of software and formats used to 'encode' the 'message' (research).

2. Plagiarism

Guédon (2001:93) states that because many people tend to think that digitized TDs are easily copied in part or in whole, they are more susceptible to plagiarism, and therefore the assumption is that it is better to keep TDs offline.
Guédon (2001:93) however, argues to the contrary:

> *"…the invention of the Philosophical Transactions (1665) by Henry Oldenburg, the Secretary to the Royal Society in London, was motivated by the issue of intellectual property. Oldenburg reasoned that if the research results of Scientist X. were printed in a journal (after being certified as being of good quality and original) and that journal was made widely available through the multiplication of copies, then Scientist. X would have a better chance to lay ownership claims than if he/she held back these results. By apparently giving away the results of his/her work, a scientist ensures his/her intellectual property most effectively. The ability to compare new results to already published work makes plagiarism a very risky business at best."*

3. Technology and implementation

According to the Wits ETD Pilot Project's final report (2004:1), the concept of digital libraries is no longer new. However, many institutions were said to lack the financial resources necessary to implement an ETD project.

The report (2004:2) exposed much enthusiasm for the archiving and dissemination of ETDs, branding it a solution that would work well within the context of African universities, which have always had fewer resources than their non-African counterparts.

The report (2004:2) foresees that with support from institutions, national bodies and international agencies; digital libraries and ETDs are poised to make a significant impact on tertiary education in Africa.

4. Prior publication

Dalton (2001:3) notes that one of the most important issues identified at the second Symposium on Electronic Theses and Dissertations in May of 1999 in Virginia was the level of awareness and acceptance of electronically distributed dissertations by the scholarly publishing community and the question of prior publication, where derivative articles or portions of research were being submitted for publication to journals.

The following question regarding prior-publication was obtained from the University of Kentucky's UK-ETD website containing Frequently Asked Questions: "*Should I submit an ETD if I want to publish my thesis later?*" The website states this as an often cited reason behind why students do not want to submit an ETD. The website goes on to quote McMillan (2001), who found that eighty six percent (86%) of publishers surveyed did not consider an ETD "prior publication" (University of Kentucky; 2006).

3.5. Models and life-cycles

In order to provide a theoretical foundation for the study, a development communication model was used heuristically to discuss different aspects of communication in a systematic way with regard to Harper's (2004) ETD life-cycle. The study also used Hackos's (2002) explanation in Gilbane's report as to why designing a carefully planned information model is a significant component of a content management strategy for Dynamic Web Delivery, which we assumed would apply to ETDs.

