TALLINNA ÜLIKOOL   høgskolen i oslo   UNIVERSITÀ DEGLI STUDI DI PARMA

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Hester Annette le Roux

INVESTIGATION OF THE DIGITAL NON-TEXT-BASED USE AND REQUIREMENTS OF A GROUP OF ACADEMIC STAFF IN A SOUTH AFRICAN OPEN DISTANCE LEARNING INSTITUTION

ABSTRACT

The main purpose of this study was to investigate whether academic staff members in an ODL institution use digital non-text-based resources (e.g, graphs, photographs and video clips) in research and teaching practice and what their future requirements for such resources would be. Though many studies exist on the use of textual resources, the subject area of digital non-text-based resources has not been widely studied, especially in the field of distance learning and this thesis will add knowledge to an emerging field and can assist in collection development decisions.

A survey to collect data was conducted in April & May 2009 under a sample of academic staff at the University of South Africa, an open-distance learning institution. The data was descriptively analysed. The study found that just more than 50% of academic staff surveyed do use digital non-text-based resources and would like to have access to more resources of this kind. It also found that many do not know of resources in their field.

The study concluded that barriers in utilising resources exist, as a large percentage of academic staff would like to receive training in search, accessing and using digital non-text-based. It is recommended that the existing digital non-text-based resources should be advertised in a more focussed way and that subject-specific training should include training in finding, accessing and using digital non-text-based resources.

DECLARATION

I declare that

**INVESTIGATION OF THE DIGITAL NON-TEXT-BASED USE AND
REQUIREMENTS OF A GROUP OF ACADEMIC STAFF IN A SOUTH AFRICAN
OPEN DISTANCE LEARNING INSTITUTION**

is my own work.

I certify that all material in this thesis which is not my own work has been identified and
properly attributed.

Signed:…………………………….   Date: 29 June 2009

      H A le Roux

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ACRONYMS

3-D   Computer graphics that use a three-dimensional representation

ACLS   American Council of Learned Societies

CLIR   Council on Library and Information Resources

GIS   Geographic information system

NITLE   National Institute for Technology and Liberal Education

ODL   Open Distance Learning

TSA   Technikon South Africa

UNESCO   United Nations Educational, Scientific and Cultural Organization

UNISA   University of South Africa

VUDEC   Vista University Distance Education Campus

CHAPTER 1

INTRODUCTION AND BACKGROUND

1.1.   INTRODUCTION

The growing availability of digital resources other than text documents, such as graphs, maps, videos, simulations, etc offer opportunities for academic staff to use these resources as aids to teaching and research. The use and requirements of digital non-text-based resources of a group of academic staff in a South African open distance learning institution will be investigated in this study.

Net books, PDAs, wireless internet, surfing the internet on the cell phone, Flickr, and being able to have constant contact with friends are but a few of the amazing developments that the advent and growth of modern electronics and computer technology has made possible. One can be nearly anywhere and check emails, chat to friends, download a book or film, attend an online conference or present a lecture to students half a world away. A group of students or researchers collaborate on an article or report and all contribute on the wiki-page where it is easy to track the different changes.

These are all elements of a globalised world. Globalisation in the specific context of communication can be defined as "a trend towards the increasing interconnectedness of social relations across the globe" (Weis, 2008). Globalisation is especially driven by communication technology in that the increase in communication flow occasioned by the proliferation of such technology between geographically distanced regions spreads ideas and diffuses cultures across the globe, thus creating the vaunted "global village." This is the world inhabited by the student and university staff member of today. It is to be expected that universities and other higher education institutions will take advantage of the opportunities and innovations offered by this world on various levels. In its report the American Council of Learned Societies (ACLS) (2006, p. 2) succinctly remarks that "the online world is a new cultural commonwealth in which knowledge, learning, and discovery can flourish."

Information resources in electronic form emerged and proliferated in the 1980s, and the internet and World Wide Web leapt into dramatic prominence in the 1990s (Carr, 2006). New technologies and innovative techniques present new challenges and different expectations for academic staff, students and the library staff and influence the information landscape and the transformation of teaching and learning.

1.2   BACKGROUND

The role players in education are the students, the academic staff who teach them and relevant academic institutions. As indicated in the title above, this study relates specifically to the academic staff who need to be contextualised by discussing in outline the students they interact with.

1.2.1   The student

The millennial generation (also known as Generation Y, or the net or google generation), born after 1982, are now entering university and the workplace. This generation of students are very different from previous generations and academic staff should keep these characteristics and learning preferences and methods in mind when developing new courseware and learning material (Smith, 2006, p. 3). How are they different and what should be kept in mind?

The Millennials, who have not known life without computers, spend more time online than in front of the TV and like to learn interactively (Oblinger, 2003, p. 44). They regard the internet as an access tool and the "ability to use nontext expression—audio, video, graphics—appears stronger in each successive cohort" (Oblinger, 2005, p. 2.10). Researchers have also found that the Millenials do not read large tracts of text regardless of the nature or purpose of the text, and are more comfortable in an image-rich environment. Clear evidence in this regard is that 3% of what they see is retained as opposed to 10% of what they read (Oblinger, 2005, p. 2.14).

Students have the perception that their lecturers are not well versed in using IT as teaching aids (eg PowerPoint) and they feel that the lecturers should use it well or not at all as inept

use of technology frustrates them (Kvavik, 2006, p.100). They rated the importance of the quality of pictures higher than academic staff members did (Pisciotta, 2005, p. 43).

Students want faster service and often prefer online resources because of the convenience of access and use (Lucasiewicz, 2007, p. 822). They do not want to wait, but want usable results quickly and without a lot of effort. They are satisfied with "good enough" and do not want to search too deeply for information. In planning the future of teaching and education, the attributes of the "always on" students entering higher education need to be kept in mind by academic staff, as well as management at higher education institutions.

1.2.2 Academic staff

Besides a changing learning and teaching environment, academic staff have to contend with the impact of technology on research, with particular reference to information-seeking behaviour, the use of information resources, and how scholarly communication takes place (Hemmiger, 2007, p. 2205; Normore, 2003). This includes a growing reliance on online and web resources and nearly total electronic communication, as well as e-research, interdisciplinary work and cross-institutional collaboration enhancing the growth in e-science practices (Brown & Swan, 2007, p. 9). E-Science (digitally enhanced science) "is based on distributed networks providing the software and computer power necessary to process large sets of data, by interconnecting computers and tools" (Osswald, 2008, p. 516), thereby giving researchers access to resources held on different computers and sophisticated computational thinking.

In conjunction with the above is also the arrival of the millennial generation with their expectations, dreams and own ways of working to contend with and add into the mix of the academic staff member's professional life.

Academic staff members use digital finding aids to search for paper-based as well as digital resources (Brown & Swan, 2007, p. 37). This use of online journals and other digital material has led to a decrease in personal library visits but it has not diminished the role of the librarian as academics find it frustrating to discover material they would like to access but cannot as it is behind a subscription barrier (Brown & Swan, 2007, p. 7). Librarians also need to be on the forefront of digital developments to be able to serve their academic audience in

the best possible manner. The ACLS report confirms that as "the Internet becomes home to more of our cultural heritage, the issues of access, management, and preservation becomes ever more critical" (ACLS, 2006, p. 12).

Text-based resources, especially e-journal articles, have become available on the internet for more than a decade, with the result that an academic staff member can now access a variety of electronic databases and full-text journal articles, including articles from journals not directly related to their field, from any given computer work station. As already mentioned, this has changed how academics do research (Hemminger, 2007, p. 2214). They can utilise various possibilities for searching and accessing. Gardiner, McMenemy and Chowdhury (2006, p. 342) observes that the variety of choices and the differences between the information services influence users' information seeking, access and use patterns. The availability of digital resources has progressed fast and now encompasses much more than text-based sources, with access to non-text-based (image) collections increasingly available, making it easier to find this material for use in research and as teaching material.

Academic staff and various aspects of their interaction with technological tools and the library have been studied in multiple ways with a view to serving them better. It is interesting that according to De Vicente, Crawford and Clink (2004, p. 407) "studies of students seem to be more prevalent than ones performed on academic staff". This trend is confirmed by the present author's observation. Questions such as what students use, how they use the internet, digital resources and the library, as well as the students' attitudes, perceptions and search strategies, have all received the attention of researchers. In "Use and Users of Electronic Library Resources: An Overview and Analysis of Recent Research Studies", a report compiled for the Council on Library and Information Resources (CLIR), Tenopir, Hitchcock and Pillow (2003) identifies more than 200 studies, undertaken from 1995 to 2003 that report on various aspects of electronic library resources, preferences and digital use, etc. by faculty and students (p iv). These reports led to a number of conclusions on the perceptions, uses and preferences brought to bear on digital. Tenopir et al (2003) summarise these conclusions as follows:

- "Both faculty and students use and like electronic resources and most readily adopt them if the sources are perceived as convenient, relevant, and time saving to their natural workflow."