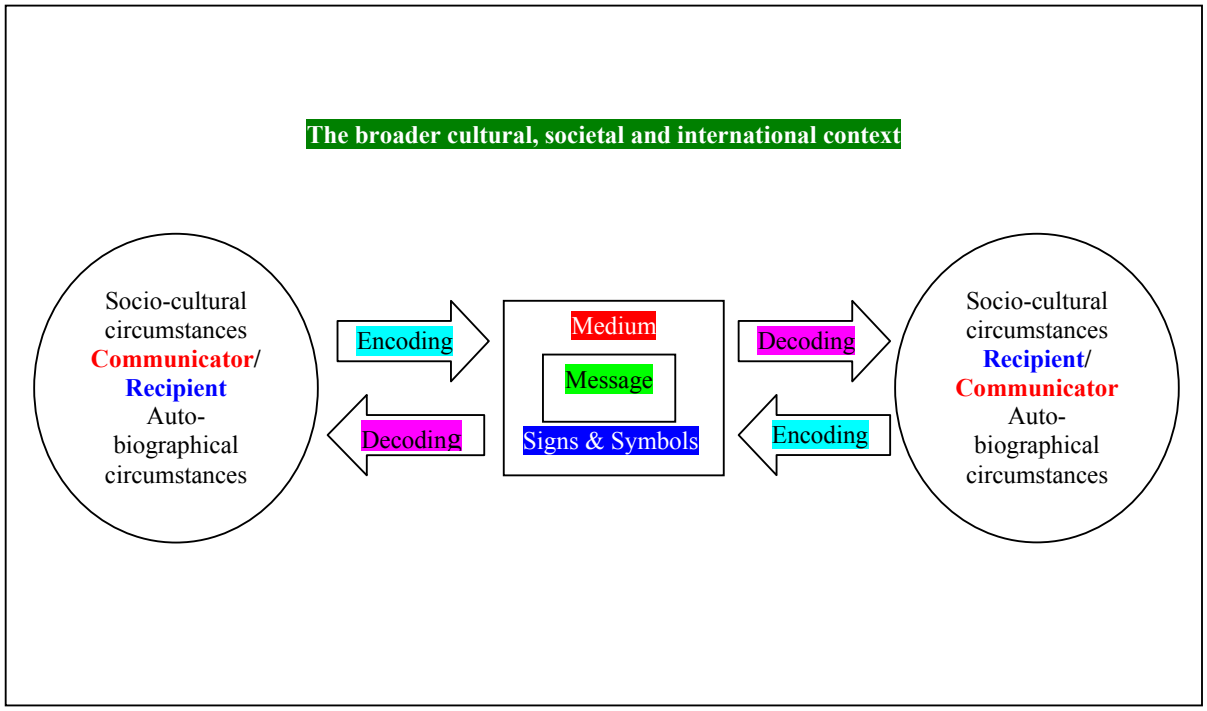

Figure 1 Mersham's Graphic Communication model.

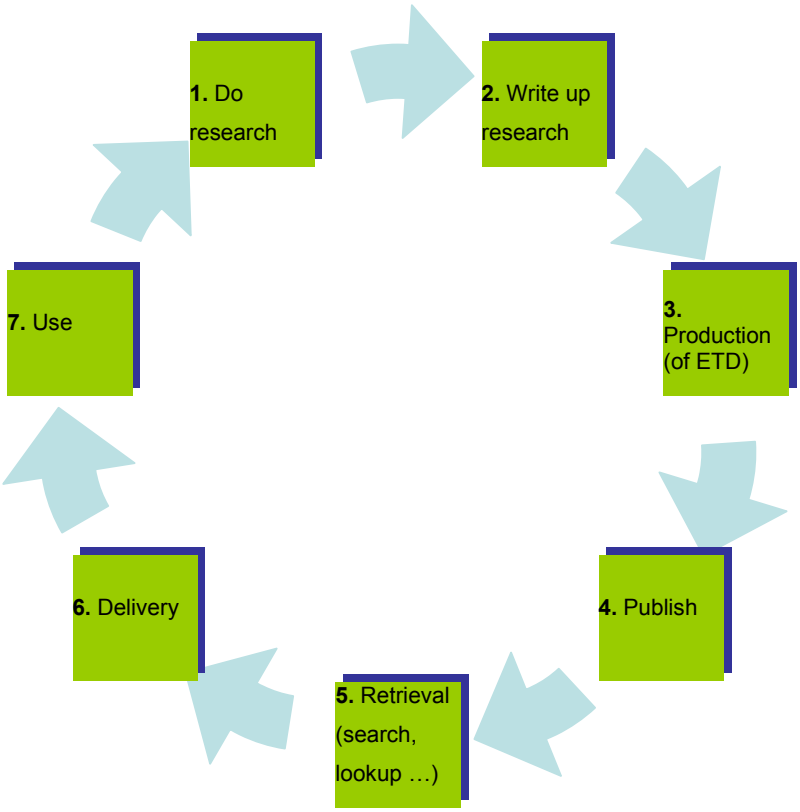

Figure 2 Harper's proposed life-cycle of an ETD.

In step one of figure 2 the researcher/communicator conducts research using various information sources, including online databases and the Web. In step two the communicator uses the prescribed software applications to write up, analyse and present his / her research. In Mersham's (1995:55) communication model this is presented as encoding the message. Step 3 can be seen as the conversion to PDF or other acceptable formats prior to cataloguing and online publication , represented as step four in figure 2, This constitutes the medium of the message which, for ETDs, is the Internet. The recipient(s) within Mersham's (1995:55) communication model now search or lookup ETDs through a web interface in step five of figure 2, while the delivery of the message or ETD in step six constitutes the web server hosting the ETDs providing the download. The recipient(s) will then use the research in step seven by linguistically decoding the message and using appropriate software applications.

According to Hackos (2002:2) in the Gilbane Report (2002), an information model provides the structure for organizing one's content in a manner that can be delivered and reused in a variety of innovative ways, which enhances search and retrieval, and makes it possible for authors and users to find the information resources they need promptly and easily.

Hackos (2002:2) states that the information model is the ultimate content-management tool, one that requires analysis, careful planning, and a lot of feedback from the user community in its creation, thus ensuring that their points of view are taken into account. Hackos (2002:3) explains that the information model is an organizational framework used to categorize the information resources on which to base the publishing design for both print and electronic information delivery.

Hackos (2002:3) goes on to describe a three-tiered structure for the Information model. The base consists of metadata dimensions that identify how information will be categorized and labeled for both internal and external use (Hackos; 2002:3). The second tier sorts information assets into information types (Hackos; 2002:3). The third tier provides structure for each information type, outlining the content units that authors use to build information types (Hackos; 2002:3). Figure 3 below illustrates the three-tiered structure.

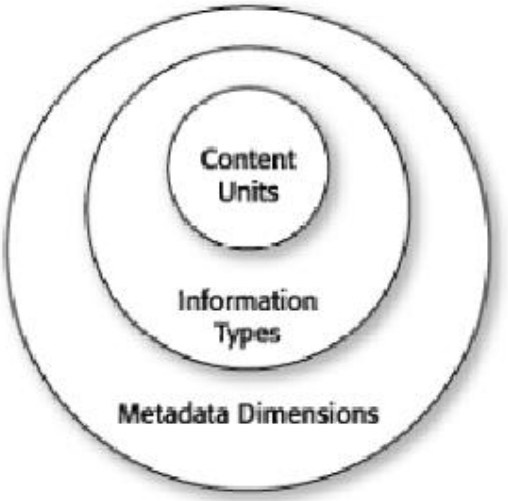

Figure 3 Hackos's Information Model

Hackos (2002:4) explains that the metadata dimensions identified as the foundation of the information model become the attributes and values of the metadata used to label the messages in the archive.
According to a report by the Online Computer Library Center, Inc Working Group (2002:4), preservation metadata constitutes information necessary to practically render digital resources over a long-term period. Creating accurate preservation metadata allows straightforward access to digital resources, thereby providing an understanding of the appropriate software applications designed to render the different archived resources.

Hackos (2002:4) further explains that information types should provide communicators with a starting point for creating well-structured messages which represent a particular purpose in communicating information, and content units should describe the content that is used to construct each information type. For example, TDs have recommended structures for disseminating research in great detail, while articles for journals have recommended structures for a more condensed dissemination of the same research; a table of contents in the TD describes the content units of the study.

4. Method

Leedy (1989:140) states that we learn truth through careful observation, and the descriptive survey or normative survey method of research describes exactly what the researcher concludes after examining survey data (Notes: review sentence). According to Leedy (1989:140), 'normative' implies that whatever we observe in the present moment is normal, and that under the same conditions in the future, could be observed again. Leedy (1989:140) explains that the basic assumption underlying this approach is that given phenomena follow a common pattern, or norm. However, he (1989:141) reminds us of the wisdom of Heraclitus who stated: '*There is nothing permanent but change*'. Norms today will not be norms in the future, especially within the context of the ever changing world of ICTs, and the different ways we could potentially make use of them.

Leedy (1989:141) defines survey as to "*look or see over or beyond*", emphasizing that in research we have many ways of seeing that have nothing to do with physical vision.

According to Shannon et al (2002), the Internet has had a great impact on the field of survey research and the number of electronically–administered surveys continues to grow.

Quantitative and qualitative data was collected via an electronic survey (e-survey). The target audience consisted of academics, postgraduate students, librarians and information technology specialists working and studying in South African tertiary education institutions. Using descriptive statistics we used graphs and tables to summarize the quantitative data obtained (Wikipedia: 2006). This paper will not disseminate the qualitative data obtained.

An e-survey was posted on the World Wide Web (WWW). The survey instrument was made up of the respondents' demographic information, and thirty one questions with a variety of response options, including drop down menus, check boxes, and radio buttons for close-ended responses and text boxes for optional open-ended feedback. The questions were chosen to solicit the respondents demographic information, their academic field of research and experience, their sources of reference or research material , the software being used in their recording, analysis and presentation of their post-grad work and or research, their general perceptions and reservations of ETDs, and whether their institutions accepted this TD format. The final part of the survey allowed the respondents to optionally give personal information, add additional comments and request notification once the results of the study were published.