- "Experts in different subject disciplines (work fields) have different usage patterns and preferences for print or electronic."
- "Print is still used for some reading and is part of research in almost every discipline. It is considered important in certain disciplines, especially in the humanities".
- "Print remains the most popular medium for books; e-book use is still in the very early stages".
- "Most e-journal users still print out articles that are judged useful—so a printing format such as PDF is popular".
- "Subject experts use hyperlinks to view related articles; students' use of hyperlinks is less clear".
- "Browsing a small number of core journals is important (in print or electronic forms), especially for subject experts and for current awareness searching".
- "Searching by topic in an article database is important for all other purposes".
- "Users will read articles from a wide variety of journal titles and sources if available to them, although most of the readings come from relatively few journals".
- "Personal subscriptions to journals continue to decrease, so users rely more on electronic subscriptions subsidized by the library and on the Internet".
- "Most journal article readings are of articles within their first year of publication, but a sizeable minority of readings come from materials that are older than one year".
- "College and high school students use the Internet more than the library for research, and many believe they are more expert at searching than their teachers".
- "Students exercise some quality judgments about materials they retrieve from the Internet, but those quality judgments may not exactly match faculty members' criteria for quality". (Tenopir et al, 2003, p. iv-v).

Since 2003 more studies have followed, and in general their conclusions concur with the summary of Tenopir et al in 2003. Some of these more recent studies are mentioned in the following section:

Jones and Johnson-Yale (2005) surveyed academics all over the USA to explore college faculty's impression of the impact of the internet on research and teaching. They found that e-mail is used extensively to communicate with students and peers, and that academic staff use the internet regularly to search for scholarly articles and keep abreast of developments in their

field. This observation confirms the finding of Tenopir et al (2003) that academic staff visit libraries infrequently in person.

Gardiner et al (2006) looked at university academics in British universities. One of their findings was that the academics use electronic journals more readily than electronic books and still prefer paper-based books. In general their perception was that electronic resources were more convenient and time-saving than paper resources. The findings on low use of e-books were confirmed in the report on Researchers' Use of Academic Libraries and their Services (Brown & Swan, 2007, p. 39), which also presented a survey of British researchers and academics.

Kemp and Jones (2007, p. 58) conducted a longitudinal study of "Academic use of digital resources" in which they reported on disciplinary and subject differences in the use of digital resources. They concluded that different disciplines and subjects use and integrate digital resources in different ways in teaching and learning. This needs to be kept in mind when developing strategies for digital resources.

Naudé (2008) confirms that academic staff members are using the internet regularly, with the result that their perspective on information gathering and research has broadened and they are finding many useful resources on the open internet. They still use their academic library most often as access portal; however, prefer the e-resources of these facilities (Naude, 2008, p. 204).

In a study conducted in 2008, Dilek-Kayaoglu studied faculty's use of electronic journals at Istanbul University in Turkey, where they found that the use of e-journals increased after 2000 due to the full digital context and especially the search capabilities and variety of advanced features (239). Dilek-Kayaoglu (2008, p. 239) calculated that the number of active online journals increased by 55% between November 2003 and May 2007.

These developments influence information dissemination and teaching and learning. Various facets need to be studied to form a broad and coherent picture. Such a facet is the use of non-text-based resources which will increasingly be used in computer-mediated instruction to deliver the message efficiently (Conole, Evans & Sims, 2002).

The literature shows that the use of digital non-text-based resources has been studied much less intensively than the use of text-based resources.   Some studies focussing on non-text-based material used by academic staff were found. Schonfeld reported in 2006 on the *The Visual Resources Environment at Liberal Arts Colleges*; (2006) reported on how digital images are used in teaching practice and learning, and Nitecki and Rando (2004) dealt with how faculty members use images (digital or analog) in teaching. These studies, among others, will be discussed in Chapter 2.

No studies or articles could be found that describe the use of and requirements for digital non-text-based resources in research and teaching practices by academic staff in Africa, South Africa or ODL institutions. Searches were conducted in various databases which included Emerald, Ebsco, ACM Portal, Academic OneFile, Wilson Web, ISI Web of knowledge, ProQuest, E-LIS, Science Direct and IEEE Xplore, up to 20 June 2009

1.3.   FORMULATION OF PROBLEM

Though many studies review the use, needs and requirements of academic staff with regard to text-based material not much is available about non-text-based resources although such resources are referred to in studies about text-based material.

Libraries have moved from the position of   "shall we digitise?" to the vector of "what shall we digitise first?" This is a given with very little debate, as can be seen from the many studies about various aspects of digital text-based resources. However, there are big gaps in the available information about digital non-text-based resources.

After reviewing the literature it became clear that few studies up till now covered the use and requirements of non-text-based material by academic staff, and this void it is even more crucial where distance education is concerned.

1.3.1   Research question

How are digital non-text-based resources used, and what are the requirements of academic staff for such materials in an ODL institution?

Sub-problems that emerged are:

1. What kind of digital non-text-based resources do academic staff incorporate into their research and teaching?

2. Where do staff members find relevant digital non-text-based material?

3. What digital non-text-based resources do academics require/ would they like to have access to for the future?

4. Are there differences between academic disciplines where the use of and need for digital non-text-based resources are concerned?

1.4   THE UNIVERSITY OF SOUTH AFRICA AND ODL

The academic staff members to be surveyed in this study are from the University of South Africa. This section introduces the University of South Africa (hereafter called Unisa) in order to give perspective to the context and population for this study.

The University of South Africa is the oldest university in South Africa and came into being in 1873 as the University of the Cape of Good Hope. It was given its charter to act as an examining and degree conferring institution, with no students of its own. Students prepared in private or attended preparatory colleges before registering for the examination. In 1916 the name changed to the University of South Africa. In 1946 it became a distance teaching correspondence university that enrolled its own students who could study for a degree "through the post" by receiving printed study material and assignments and then posting back the completed assignments (Unisa, 2009). In 2008 Unisa had 258 406 registered students who were distributed throughout South Africa, the rest of Africa, and worldwide. Unisa's main campus is in Pretoria, with branches at various locations in South Africa, such as Cape Town, Durban and Polokwane, as well as one in Ethiopia. Its vision is encapsulated as *In the service of humanity* (Prinsloo, 2009, p. 6).

The current university was formed when the former Unisa, Technikon SA (TSA) - a distance teaching techikon and the distance education part (VUDEC) of Vista University - merged to form the new Unisa in January 2004 (Unisa, 2009).

It is organised in 5 academic colleges:

    College of Agriculture and Environmental Sciences (CAES)

    College of Economic and Management Sciences (CEMS)

    College of Human Sciences (CHS)

    College of Law (LAW)

    College of Science, Engineering and Technology (CSET)

Unisa is a comprehensive university in that 'comprehensive' is defined as "a combination of vocational courses usually associated with a technikon, and general formative courses usually associated with a university" and offers study at levels from certificates to higher degrees. It is also a research institution and has some National Research Foundation accredited staff (Unisa, 2009).

It is necessary to place the South African student with particular reference to Unisa's students and academic staff in perspective.

South African students come from a considerable range of backgrounds, with some on par with the American and European millennials. A sizeable contingent falls in the category designated 'low socio-economic status' (Letseka & Breier 2008: 90), however, which puts pressure on their ability to complete their degree in the usual given time as there is a tendency to drop out or 'stop out' to earn money for further studies (Lindow, 2006). Furthermore, these students do not always Students do not always have access to computer and internet facilities and tend to lack the knowledge and skills required to pursue their studies with the aid of such facilities (Brown & Mokgele, 2007, p. 6; Lindow, 2006).

Many Unisa students are first-generation higher education attendees and often lack intellectual as well as financial backing as parents or guardians do not have much schooling and cannot support the student at university (Letseka & Breier, 2008, p. 88). Given its status as an ODL institution Unisa tends to have more mature students too, who have had several years' experience of remunerative employment before their enrolment for tertiary studies, which means that their origins predate the millennial generation, they are digital migrants. These more mature students bring their life and work experiences into the mix of student diversity.

This diversity of the students and the reality of so many without access to computers have implications for teaching methods and the delivery of study material. Academic staff may have the opportunity to deliver all tuition material electronically, but have to accommodate a real need for hybrid delivery as many students can only receive study material in printed format. In corroboration the results of the 2008 Unisa Student Satisfaction Survey showed that 59% of students indicated a preference for study material in printed format, with videos on DVD and data on CD-Rom as second and third choices (Student Satisfaction Survey, 2009, p. 23).

Unisa has embraced the Open and Distance Learning philosophy with the ODL implementation plan approved by the Council of Unisa in November 2008. It is also developing and implementing a comprehensive strategy for its ODL model.

In ODL the teaching and learning is conducted by parties removed in time and space from one another, thus allowing more flexible study (Unesco, 2002, p. 20). Delivery of user-friendly study material to the student and communication in both directions are two of the most important elements in an ODL institution (Unesco, 2002, p. 26).

The emergence of the internet and other technological advances brought new dimensions to ODL, helping to create new educational platforms and the way students learn as well as giving access to the library and information sources worldwide (Unesco, 2002, p. 66). Study material can be made available online and more functionalities and interaction can be utilised, for example by exploring blogs and wikis and other web2.0 applications (Unesco, 2002, p. 11).

The Unisa ODL philosophy concentrates on the following points:

- Learner-centeredness,
- lifelong learning,
- flexibility in provisioning of learning facilitation,
- removal of barriers to access,
- recognition of prior learning,
- provision of appropriate learner support,
- construction of learning programmes (Unisa, 2009)

Unisa is utilising the opportunities afforded by the developing technologies and is designing systems and putting processes in place to support students by enabling them to gain access to optimum study opportunities and resources. The university emphasises throughput, or successful completion of studies, and has made this goal one of the driving forces of the ODL model (Prinsloo, 2009, p. 88).