The participants were identified by published email addresses within their tertiary institutions or departmental websites. Email lists were compiled in Microsoft Excel and saved in a comma delimited format, then imported into Outlook Express's address book. A total of six thousand one hundred and sixty six (6166) email addresses were obtained and added to the survey's address book. From the 17th of October 2005 to the 7th of November 2005, potential respondents were sent an e-mail message with a cover letter requesting their participation and a link to the survey instrument which was published at the following URL: http://wwww.lis.uzulu.ac.za/etd/survey. From the total of six thousand one hundred and sixty six (6166) emails sent, one thousand two hundred and eighty five (1285) were returned undelivered, and four hundred and twenty two (422) responses were received. Of these, twenty three (23) were duplicate submissions. Upon subtracting these undelivered emails (1285) from the overall sample (6166), and the duplicates from the overall submissions, a response rate of eight percent (8.2%) was obtained (i.e. 401 out of 4881).

Leedy (1989:152) states that sampling is divided into two major categories: non-probability sampling and probability sampling. He (1989:152) warns that in non-probability sampling there is no way to predict, estimate or guarantee that each element in the population will be represented in the sample. It was recognized that due to non-probability convenience sampling, a correlation in some cases between the recipients' interest and awareness in ETDs, and their willingness to participate in the survey, could introduce bias in support of ETDs into the results. Another shortfall of this sampling technique would be an imbalanced representation of individuals in the population for whom email and e-surveys would not constitute a preferred method of communication for survey research, hence lack of participation would introduce bias in the data gained, since the opinions of this sample of the population would be excluded from the study (Hill; 1998).

According to Hill (1998), the calculation of an appropriate sample size generally depends on the size of the population in question. However researchers using e-surveys generally cannot find out, nor even estimate the size of the population they are studying. Krejcie & Morgan (1970) in Hill (1998) calculate that as the population increases, the sample size increases at a diminishing rate and eventually remains constant at a point above three hundred and eighty (380) cases, thus they state that there is little to merit the cost and energy of sampling above this figure. According to Hill (1998), Alreck and Settle (1995) provide similar evidence.

5. Results

5.1 Sample and demographics

Four hundred and one (401) participants took part in this survey from twenty two (22) different tertiary institutions in South Africa (see table 1).

Most participants selected as occupation that of faculty member (51%), then researcher (20%), post-grad student (17%), librarian (5%), IT specialist (4%) and the remaining twenty, or four percent (4%), originated from administrative posts and positions in the Department of Education.

Of the seventy six percent (76.6%) of 398 participants that answered the question, three had post-graduate degrees while four percent (4.3%) did not. Nineteen percent (19.1 %) were still in the process of obtaining post-graduate degrees.
Ninety percent (90%) of the participants were South African, and about ten percent (9.5%) were from other countries.

Fifty one percent (51%) were male, and forty eight percent (48%) female. Sixty eight percent (68%) of the participants were White, eighteen percent (18%) Black, six percent (6%) Coloured, four percent (4%) Indian and two percent (2%) Asian.

Forty four percent (44%) stated that their home language was English, while thirty seven (37%) percent stated that it was Afrikaans, sixteen percent (16%) was made up of a combination of IsiNdebele (0.7%), IsiXhosa (2.7%), IsiZulu (4.2%), Sepedi (2.7%), Sesotho (2.0%), Setswana (1.2%), SiSwati (0.5%), Tshivenda (1.5%) and Xitsonga (0.5%).

Table 1 Number of participants from different South African tertiary institutions.

		Frequency	Percent
Valid	Cape Peninsula University of Technology (CPUT)	11	2.7
	Central University of Technology (CUT)	8	2.0
	Durban Institute of Technology (DIT)	17	4.2
	Monash University	1	.2
	Nelson Mandela Metropolitan University	6	1.5
	North-West University (NWU)	23	5.7
	Pretoria University (Tuks)	14	3.5
	Rhodes University	25	6.2
	Tshwane University of Technology (TUT)	10	2.5
	University of Cape Town (UCT)	33	8.2
	University of Fort Hare (UFH)	1	.2
	University of Johannesburg	31	7.7
	University of KwaZulu-Natal (UKZN)	14	3.5
	University of Limpopo (UL)	24	6.0
	University of the Free State (UFS)	58	14.5
	University of South Africa (UNISA)	26	6.5
	University of Stellenbosch (US)	5	1.2
	University of Venda for Science and Technology (UNIVEN)	4	1.0
	University of the Western Cape (UWC)	15	3.7
	University of Witwatersrand (Wits)	30	7.5
	University of Zululand	32	8.0
	Walter Sisulu University (WSU)	6	1.5
	Total	394	98.3
Missing	No answer	3	.7
	Other	4	1.0
	Total	7	1.7
Total		401	100.0

5.2. Research sources

Ninety two percent (92%) of the participants have made use of online databases to obtain research material. Seventy three percent (73%) found obtaining research material from online databases more efficient than from paperbound journals.

Seventy three percent (73%) found online databases search functions easy to use, while eighteen percent (18%) said they found them difficult.

Almost the entire sample (98%) had used internet searches to find research material, with eighty nine percent (89%) finding this method of searching for material efficient.

Sixty eight percent (68%) said they found relevant material most of the time, while eighteen percent (18%) said they found the material all the time. Ten percent (10%) said they seldom found relevant material and only three percent (3%) of the participants said they never found relevant material.

5.3. Perceptions of ETDs

Fifty one percent (51%) of the participants of this study were familiar with the concept of ETDs (see figure 4). Forty two percent (42%) had actually browsed through digital libraries hosting ETDs, and only twenty three percent (23%) had browsed through South African ETD collections.

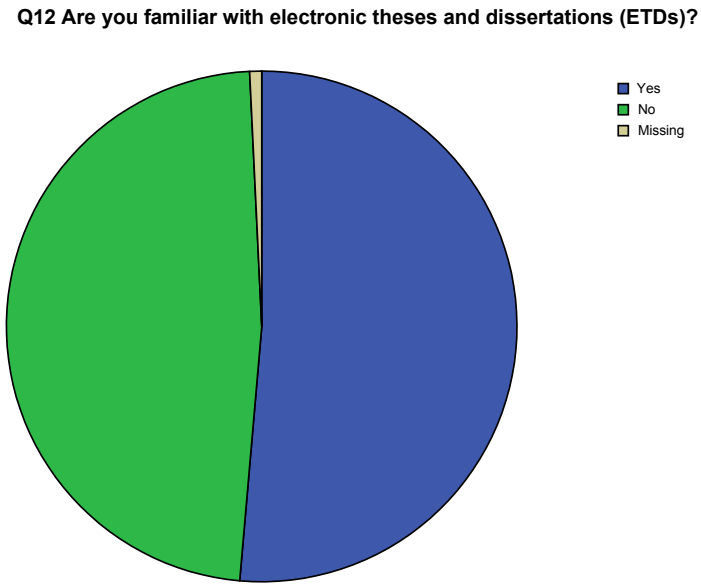

Figure 4 represents Q12.

Only twenty nine percent (29%) said their tertiary institutions accepted ETDs. However, forty eight percent (48%) thought that ETDs should be introduced to their tertiary institutions.

Forty percent (40%) said that they thought that adding multi-media content to TDs would improve the expression of Graduate Education, while forty five percent (45%) stated that it would in some cases. Eleven percent (11%) thought it would not improve the expression of Graduate Education (see figure 5)

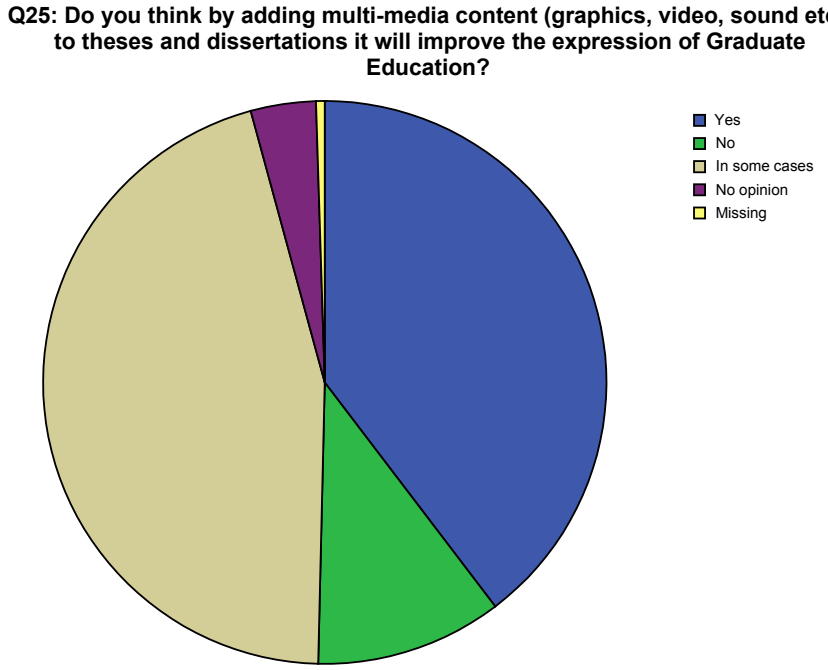

Figure 5 represents Q25.