In part this entails a technology-enabled environment with flexible options in regard to study material and an excellent library (Unisa, 2009). This student-centred approach undertakes to "not only provide students with well-designed independent study packages but also with the necessary support from the moment they first make enquiries about studying at the University until they complete their studies" (Unisa, 2009). Communication channels to keep students in contact are being expanded and a student receives an email address when registering. Continuous improvement of the quality of study material is an important strategic plan (Unisa 2015, 2005, p. 18). The courses and study material are developed by teams of specialists, including academic staff (Unisa, 2009). Access to and use of digital non-text-based resources can play an important role in the development and delivery of high quality study material and coursework packages, thereby encouraging students to enjoy and to be successful at their studies.

In 2008 the University established the Institute for Open and Distance Learning (IODL), which hosts a UNESCO Research Chair in ODL. Its aim is to benchmark Unisa ODL activities against global best practice, with the by-product of increased research output, given that "teaching and research are inseparable as they complement one another" (Braimoh, 2008, p. 2).

1.5. TERMINOLOGY / DEFINITION OF KEY CONCEPTS
Academic library
"Libraries in educational establishments at any level – universities, colleges, research associations etc. although the term is less often associated with school libraries. Such libraries have a role in the educative process far beyond the provision of materials" (Harrod's librarians' glossary, 2005, p. 4). Some of these roles could be more social and/or concerned with community building, both within and beyond the confines of the University. There are interesting discussions about the "Library as place in the digital era", but these fall outside the parameters of the present study.

Digital non-text-based resources:

No standard term could be found for resources that are not essentially in the form of text. The commonest terms were "images" or "pictorial collection", which mostly referred to digitised photographic or picture collections relegated to the fields of art, architecture and history (Choi & Rasmussen, 2003, p. 499). Cunningham Masoodian (2006) speaks of "visual documents" (p. 198). Normore (2003) uses "digitized images", pointing to "digital surrogates that depict real-world objects, whether the objects are textual by nature (e.g., a manuscript or hand-written letter) or whether it be a digitized copy of graphic material (e.g., pictures, photos, postcards) or even a three-dimensional virtual representation of realia" (Normore, 2003). Pisciotta (2001) defines "digital image" as "still pictorial data files rather than image files that primarily convey text". Conole et al (2002) mentions that 'image' includes a range of types, including "pictoral/graphical representations". Harley et al (2006, p. 3; Harley, 2007) uses "non-text" and describes it as "rich media objects" including maps, video, images, etc. Chowdhury (2004, p. 299) subsumes x-rays, architectural drawings, bird-call recordings, etc. under "non-textual". The ACLS (2006, p.12) finds that "…these nontextual materials proliferate faster than does text" and includes examples such as still and moving images and audio files.

The online Dictionary of Information and Library Management (2006) defines "image" as:

> "1. a picture or reflection of somebody or something and
>
> 2. in computing, an exact replica of an area of memory".

The term "non-text-based resources" was chosen for this study to encompass more than pictures, scanned versions of photographs, drawings or photographs of three-dimensional objects. The category includes, but is not limited to, digital resources such as diagrams, drawings (eg engineering drawings), editorial cartoons, engravings, maps, postcards, photographs, moving images such as video clips, and audio files. Images of art works, three-dimensional objects, such as museum artefacts, pictures from spectro-microscopes, laboratory exercises, online simulations, animations, and online data sets are also non-text-based material. It is accepted that graphs and charts among others, include some text.

Open Distance Learning (ODL)

"Open learning: A process of teaching and learning by which students study in their own homes or local centres using materials mailed or broadcast from a central unit. The emphasis is on opening up opportunities by overcoming barriers of geographical isolation, personal or work commitments, and conventional course structures, which have often prevented certain categories of people from gaining access to educational and training facilities. .. The term distance learning is practically synonymous" (Harrod's librarians' glossary, 2005, p. 509-510).

1.6.   DELIMITATION AND CONSTRAINTS OF THE STUDY

➢ This study will only focus on the digital non-text-based resource use and requirements of academic staff in the context of teaching and research.

➢ It is limited to academic staff in an open and distance learning institution.

➢ The research is conducted primarily for practical purposes, with the scope being limited to the Unisa Library's need for the development of new digital services and digital collection development.

➢ Therefore, this quantitative study will not warrant generalisation to residential education institutions though it may be used as the basis for exploring the digital non-text-based needs and requirements of academic staff in residential universities.

1.7.   SIGNIFICANCE OF THE STUDY

The current world wide-economic downturn has brought economic and budgetary constraints to all academic institutions, especially in the field of donations and endowments. For example the University of the Witwatersrand in Johannesburg, South Africa, expects a 20% drop in income (MacGregor, 2009). The drop, not only in income but also in student numbers may be attributable to the difficulty in obtaining a study loan and/or bursary (ie reluctance of lending institutions to extend credit).

In conjunction with the above, the growing cost of electronic resources means that it becomes even more vital to know whether a resource is needed (or nice to have) and whether it will be utilised. Ascertaining whether academic staff use or would use a resource if they had access

to it can guide collection development strategies to deploy available funds in the most effective and strategically viable manner.

The study will add to the knowledge of how digital non-text-based resources can be developed and utilised in an ODL setting.

1.8.   ETH ICAL ISSUES

Academics may be perplexed and concerned about the fact that they are asked to state their post level and academic department. However, they may rest assured that their anonymity will be preserved as the questionnaire will be sent to a central server before being sent for input into the SPSS package. They are informed of this in a cover letter in which their anonymity is guaranteed and the use of the data, namely to advise the Information Resources Development Team of the Library, is explained.

1.9.   STUDY OUTLINE

Chapter 1:   Introduction
Chapter 2:   Digital non-text-based resources
Chapter 3:   Research methods
Chapter 4:   Research results
Chapter 5:   Conclusions and recommendations

CHAPTER 2
DIGITAL NON-TEXT-BASED RESOURCES

2.1   INTRODUCTION

In the previous chapter the background setting of the study was established and the problem at issue was enunciated. Globalisation and the millennial generation and their expectations were touched on. It was noted that academic staff also had to adapt to the use of technology and get to know the possibilities it has to offer in teaching and research. Studies on academic staff and their use of digital text-based material were reviewed. It was noted that academics have very readily taken to electronic communications, e-journals and searching for articles, but have not necessarily embraced all the possibilities of digital resources.

In this chapter literature will be discussed on the use of digital non-text-based resources. In the literature "images" was the most used term, and "digital resources" was often used while Harley (2007, p. 13) uses the term "rich media" meaning "maps, videos, images, simulations, and so forth". It is not always possible to determine whether all kinds of digital resources, including digitised text was meant or whether it referred mostly to digital non-text-based resources.

 The use of visual images across the range of media in the educational context is growing, as easier access and management software have encouraged academic staff to utilise it more.

On the question of how academic staff take advantage of the growing availability of digital resources in teaching and research, Harley et al (2006) contend that there has been "no coordinated conversation about user research that could apply across the many types of available digital resources and their sources" (p. 2-4) and there is a lack of literature examining the integration of non-text, non-library resources by social sciences faculty staff. It is assumed that academic staff use digital non-text-based content in their teaching and research but it has not been measured consistently (Harley et al, 2006, p. 2-1). Conole, Evans and Sims (2002) agree that there is a need to document the ways in which images are used and can be used to support learning and teaching.

2.2   WHAT KIND OF DIGITAL MATERIAL DOES ACADEMIC STAFF INCORPORATE INTO THEIR RESEARCH AND TEACHING?

Academic staff mostly tend to use images such as pictures or photographs, especially for lectures in the classroom (Harley et al, 2006, p. 1-4). In the past art history departments had big slide collections for use in classrooms. These are gradually being converted to digital format, but some academic staff find the digital images less usable than the slides. Art historians use high quality images to illustrate, compare and analyse art works for technique, style, use of colour, etc. in their presentations (Schonfeld, 2006, p. 4).

Other material used includes maps, facsimiles of historical manuscripts, digital film or video, digital audio, simulations, and animations (Harley et al, 2006, p. 4-17) used mostly for teaching purposes. The most commonly used resources, however, are images and visual materials, news and other media sources, online reference resources, digital film or videos, and portals. It is not always clear what is meant by online reference sources and news sources, thus it could also and probably does include textual material. These presumably text-based sources are mentioned in passing to illustrate the widening scope of digital material that is increasingly available to academic staff, but is not discussed as the study concentrates on the growing use of non-text-based material. Harley et al (2006) also note that coursepacks, curricular material and simulations were much less used (p. 4-21), although Kemp and Jones (2007) found that in physics, engineering and mathematics academic staff were interested in using images, including mathematical packages, 3D images and simulations (p. 55). McMartin, Iverson, Manduca & Wolf, (2006) confirms that academics teaching science, technology, engineering and mathematics (STEM) look for "images, animations or simulations, as well as 'real world' data or data sets" (p. 255). The Performing Arts Department of one university uses photographs of a collection of historical costumes while an environmental-studies department uses images to enrich lectures given by staff on departmental sustainability projects (Green, 2006, p.14). Borgman (2004), interviewing geography professors, established that they need "maps, images, and other illustrations" (p. 181) for both research and teaching.

In a study for CSA, Tenopir et al (2006, p. 4) confirmed that the academic staff and researchers rated access to quality digital non-text resources such as maps, graphs, figures and photographs essential for both research and teaching. Borgman (2004) concludes that

research and teaching are "mutually reinforcing activities" as geographers spot examples to use in teaching while searching for research purposes, and that said geographers sometimes get an idea for new research while searching for teaching material (p. 181).

2.3   WHERE DO ACADEMIC STAFF FIND RELEVANT DIGITAL NON-TEXT-BASED MATERIAL?

2.3.1   Personal collections

Academic staff members make use of a variety of sources, but it was found that most have as a first port of call their own personal and colleagues' personal collections as resources for teaching material (Green, 2006, p.12; Waibel & Arcolio, 2005; Harley et al, 2006, p. 4-24). These images are usually digital camera pictures taken by themselves or images scanned in from books and other materials (Borgman, 2004, p. 182; Schonfeld, 2005, p. 14). They are sometimes wary of sharing with colleagues or making materials available to students because they are aware of possible rights problems (Waibel & Arcolio, 2005) through informal networks, including word-of-mouth transmission from colleagues (Brophy, Markland & Jones, 2003, p. 24). Manduca, Iverson, Fox & McMartin (2005) confirms that academic staff from a geoscience faculty would ask a colleague first when they seek new resources. As noted by Harley et al (2006), staff take the action that seems most appropriate and least time-consuming to negotiate what some regard as the "digital morass" (p. 8-2).

They prefer to maintain their own collections and the collections remain invisible to the department and the University; and because of the scanning and sharing, it is not always possible to ascertain the original source of the contents of these personal collections (Harley et al 2006, p. 4-34). Staff also keep their own collections in order to annotate, manipulate and organise material for various uses in order to give context (Harley, 2007, p. 15).

Most do not have an organisation system or organising software for these personal digital resources which they keep on their computers as files, or which they organise into folders (Schonfeld, 2005, p. 15). Most academic staff save the images they gather or create for future use. They also keep the PowerPoint slides of lectures for later use (Waibel & Arcolio, 2005).

2.3.2   Remote collections

Online free: Remote collections including online collections that are freely available, such as Google images, RLG Cultural materials, as well as collections that might need registration are also accessed. Some academic staff were keen to access these more widely available sources of non-text-based resources because they allowed greater variety and choice in order to illustrate lectures more appropriately; and they often offered good search facilities which some campus collections lacked (Schonfeld, 2006, p. 16). Some use material from specific online sites (eg various NASA sites, the Perseus Project, Artchive, Artcyclopedia and Library of Congress) (Green, 2006, p. 13). Interestingly McMartin et al (2006) found that knowing about and using a specific digital library did not mean that academics would know about other collections or digital libraries (p. 255).

Search: Google and Google Image Search are the favourite tools used by academic staff members to search for digital resources including images and other digital non-text-based resources, on the web (McMartin et al, 2006, p. 255; Harley, 2007, p. 15; Waibel & Arcolio, 2005; Othman, 2005, p. 116). Public or free image databases and library collections are also favourites for searching for non-text-based resources (Harley et al, 2006, p. 4-24).

Licensed sources: Harley et al (2006) found that licensed (ie commercial) image databases were infrequently used, even when the library subscribes to them. They caution that academic staff may not realise that they have used a licensed database, as they accessed it via their library, and this would skew their results (p. 4-24). Licensed resources were mostly underused, in fact, as much as 52% of respondents reported that they "never" used licensed resources (Green, 2006, p. 13). Often academic staff were not aware of the availability on campus of these licensed resources (Waibel & Arcolio, 2005), and even so they might or might not use such resources (Brophy et al, 2003, p. 24). Some academic staff members who had tried to use licensed resources were of the opinion that the content did not meet their immediate need (Waibel & Arcolio, 2005). Licensed resources mentioned by academic staff included ARTstor, AMICO, Saskia, Associated Press Multimedia Archive, Birds of North America Online, Grove Dictionary of Art, History of Costume slide set, JSTOR, Science Direct, and Prometheus (Green, 2006, p. 12).

Campus/ departmental collections: Digitised collections are also available on campuses, usually as departmental collections, though many respondents replied that their collections were small and only starting (Green, 2006, p. 14). These were often the art and history of art departments' slide collections that had been digitised and were still residing within the department (eg the Art History Department collection of more than 350,000 slides), but in some cases were not available on a network for the entire campus (Pisciotta, 2005, p. 44). Sometimes the digitised slide or other collections would be moved to the care and administration of the academic library, in which case metadata would be added to the resources while. Libraries should consider making it easy for departments to add metadata or to form working relationships perhaps by supplying support.

Academic Library: A significant number of academic staff members could not say whether their library had a digital non-text-based collection, and many had never used their library's digital image collections. Green found that nearly 65% of his respondents never use their college library's digital image collection (Green, 2006, p. 15). The library plays an insignificant role in faculty's acquisition of digital image resources; in fact it seems as if their marketing of the resources does not reach the correct audience (Waibel & Arcolio, 2005). It is important for libraries to consider this fact as they should play a more central role in making digital non-text-based collections and resources available to all users, whether on campus or affiliated to the University. They need not only concentrate on digitising their own collections. Libraries can (and should) take the initiative, form alliances with other role players and stakeholders in the University, and be a central part of the provision of information resources in all forms and formats. An example of such an initiative by a library is the University of South Carolina's Digital Activities Department. It started with interested librarians forming a Digital Initiatives Group in order to "determine interest in digitization within the various areas and to discuss possibilities for a digital collections program". They collaborated with everybody who was interested in digitising collections, such as academic departments, the computer services department, etcetera, and this grew into the library's Department of Digital Activities (Boyd & King, 2006, p. 180).

2.4   HOW DO ACADEMIC STAFF USE DIGITAL NON-TEXT-BASED RESOURCES?

2.4.1   In the classroom

Academic staff reported that incorporating digital non-text-based resources in their teaching practice had such good results that in their view it "revolutionised" their teaching and they could present "daunting" subjects in new ways. There are possibilities of interactivity and more in-depth reviews, for instance of art images. They reported that they used more images than before because of the ease of accessing images and importing them into a lecture (Green, 2006, p. 20). Academic staff mentioned that they could make lectures more interesting, convey concepts more easily and engage the students more (Green, 2006, p. 28). Digital images made it possible to integrate primary source material and teach critical thinking (Harley et al, 2006, p. 4-27). The life sciences were very positive in this regard (Green, 2006, p. 27). Biology lecturers enjoy presenting complicated processes using digital non-text-based resources, and surprisingly, even higher mathematics lecturers use "images" to enhance their lectures (Green, 2006, p. 19).

Compiling lectures and group viewing were the most important uses of digital non-text-based resources (Pisciotta, 2005, p. 42). Green (2006, p. 11) ascertained that digital images (including web sites, text and images, etc) were used in approximately 84% of teaching situations, ranging across large, medium and small lectures and seminars.

Penn State Visual Image User Study (VIUS) survey results showed that digital images were slightly more likely to be used for research than for teaching, while analogue images were more actively used in teaching. This could be partly due to the time-consuming task of digitising analogue slides, and teaching staff do not always have the time and support to transfer the analogue slides to digital format (Pisciotta, 2005, p. 41). The important consideration for academic staff is their interest in images rather than whether the images are digital.

Academic staff usually import digital non-text-based resources into a PowerPoint presentation and sometimes link directly to resources on the internet (Schonfeld, 2005, p. 9). Many staff members prefer not to use images by direct internet linking as they found that often the download time is very slow or does not work in the classroom on the given day,

which leads to embarrassment and loss of instruction time (Harley, 2007, p. 18; Green, 2006, p. 49, 64). Many academics liked using PowerPoint as it was easy to use and to create slides from; moreover it was available in most classrooms. Some academic staff reported that using it transformed their style and they used images more readily. Reasons why others disliked PowerPoint included the pre-set and automated features, the "cumbersome" process of creating a slide show, and the fact that it could not handle high resolution images (Green, 2006, pp. 4, 36-37). Waible and Arcolio (2005) report that although academic staff use PowerPoint they dislike it as an instructional tool, mainly because they cannot compare different images side by side. Again some find it too rigid and think it inhibits the intellectual engagement and dialogue that they would like to have in the classroom with the aid of images.

2.4.2   Teaching and study

Digital non-text-based resources are included in online courses or discussion groups, especially in community colleges. Resources are also made available to students to assist their completion of assignments, projects or portfolios (Harley et al, 2006, p. 4-18; Green, 2006, p. 18; Schonfeld, 2006, p. 5). Roda (2005) studied the digitisation of an art slide collection and reports that one of the very positive results was that re-use of images soared as it was now possible for many staff and students to use the digitised images simultaneously to prepare lectures or complete homework. This was not possible with the analog slides (p. 265).

Academic staff from the sciences liked the digital format because it gave them tools to visualise concepts or things too small or big to see otherwise, and it gave students a better understanding concepts at issue (Green, 2006, p. 81).

Staff realise that they as well as their students need to learn how to read and interpret images. Some teach their students to do this while others expect the expertise to be already in place (Green, 2006, p. 30).