Eighty seven percent (87%) of the sample agreed that adding theses and dissertations to an online database would improve the accessibility and use of this type of research (see figure 6).

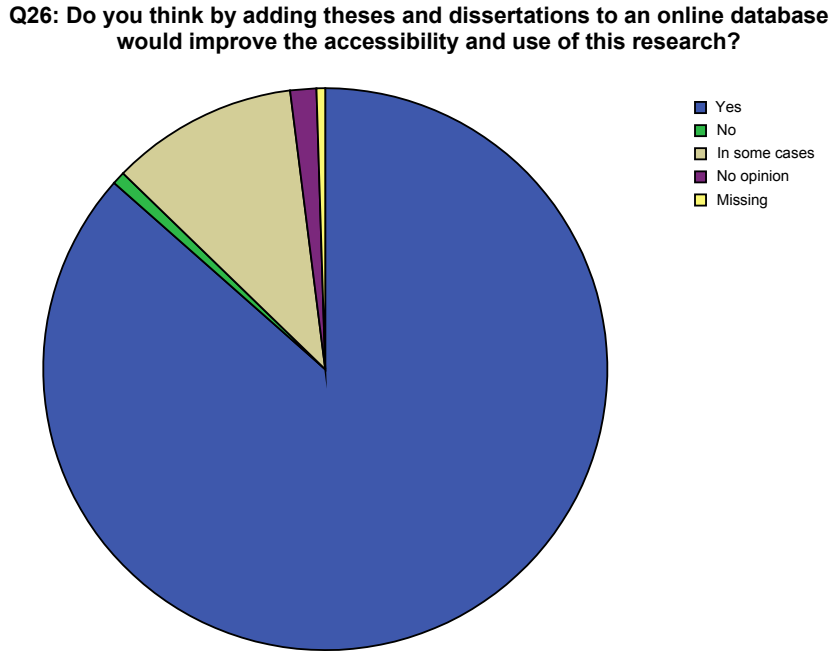

Figure 6 represents Q26.

Sixty five percent (65%) indicated that they would not have any reservations with regard to adding their thesis or dissertation to an online database. Thirteen percent (13%) said they would have reservations, while twenty percent (20%) said they would in some cases (see figure 7).

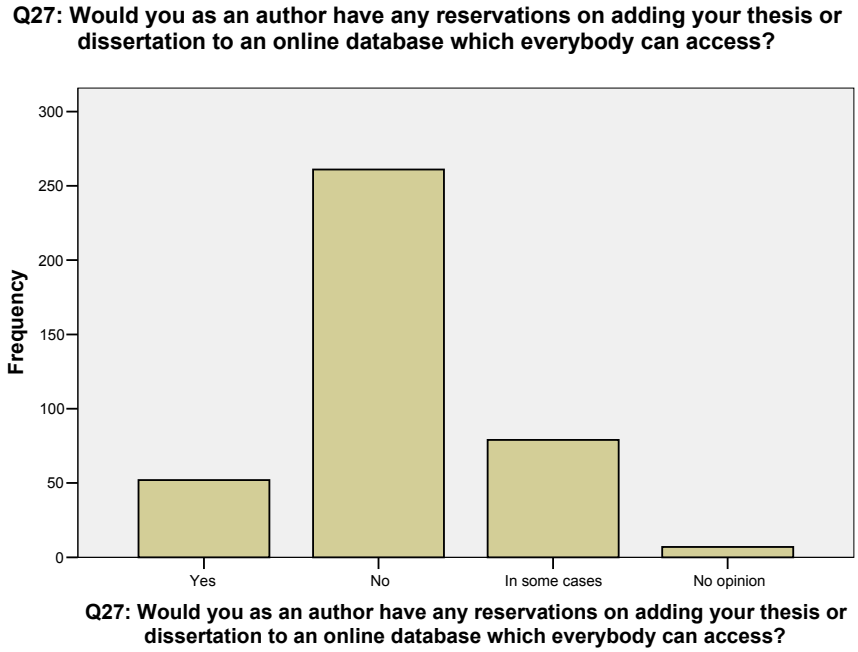

Figure 7 represents Q27.