2.4.3   Differences between disciplines

Some of the authors remarked on the difficulty of comparing disciplines. The VIUS study at Penn State observes that "breaking down the data by discipline has proven difficult"

(Pisciotta, 2005, p. 38), and Kemp and Jones contend that "research investigating disciplinary differences has not been fully developed to explore whether such disciplinary and subject differences affect the ways in which digital resources are conceptualized and used". They feel that different disciplines and subject areas diverge sharply in kind and in their use of non-text-based resources; that moreover "disciplinary and subject differences reported in other contexts have a significant influence in relation to the use of digital resources"(Kemp & Jones, 2007, p. 52-53).

The literature shows that the surveys conducted on the subject of using of digital material are heavily weighted in favour of the liberal arts (Schonfeld, 2006, p. 3) and towards exerting influence on teaching. Penn State's "Visual Image User Study" studied users in arts, humanities, and environmental studies at all Penn State campuses as these disciplines were selected because they were active users of non-text-based material (Pisciotta, 2005, p. 38).

The liberal arts can be defined as

> "college or university curriculum aimed at imparting general knowledge and developing general intellectual capacities in contrast to a professional, vocational, or technical curriculum. In the medieval European university the seven liberal arts were grammar, rhetoric, and logic (the trivium) and geometry, arithmetic, music, and astronomy (the quadrivium). In modern colleges and universities the liberal arts include the study of literature, languages, philosophy, history, mathematics, and science as the basis of a general, or liberal, education. Sometimes the liberal-arts curriculum is described as comprehending study of three main branches of knowledge: the humanities (literature, language, philosophy, the fine arts, and history), the physical and biological sciences and mathematics, and the social sciences" (Encyclopaedia Britannica Online, 2009).

The liberal arts colleges are residential institutions that concentrate on undergraduate teaching with a higher teacher-to-student ratio than at universities, and academic staff who are more involved in teaching than at doctorate-conferring and research universities. Liberal Arts Colleges confer a bachelor degree. Research is mostly associated with universities.

Community colleges were included in one of the studies (Harley et al, 2006) used in this thesis. Community Colleges are defined as an "educational institution that provides two years of academic instruction beyond secondary school, as well as technical and vocational training to prepare graduates for careers" (Encyclopaedia Britannica Online, 2009). The credits allowed for these two-year associate diplomas can be transferred to a four-year college and lead to a bachelor's degree which implies that since teaching is central to community colleges, digital non-text-based resources would suit their needs exactly as teaching aids of choice.

The following table summarises the main studies found and used in this thesis as well as the institutions and disciplines surveyed; and indeed, the list leans clearly towards the liberal arts. Another facet that surfaces from the table is that most of the studies announce teaching, learning and education as themes in their titles. The study under review is conducted at a comprehensive university which also conducts broad-spectrum research.

Table 2.1   Studies, institutions and disciplines surveyed that was used in this study

Author(s)	Date published	Title	Respondents
Pisciotta, et al	2005	Penn State's Visual Image User Study	faculty & students - 68 depts - arts, humanities, environmental studies **Pennsylvania State University**
Nitecki, DA & Rando, W	2004	A library and teaching center collaboration to assess the impact of using digital images on teaching, learning, and library support	14 faculty - American Studies **Yale University**
Roda, C. Borel, AM. Gentchev, E & Thomas, J	2005	Digital image library development in academic environment: designing and testing usability	Students & faculty - Dept: computer science, art history, and international communication **American University, Paris**
Waibel, G. & Arcolio, A.	2005	Out of the Database, Into the Classroom. Final Report from the RLG Instructional Technology Advisory Group	Faculty (9) – Humanities 3 campuses: **University of Southern California** **University of California, Berkeley** **Stanford University**
Green, D	2006	Using digital images in teaching and learning: Perspectives from liberal arts institutions	* >500 faculty and staff **31 liberal arts colleges** - northeast and mid-Atlantic states & * **Yale and Harvard Universities**

Harley, D., Henke, J., Lawrence, S., Miller, I., Perciali, I., & Nasatir, D. Kaskiris, C & Bautista, C.	2006	Use and Users of Digital Resources: A Focus on Undergraduate Education in the Humanities and Social Sciences	Faculty - Humanities and social sciences **Univ of California, liberal arts colleges, & community colleges in California**
Schonfeld, R	2006	The Visual Resources Environment at Liberal Arts Colleges	faculty, librarians, IT professionals, and campus administrators **7 liberal arts colleges**
Tenopir, C., Sandusky, RJ., Casado, MM., Hodges, JC	2006	The Value of CSA Deep Indexing for Researchers	Academics & researchers in the UK & Europe - science
Kemp, B & Jones, C	2007	Academic Use of Digital Resources: Disciplinary Differences and the Issue of Progression revisited	academic staff 19 / 9 **1 University in the UK**

Harley et al (2006, p. 1-5) notes that disciplines' use of digital non-text-based resources varied according to their pedagogical goals. The staff from the humanities and social sciences reported that they used a wide variety of digital resources, that many of these "fall outside of what are formally called 'collections' or 'educational'" and that different disciplines often have different needs, including different applications of similar digital non-text-based resources. Harley et al warn against generalised uses and requirements (Harley et al, 2006, p. 4-70).

Art historians always require very high quality images, for detailed analysis of technique and style in class presentations (Schonfeld, 2006, p. 4), and to make available to students who need to memorise art works as part of their course. It is interesting that they, as well as other disciplines in the humanities and social sciences were early users of ARTstor, mainly because of the easy access to images (Schonfeld, 2005, p. 5). The relevant disciplines include architecture, history, anthropology and political science, the last being the heaviest users of data sets (Harley et al, 2006, p. 1-5).

Interaction from students of literature, theatre, art history and archaeology has increased, and lively discussions in class with the use of digital non-text-based resources are common (Green, 2006, p. 32). Language and cultural studies make use of pictures, photographs, audio-visual material, etc to teach vocabulary and cultural background (Schonfeld, 2006, p. 5).

The NITLE study (Schonfeld, 2006) subsumed the natural sciences in which context it was reported that biologists and scientists mostly use pictures or photographs to illustrate concepts, and animations to show how processes work. Wolf (2007) established that the life and physical sciences "show the highest use of these visual materials" (p. 500). Penn State found, surprisingly, that the earth and mineral sciences are higher users of digital non-text-based resources than those in the faculties of arts and architecture, though the latter are the biggest users of "pictures" of all types (also analog) (Pisciotta, 2005, p. 38). Note that many art slides have yet to be digitised.

Harley et al (2006) finds various studies of models for integrating digital materials in science and technical courses (eg chemistry, physics, biology, and computer science), but applications in the humanities and social sciences uncommon; in fact there "appears to be a paucity of literature that has systematically examined these issues, especially as they relate to the integration of non-text, non-library resources that are valued frequently by faculty in the H/SS" (Harley et al, 2006, p. 2-2).

The study for CSA by Tenopir et al (2006) surveyed the searching and use of digital non-text-based resources by academic teaching staff and researchers in the natural sciences. Significantly, the study allowed that respondents consistently rated access to tables, graphs, and figures higher than photographs or maps (Tenopir et al, 2006, p. 44).

The following table summarises various disciplinary uses mentioned in the literature:

Table 2.2 Disciplinary uses of digital non-text-based resources mentioned in the literature

Humanities				
Depatments	**What is used**	**What is it used for**	**University**	**Source**
Arts & Architecture	Images	Teaching	Penn State	Pisciotta
Communications	Images	Teaching	Penn State	Pisciotta
Liberal Arts	Images	Teaching	Penn State	Pisciotta
Anthropology	Images		Liberal art colleges	Schonfeld
American studies	Images	Teaching	Yale	Nitecki
Architecture	Images, audio-visual	Teaching, portfolios	California Univ., liberal arts colleges, community colleges	Harley et al
	Images		Liberal art colleges	Schonfeld

Art history	High quality images	Analysis of technique and style – teaching, homework	Liberal art colleges	Schonfeld
	photographs, maps, & texts	Illustrating historical discussion	Liberal art colleges	Green
	Images of art works	Memorising art works	Liberal art colleges	Schonfeld
	Images of art works	Teaching, assignments	American Univ, Paris	Roda et al
Classics	Images	Study myth in art & literature	Liberal art colleges	Green
History	Historical documents, maps	Class, teaching	California Univ., liberal arts colleges, community colleges	Harley et al
	Images	Primary sources - students analyze - homework	Liberal art colleges	Green
	Images		Liberal art colleges	Schonfeld
Language	Images	Enhance language & culture teaching; contextual background	Liberal art colleges	Green
	Period paintings Photographs, posters, videos,	Enhance language practise Multimedia narrative	Liberal art colleges	Green
	Images (photographs of signs, product wrappers	Teaching/illustrate vocabulary and national culture	Liberal art colleges	Schonfeld
	Images, audio-visual		California Uni., liberal arts colleges, community colleges	Harley et al
Media studies & Communication	Images, audio-visual,		California Univ, liberal arts colleges, community colleges	Harley et al
Medieval Studies	Photographs of books e-versions	More emphasis on material culture, on the circumstances of book production - teaching	Liberal art colleges	Green
political science	Data sets		Liberal art colleges	Schonfeld
Sociology	Photos	Photo-elicitation method to conduct interviews - research	Liberal art colleges	Green
Sciences				
Scientists	Pictures, photographs, Animations	Illustrate concepts, how processes work	Liberal art colleges	Schonfeld
	Tables, graphs, figures & photographs & maps	Research	Various UK & European institutions	Tenopir et al

STEM	real world data, data sets	Teaching	California community, four-year public & private institutions	McMartin, Iverson, Manduca & Wolf
Life and physical sciences	Images, video clips, data sets, simulations	Instruction	Nation wide - higher education institutions	Wolf
Earth & Mineral Sciences (incl Geography, Meteorology)	Images	Teaching	Penn State	Piscsiotta
Agriculture	Images	Teaching	Penn State	Pisciotta
Astronomy	Digital photos; data	Extract quantitative info perform mathematical operations	Liberal art colleges	Green
	Audio-visual modes	Students closer to the actual experience of doing science		
	Images / photos	Essentially to be mined and manipulated.		
Biology		Directly interpreting data	Liberal art colleges	
	Pictures or photographs animations	Illustrate concepts, how processes work	Liberal art colleges	Schonfeld
Chemistry	3-d images	Rotated & manipulated	Liberal art colleges	Green
Engineering	Specialist software	Teaching	UK university	Kemp & Jones
Environmental science	Interpretive and historic maps, popular images		Liberal art colleges	Green
Genetics		Groupwork - interpret	Liberal art colleges	Green
Geography	Data, maps, primary resources	Teaching		Harley
		Teaching	Research univ	Borgman
Landscape studies	Images of contemporary or vernacular landscapes	Teaching	Liberal art colleges	Green
Mathematics	Digital packages	Teaching	UK university	Kemp & Jones
Neuroscience	Images	Explain concepts more easily - teaching	Liberal art colleges	Green
Physics	Images	Students - incorporate images into assignments & research	Liberal art colleges	Green
	Images Digital graphs	Applications of theory, varying parameters - show role & importance of each	Liberal art colleges	Green
	images, videos, 3-D images & simulations	Teaching	UK university	Kemp & Jones
Plant biologist	Photographs in botany database - 200 species	Learn to identify plants - teaching	Liberal art colleges	Green

The table shows that the listed studies have a bias towards the liberal arts and that teaching activities dominate in the utilisation of non-text-based resources. It also shows that digital resources are used in a wide range of subjects.

2.4.4 Why faculty do *not* use digital resources

Many academic staff successfully adopted the use of digital non-text-based material in their teaching practice and uses it to great effect, but some do not and one reason mentioned was that it did not support or "mesh with" their teaching approach (Harley, 2007, p. 16, 19).

Academic staff also found that the "availability, reliability, and expense of the necessary equipment, both in the classroom and for personal use" made it difficult for them to use the various digital resources (Harley, 2007, p. 18). Pisciotta (2005) confirms that comfort, or rather discomfort, with the technology in the classroom is a critical factor that determines whether the technology will be used. In corroboration it has been found that comfort with technology increases the use of images (Pisciotta, 2005, p. 33; Green, 2006, p. 25). Most academics use PowerPoint and are not familiar with other specialized image management and presentation software such as Luna Insight, CONTENTdm and MDID (Waibel & Arcolio, 2005).

Though academic staff were eager to use digital resources they were intimidated by their own lack of technical expertise. They were also hesitant because of their uncertainty about the potential impact of their use of digital non-text-based resources in their teaching practice (Green, 2006, p. 46; Nitecki & Rando, 2004, p. 119).

Some staff with large collections of analogue slides felt they were being forced towards digitisation though there was not enough support (Schonfeld, 2006, p. 2).

A constraint that was often mentioned was a lack of time to search for digital resources, to organise, manage, maintain and reuse resources in new contexts, and in some cases to learn the new technology and related teaching methods (Green 2006: 46; Harley 2007: 16; Waibel

& Arcolio 2005). Staff would like to be able to search across all licensed databases and the internet in one go instead of having to log on to each site (Waibel & Arcolio, 2005).

Across the board, academic staff felt a need for support, depending on their level of advancement as users, when integrating digital resources into learning material. In their view they were not getting enough or timely support for the digitising, organising and managing aspects, among others, of using digital resources (Harley, 2007; Green, 2006, p. 42-49; Schonfeld, 2006, p. 16).

In discussing evolving campus roles and responsibilities concerning the use of digital resources Schonfeld (2006, p. 18) cites the problem of the frequent "vague definition of the responsibilities of the instructional technology group," which could frustrate and discourage academic staff. This problem occurs to different degrees at different institutions. Green emphasises the importance of the relationship between academic and IT staff, which therefore needs to be maintained and grown, as money, staffing and systems can be major hurdles in the wider use of digital resources (Green, 2006, p. 87).

Staff are not always aware of available resources, whether licensed through their academic library or elsewhere on campus (Waibel & Arcolio, 2005), but when introduced to possible resources they are interested in trying to integrate these into their teaching and learning programmes.

Most academic staff members are concerned about copyright and fair use issues, which make them reluctant to use digital non-text-based resources. Kemp and Jones (2007, p. 55) found that copyright issues are a significant deterrent in the music discipline.

Farley summarises the obstacles to using digital resources as reported by academic staff – he mentions the lack of comfort with technology and not enough "smart classrooms". Staff are concerned about the quality images; the time factor (or lack thereof). They also voice their concerns about copyright (Farley, 2004).

2.5. WHAT DIGITAL NON-TEXT-BASED RESOURCES DO ACADEMICS REQUIRE, OR WOULD THEY LIKE TO HAVE FUTURE ACCESS TO?

The literature mentions very little about specific digital non-text-based resources that academic staff would like to acquire or have access to.

Academic staff identified an urgent need for pedagogically relevant (ie drawn from credible resources), dependable (stable links), high quality resources (ie "better than Google images") (Harley, 2007, p 19; Green, 2006, p. 88; Pisciotta, 2005, p. 46). The interesting phenomenon is that though, these high-quality, free online, non-text-based resources are available from scholarly associations, cultural institutions and government agencies, many academics do not know of their existence (Green, 2006, p. 15). It is clear that these resources need to be marketed more effectively to academic staff.

Applications Academic staff would like to have a widely accepted (generic) presentation tool or software that is trouble-free and simple, that will enable them to easily and without fuss create presentations or lessons incorporating elements from various sources and media (Green, 2006, p. 39). They would like a digital delivery system that will enable them to acquire digital non-text-based resources effortlessly. Their main goal is to reduce labour or be more productive (Pisciotta, 2005, p. 37).

Some academics would like to be able to annotate digital non-text-based resources, to write on an image, even in the course of a lecture, and to find and call up an image should it become necessary during a class (Green, 2006, p. 40).

Some academic staff would like good 3-D capabilities in order to "rotate" or "walk around" objects, even to "walk through" architecture and to "display stereo images to see 3-D landscapes" (Green, 2006, p. 39). Others would like to have GIS capabilities and be able to manipulate and annotate maps (Green, 2006, p. 24).

A variety of the requirements were related to systems such as a ready-to-go internet connection that would be available in the classroom at all times without requiring advance measures to set it up (Green, 2006, p. 42) and persistence of links to website or web resources (Kemp & Jones, 2007, p. 56). Constant and timely institutional technical support for faculty

to use electronic resources in teaching has also been on the wish list of many academics (Green, 2006, p. 48).

Copyright　　Academic staff are aware of the constraints that copyright might impose on the use and reuse of digital material (see also 2.3.1). They would like to utilise digital non-text-based resources provided someone else assumes the task of resolving the issues for them. They require clear directions and guidance about permitted use, to which end they would like to have a system that would inform them of a work or resource's copyright status (Borgman, 2004, p. 184; Pisiotta, 2005, p. 42; Green, 2006, p. 6). They want an easy system that will prevent the images from being used outside their coursework or lesson packages, but will still allow easy access for their students.

Copyright is slightly less of a problem in residential institutions where digital non-text-based resources are incorporated into classroom presentations, or when a staff member sends a student a resource to illustrate the answer to a question. It is when staff want to incorporate such resources in course-packs, homework sites on the web, or blogs for students to access, that academics feel they are on shaky ground.

2.6　　SUMMARY

In chapter 2 the literature on digital non-text-based resources used by academic staff has been discussed to confirm the coverage of issues concerning academic staff and their use of digital non-text-based resources for their research and teaching practice.

The possibilities of using non-text-based resources in teaching and research activities are expanding by the day as more material is digitised or becomes available "born digital". The growing availability from increasing sources indicates a definite growing trend in the use of digital non-text-based resources as well as academic staff's growing confidence in using the relevant technologies. Schonfeld's (2006) strongest impression in his survey of liberal arts colleges is that digital images are being used more widely than ever before (Schonfeld, 2006, p. 4).

One can expect varying patterns of usage among Unisa staff, given that they work in an ODL environment where they do not generally present lectures to audiences in a classroom but write study guides, and are likely to be publishing more study material online in due course. They are likely to develop a different perspective with the passage of time, and it would be interesting to see if this is borne out by the survey.