Thirty seven percent (37.3%) of those who did have reservations stated plagiarism as their reason, Thirty percent (30.7%) stated their reason was that it could be seen as prior publication and ten percent (10.1%) gave patents pending as their reservation.

Sixty three percent (63%) of the participants thought that there would be cost benefits in publishing and storing electronic theses and dissertations (ETDs) compared to paper bound TDs (see figure 8).

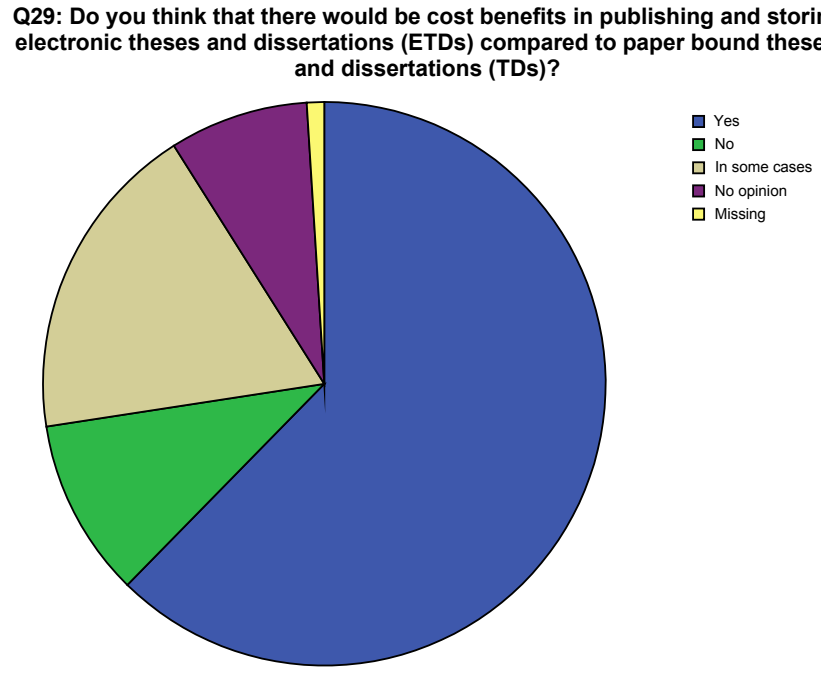

Figure 8 represents Q29.

5.4. Software applications used

Ninety five percent (95%) of the sample were familiar with Adobe Acrobat Reader, while (51%) had actually created a PDF file.

Only thirty five percent (35%) had created a web page using web authoring programs, with twenty five percent (25%) having published some of this work on the Internet.

Software applications being used in the recording of post-graduate work and or research included word processors (32.7%), spreadsheet applications (19.5%), presentation applications (15.7%), database applications (8.3%), Adobe Acrobat reader (14.2%), web authoring applications (3.1%) and other (6.5%).

Software applications being used in the analysis of post-graduate work and or research included word processors (33.8%), spreadsheet applications (30.7%), MS Access (4.8%), SPSS (12.6%) and other (18.1%).

Software applications being used in the presentation of post-graduate work and or research included word processors (29.0%), spreadsheet applications (13.7%), presentation applications (27.3%), database applications (4.7%), Adobe Acrobat reader (11.6%), web authoring applications (2.5%), web - browsers (8.1%) and other (3.2%).

The last question asked participants whether they prefer to print downloaded literature when reading. The majority (71%) do, while about a quarter (24%) does in some cases and only five percent (5%) prefer to work with the electronic format.

6. Discussion of findings

The self-administered e-survey focused on a population that had published e-mail addresses and access to ICTs. The low response rate (8.2%) may be attributed to the fact that an invitation to respond to e-surveys could potentially be perceived as junk mail, and mass mailings to published email lists perceived as "spam."

One of the findings of this study is the preference of seventy four percent (74%) of the participants for online research sources which they agreed were more efficient when obtaining research literature compared to paperbound journals. The use of peer reviewed journal sources, either on paper or in electronic formats, should form the benchmark or point of reference for any research field.

The use of ETDs as research sources is still rather limited, with only nine percent (9%) stating they have downloaded them. Peer-reviewing ETDs would effectively give recognition to worthy research, and be used by the author or supervisor to hone any particular study for publication. It would also increase the use of these studies within mainstream research.