CHAPTER 3
RESEARCH METHODOLOGY

3.1   INTRODUCTION

Chapter 2 provides a survey of the literature on digital non-text-based resources used by academic staff surveyed to ascertain what has been studied about the academic staff and use of non-text-based resources for their research and teaching. The findings are reported using the same themes as the sub-problems. It was found that some academic staff use non-text-based material, especially for the purposes of teaching in the classroom.

The purpose of this study is to determine how and to what extent academic staff are making use of digital non-text-based resources and what their future requirements will be in this regard. A quantitative approach entailing the use of a questionnaire as survey instrument has been adopted.

The chapter also focuses on the method used to collect the data and administer the questionnaire.

3.2   QUANTITATIVE RESEARCH

According to Babbie (2007, p. 89) social research is largely conducted to explore and describe a specific topic or subject area. The exploratory and descriptive research methods used in this study do not establish cause-effect relationships under experimental conditions. However, "the purpose of a descriptive survey is to describe a situation and/or look for trends and patterns within the sample group that can be generalized to the defined population of the study" (Pickard, 2007, p. 96). The purpose of a descriptive study is also to "measure the occurrence of a phenomenon without intervening" (Hart, 2005, p. 319). It will be possible, and it is intended, to extrapolate the results of this survey to the specific target population as a whole, namely the academic staff of Unisa, an ODL institution. The results will be irrelevant to residential universities however because their teaching methods are essentially different from those used at ODL institutions.

Hopkins (2000) describes quantitative research as "either descriptive (subjects usually measured once) or experimental (subjects measured before and after a treatment)". Moreover quantitative measures are often "most appropriate for conducting needs assessments" (Weinreich, 1996). As noted above the purpose of the study under review is to determine the needs of academics at ODL institutions for digital non-text-based resources.

Quantitative (ie numerical) data provide a useful means of analysing large amounts of data in the context of a predetermined structure (Punch, 2005, p. 55). The difficulty here is that people may be placed in categories in the relevant structure where they are required to respond to questions that are inappropriate to them. However it remains a useful platform from which to draw up numerical (ie statistical) summaries that illuminate prevailing circumstances.

A questionnaire containing a limited number of questions administered to a sample population of respondents and then extrapolated to represent the population lecturers at Unisa as a whole was considered more effective than relying on interviews which are time consuming and less generalisable. The questionnaire has a significant advantage over interviewing as a result of its gearing (or extrapolation) potential, which therefore measures the relevant situation as it at a given moment (Babbie, 2007, p. 23), thereby establishing a reliable baseline as economically as possible from which to determine the extent to which academic staff make use of digital non-text-based resources in the present and are likely to do so in the future. Establishing this benchmark is an important milestone in the explorations of the relatively uncharted territory of the existing and projected use of digital non-text-based resources at tertiary institutions in South Africa.

3.3   SURVEY RESEARCH

Survey research gives the opportunity to use large samples, which is necessary for a descriptive study (Babbie, 2007, p. 276). A survey is to describe characteristics of a population and the information is obtained by using standardised procedures and addressing the same questions to all the respondents (Scheuren, 2004, p. 9). The information obtained enables the researcher to form a general picture of the area of research, but the researcher "rarely develops a feel for the total life situation" Babbie (2007, p 276). This is especially true of the present survey of the use of non-text-based resources which explores a new and

relatively unfamiliar research area of distance-learning. The pioneering nature of the research is underlined by the fact that the literature only reports on academic staff at residential universities. In the study under review the prevailing state of affairs of topical interest is briefly covered in par.1.4.

3.4   DATA GATHERING

Data collection began with discussions with the Unisa Library Executive Team and the Library Research Coordinator and some of the personal librarians. The next step was to obtain consent from the Library Executive Team to undertake the survey (See appendix 1). Data for the empirical study to determine academics existing and projected use of digital non-text-based resources for teaching have been collected through a self-administered questionnaire sent to a sample population of academic staff at Unisa to elicit their input concerning the use of digital non-text-based resources. The questionnaire is discussed in 3.6.

The whole research process including - requests and follow-up - has been conducted via e-mail, and the questionnaire was made available on the Unisa staff website only. Academic staff at Unisa are computer literate and have sufficient internet knowledge to be able to find and complete the questionnaire on being provided with the relevant URL.

This research will add another facet to the academic staff client profile, as this study forms part of the Unisa Library's Client Profile Study. The information on academics' current use and future requirements will assist the Unisa Library in deploying funds and information resources to best advantage.

3.5   SAMPLING

The 1,314 academic staff members of the five existing Unisa academic colleges comprise the population of this study Systematic sampling, sometimes called interval sampling, was done for this study.

The sample size is calculated as 415 with a 95% confidence level and a confidence interval of four. Using a confidence interval of four means that if a closed question requiring a yes/no answer was answered positively by 52% of the sample, then between 48% (52% - 4) and 56%

(52% + 4) of the whole population would have answered yes. There are online sample size calculators that can be used, for example the calculator on http://www.surveysystem.com/sscalc.htm.

The appropriate *sampling interval*, I, is calculated by dividing population size, N, by the sample size, n, as follows: I = N/n (I = 1,314/415). When I is not a whole number it is rounded to the nearest whole number. For this study I was calculated as 3.

The starting point was chosen by randomly selecting 1 as a number in a range extending from 1 to 5, and by selecting the earliest (ie lowest) unique Unisa academic staff number on the population list. Thereafter, every 3rd staff number was selected up to a tally of 415, thus providing a good spread right across the population.

Data capture was handled by the Unisa Library Research Coordinator, and the *Statistical Package for Social Sciences* (SPSS) was used to analyse the results. As it is an online questionnaire submissions are automatically added to the accumulating database (Babbie, 2007, p. 409).

3.6   QUESTIONNAIRE

An online questionnaire was judged to be appropriate because it is relatively inexpensive especially given the time constraints implied by the distribution of the academic staff over three campuses. The questionnaire was designed in collaboration with the Unisa Library Research Coordinator and in the light of commentary from members of the Information Resources Development Team.

An email request to fill in the questionnaire - with a link to the questionnaire and online response - is a faster process than posting a paper-based version would be and it saves costs. It is also less work for respondents as they do not have to post it back.

A covering letter explaining the aim of the study was attached to the questionnaire -in order to encourage a better response rate and to clarify the reasons for the survey and explain the unfamiliar term "non-text-based". After an interval of two weeks the original email request was followed by a further email to thank those who had responded and encourage those who

had not. This practice usually draws a further number of responses (Babbie, 2007, p. 262), and the present case proved to be no exception.

The questionnaire contains 20 closed and open-ended questions.

| Closed questions | ”Questions in which the respondent is asked to select an answer from a list provided by the researcher” (Babbie, 2007, p. 246) |
| Open-ended questions | "Questions for which the respondent is asked to provide his or her own answers" (Babbie, 2007, p. 246) |

The advantages and disadvantages respectively attached to using closed and open ended questions in an online questionnaire are tabulated below (Reja, Manfreda, Hlebec, & Vehovar, 2003).

Table 3.1   Advantages and disadvantages of using closed and open-ended questions in an online questionnaire

	Advantages	**Disadvantages**
Open-ended question	- avoiding bias with spontaneous answers – respondents can qualify answers - more diversified set of answers – richer answers - cognitively more demanding – but can be interesting for respondent - relative ease of typing, instead of writing a longer answer	- extensive coding needed before analysis can begin - larger item non-response / missing data - larger possibility of invalid answers, including typing errors - cognitively more demanding – can tire respondent quickly - requires more effort - researcher can misclassify answers
Closed questions	- less possibility of invalid answers - cognitively easier - coding easier – precoded - set questions easier/ faster to answer - better response rate – click only	creating possible bias with set responses

Though it is a quantitative survey that relies on statistical analysis, the open-ended questions will add detail to the closed questions and might bring a new perspective to the questions (Pickard, 2007, p. 195) It also provides the opportunity to add to the examples mentioned in the questionnaire.

When compiling a questionnaire the questions need to be formulated clearly and unambiguously in order to avoid confusing the respondents. Failure to do so could cause a low return rate, incomplete responses, or incomprehensible/irrelevant answers.

An explanation of what is meant by "non-text-based" was provided above the questions as this specific term is not generally known and the researcher wanted to eliminate possible confusion.

The questionnaire is divided into four sections namely:

Section A   **Current use**

This section contained 9 questions which sought information on the current use of digital non-text-based resources, including obstacles to gaining access to and using these resources. A filtering, yes/no question, namely "do you use any digital non-text-based material" was used to separate users and current non-users.

Non-user respondents were diverted directly to the section on future use (Section B). Only two filtering questions were used, in order not to create confusion for the respondents (Pickard, 2007, p. 187).

Respondents had to indicate which digital resources they used and how frequently. There were 30 different examples of resources listed. Some of the examples will be discussed later on.

Section B   **Future use**

This section had three questions to determine what digital non-text-based resources respondents would like to have available for use. One question repeated the same 30 choices that were used in the previous section and their importance for use had to be rated.

Section C   **Training**

Two questions regarding information on training needs and preferences in the use of non-text-based resources. This will indicate what kind of instruction, if any, is needed by respondents, but it could also give an indication of some of

the impediments respondents face in possible use of digital non-text-based resources.

Section D   Demographics

Literature has indicated that some disciplines use digital non-text-based resources more than others. This section sought information on age, gender, position, and department as this would give an indication of clusters of use or non-use as well as where more information dissemination on existing resources needs to be done.