The concept of ETDs was familiar to about half of those who participated. However, most had browsed international digital libraries hosting ETDs, and only a quarter had browsed South African ETD collections. Almost a third of the participants said their tertiary institutions accepted ETDs, and of those participants whose tertiary institutions did not accept ETDs, the majority thought they should. There was a perception that in some cases, adding multi-media content (graphics, video, sound etc.) to TDs would improve the expression of Graduate Education. Most participants (86.5%) agreed that adding TDs to an online database would improve the accessibility and use of this research source and reduce cost (63%). There was no clear decision on whether ETDs would minimize duplication of research, with forty two percent (42%) saying it would, thirty percent saying it would in some cases, and twenty percent (20%) saying it would not. Some participants believe that duplicating research in order to strengthen new concepts, or applying a different perspective to the same study was a healthy prospect. Most (65%) participants said that they would not have any reservations with publishing their TDs' online. Those who did have reservations stated that plagiarism (37.3%), prior publication (30.7%) and patents pending (10.1%) were the main causes.

There seemed to be no shortage of client-side software applications being used to record, analyse and present post-grad work and/or research in electronic formats. What is required now, is adequate server-side content management systems (CMSs) to host and display these works within accepted web-based interfaces with efficient information models in order to find and retrieve material.

7. Conclusion

Our preferred means of communication within the current information age promotes certain advantages of ETDs, emphasising: immediate access, remote access, around-the-clock access, simultaneous use by multiple researchers and increased use of TDs (Robert Gordon University: 2006).

Researchers can undertake full content searches of ETDs on the Web, without having to judge from an abstract whether it is worth requesting a copy of the full text/hard-copy TD at an inter-library loan. (Robert Gordon University: 2006).

The study acknowledges that students, academic staff, managerial and administrative staff, and library staff all have to be involved in ETD programmes. Each group would have different priorities or reasons for participating in order to complete the ETD lifecycle (Robert Gordon University: 2006).

For students, the production of electronic TDs enables the acquisition of new skills and publication of research (Robert Gordon University; 2006). The cost effective aspect of ETDs also promotes the acceptance of ETDs with students who would otherwise be required to provide multiple copies of printed TDs. Students should be assured that a restriction period for an ETD can be agreed upon in cases in which they wish to publish their results in other formats before the full text of the thesis is made available on the Web (Robert Gordon University; 2006). This restriction period potentially eliminates reservations on ETDs, such as prior publication and plagiarism, which follow the logic that upon publication in a recognized forum, it is easy to lay claim to another's intellectual property rights (Guédon; 2001).

Research supervisors should be supported by Library and/or IT staff in providing training and support for postgraduate students who wish to create multimedia ETDs (Robert Gordon University; 2006). However, undergraduate curriculums should encompass most of the IT skills required to produce and submit simple versions of 'born digital' ETDs, such as those produced in Word processor or PDF software applications.

The Robert Gordon University website (2006) states that for libraries, benefits of ETDs include saving shelf and storage space, and reducing inter-library loan requests through electronic access. The usage statistics of the collection would be easier to determine, and an improved level of customer satisfaction would potentially be achieved (Robert Gordon University; 2006).

One of the key benefit's of ETDs, is their ability to improve the publicity of research output by the institution's staff and students, consequently drawing attention to the institution's general research profile (Robert Gordon University; 2006).

Attention should be drawn to the number of institutions currently in the process of making TDs electronically available, such as Rhodes University, Pretoria University, Witwatersrand University, University of the Free State, Unisa and the University of Johannesburg. Examining and comparing these established ETD programmes may provide examples of best practice and answer concerns relating to the time involved in the creation of an archive, its ongoing maintenance and development (Robert Gordon University: 2006).

Kling and McKim (1999:2) characterized three dimensions of scholarly publishing as a communicative practice, namely publicity, access, and trustworthiness. For the latter, they suggested peer-reviewing, which provides a valuable function in scholarly communication that can not simply be replaced by self-published articles in electronic media (Kling and McKim; 1999:2).

8. Recommendations

This study recommends a need for all academic institutions in South African to create institutional archives as well as a national development/upgrade of ETDs which would give our scholars and the country the full benefits associated with accessing local research documentation through computer networks.

Management would have to appoint responsible persons/bodies for the creation and maintenance of the ETD collection, the study recommends that this fall under present library structures.

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