This, however, will not be discussed in this study as it is a thesis of limited scope.

The demographic questions were positioned last, as suggested by Pickard, as respondents might not want to give personal information first (Pickard, 2007, p. 186) and also because a filtering question was used early on to separate users and non-users.

The last question (no 20) was open-ended and allows for "any other comments". This gives the respondents the opportunity to mention aspects they might think were not covered in the questionnaire.

In the literature "images" was the term frequently used and usually included photographs of paintings and other objects or places. In the questionnaire respondents were offered different choices in order to enhance the concept that digital non-text-based resources include more than that. Choices included diagrams, images of circuits, chemical structures, architectural drawings, data sets, histograms, flow charts, sound and video files, etc. as well as images of art works and photographs. Respondents were given this wide variety of choices (p. 30) to strengthen the concept that "non-text-based" includes more than pictures. An "other" box was offered in order to give respondents the opportunity to add more examples and give the researcher a better insight in what is used and what is needed in regard to digital non-text-based resources.

3.7   SUMMARY

This chapter discussed the methodological choices, namely a quantitative approach and a descriptive survey using a questionnaire. The various aspects of the questionnaire were highlighted, such as the open-ended and closed questions.

CHAPTER 4

RESEARCH RESULTS

4.1   INTRODUCTION

The previous chapter discussed the research methodology and how the survey was conducted.

This chapter reports on the data obtained from the questionnaires and analyses of the data. The findings are based on the analysis of 181 questionnaires out of a sample of 415 sent out. This represents a response rate of 43.61 %. In the analysis of each question the number of respondents for that question is noted in each diagram by "n", for example : n=72.

The questionnaire was divided into four sections, namely

Section A   Current use

Section B   Future use

Section C   Training

Section D   Demographics

Though the demographics section was the last section of the questionnaire, it will be discussed first in order to give context and meaning to the rest of the data.

4.2   DEMOGRAPHIC INFORMATION

The demographic information collected was about gender, age, post level (occupational position), college and department. The "Department" data is detailed information required by the Unisa Library; therefore to answer the research question, only the data at College level will be used.

4.2.1   Gender

The gender division consists of 54.7% male and 45.3% female respondents, which is in contrast to the population of Unisa where 54.33% of employees are female. The proportion of female academic staff was unfortunately not available at the time of submission. The gender division is summarised in Table 4.1

Table 4.1   Demography: Gender [n=179]

Gender	Frequency	Percent %
Male	98	54.7
Female	81	45.3
Total	**179**	**100**

4.2.2   Age

The distribution of respondents by age indicates that the highest proportion of respondents is older, as the combination of 40 to 49 and 50 to 59 brackets are 62.6% (Table 4.2), and only 12.3% of respondents are below 30 years of age.

Table 4.2   Demography: Age [n=179]

	Frequency	Percent %
Below 30 years	22	12.3
30 - 39 years	33	18.4
40 - 49 years	49	27.4
50 - 59 years	63	35.2
60 years and older	12	6.7
Total	**179**	**100**

4.2.3   Post level (Professional position)

The various post levels have been combined into two levels. The Senior Positions are a combination of Professor, Associate Professor and Senior Lecturer and together they represent 58.9% of the respondents (Table 4.3). The sample is thus positively skewed towards the senior academic level. The rest of the post levels were combined as Junior Positions in Table 4.3 and form 40.2% of respondents.

Table 4.3   Demography: Post Level [n = 174]

	Frequency	Percent %
Senior positions	104	59.8
Junior positions	70	40.2
Total	**174**	**100**

4.2.4   Representation of Colleges

All five academic Colleges were represented in the responses, namely

College of Agriculture and Environmental Sciences (CAES)

College of Economic and Management Sciences (CEMS)

College of Human Sciences (CHS)

College of Law (LAW)

College of Science, Engineering and Technology (CSET)

Table 4.4   Demography: College [n=176]

	Frequency	Percent %
CAES	9	5.1%
CEMS	47	26.7%
CHS	70	39.8%
LAW	22	12.5%
CSET	19	10.8%
Other	9	5.1%
Total	**176**	**100.0%**

The College of Agriculture and Environmental Sciences (CAES) has only 5.1% (Table 4.4) of the respondents and this seem a bit low but, as the staff of this College is 4.79% of academic staff, it is a fair representation of the College.   The College of Human Sciences (CHS) has the highest representation with 39.8% which is not surprising as they are the biggest college,

while the College of Economic and Management Sciences (CEMS) has the second most (26%) respondents.

4.3 THE USE AND NON-USE OF DIGITAL NON-TEXT MATERIAL IN RESEARCH OR TEACHING

Table 4.5   Use of digital non-text material in research or teaching [n=181]

	Frequency	Percent (%)
Yes	96	53%
No	85	47%
Total	**181**	**100.0**

Table 4.5 shows that 53% of all Unisa academic staff uses non-text material in research or teaching.

In an attempt to ascertain whether there is a difference in use of digital non-text material when the post level of the staff member was taken as an independent variable, it was found that on the senior positions level 52% of the post level staff use digital non-text material in research and teaching (see table 4.6) while in the junior positions 54.3% are users of digital non-text material.

An interesting fact came to light when age was taken as the independent variable. As expected, it was found that academic staff members 60 years and older are less likely to use digital non-text material in research and teaching (see table 4.7). It is interesting that the use in the other post levels are all in the range of 51% to 57%, with the 30-39 year group the most active users.

Table 4.6   **Extent to which academic staff on different post levels uses digital non-text material in research and teaching [n=174]**

Post Level & Question1 (use or not) Cross tabulation			Question 1		
			Yes	**No**	**Total**
Post Level	Senior Positions	Count	54	50	104
		% within Post Level	52%	48%	100.0%
	Junior Positions	Count	38	32	70
		% within Post Level	54.3%	45.7%	100.0%
	Total	Count	**92**	**82**	**174**
		% within Post Level	**52.9%**	**47.1%**	**100.0%**

Table 4.7   **Extent to which academic staff in different age groups use digital non-text material in research and teaching [n=179]**

Age & Question1(use or not) Cross tabulation			Question1		
			Yes	**No**	**Total**
Age	Below 30 years	Count	12	10	22
		% within Age	54.5%	45.5%	100.0%
	30 - 39 years	Count	19	14	33
		% within Age	57.6%	42.4%	100.0%
	40 - 49 years	Count	25	24	49
		% within Age	51.0%	49.0%	100.0%
	50 - 59 years	Count	34	29	63
		% within Age	54.0%	46.0%	100.0%
	60 years and older	Count	4	8	12
		% within Age	33.3%	66.7%	100.0%
	Total	Count	**94**	**85**	**179**
		% within Age	**52.5%**	**47.5%**	**100.0%**

Table 4.8   Extent to which academic staff in different Colleges use digital non-text material in research and teaching [n=176]

College * Question1 (use or not) Cross tabulation				
		Question1		
		Yes	**No**	**Total**
College	CAES	7	2	9
		77.8%	22.2%	100%
	CEMS	20	27	47
		42.6%	57.4%	100%
	CHS	36	34	70
		51.4%	48.6%	100%
	LAW	8	14	22
		36.4%	63.6%	100%
	CSET	14	5	19
		73.7%	26.3%	100%
	Other	9	0	9
		100%		100%
	Total	**94**	**82**	**176**

Other, eg. Bureau of Market Research

Different levels of digital usage exist at Unisa.

There seems to be a significant difference in usage of digital resources by the different Colleges at Unisa. (If the p-value is smaller than 0.05, use caution because some of the cells in the table are smaller than 5.)

The largest proportion of digital use comes from CAES with 77.8% (7/9) and the second largest proportion from CSET 73.7% (14/19).

A lower proportion of digital use comes from LAW with 40% (8/20) and the second lowest proportion from CEMS 43.5% (20/46). It is difficult to comment on the 'Other' category since it is mixed.

By using gender as the independent variable it was found that though 45% of respondents are female, surprisingly only 36% use digital non-text-based resources (see table 4.9). This is interesting as females form 54% of Unisa staff complement.

Table 4.9   Gender differences in academic staff use of digital non-text material in research and teaching [n=179]

Question1 (use or not) & Gender Cross tabulation				
		Gender		
		Male	**Female**	**Total**
Question1	Yes	60	35	95
	% Yes	63.2%	36.8%	100%
	No	38	46	84
	% No	45.2%	54.8%	100%
	Total	**98**	**81**	**179**

4.4   REASONS FOR NOT USING DIGITAL NON-TEXT-BASED MATERIAL

Respondents answering that they do not use digital non-text based material were asked to clarify why not. A worrying fact that comes to light is that 59.5% of all respondents are not aware of non-text based material relating to their field. Only 30.4% of respondents replied that non-text based material is not applicable to their field (see Table 4.10). There was also an open-ended option "Other, please specify" which had 9 responses and - though this did not yield any new information - it confirmed the choices offered in the question. Some of the responses are listed below.

- "Prescribed books currently contain all anatomical and other 'medical' non-text needed."
- "Simply have not yet explored digital possibilities."
- "We believe that our Tutorial matter is adequate."

**Table 4.10   Reasons for non- use of digital non-text material
in research and teaching [n=79]**

	Frequency	Percent %
Not applicable to my field	24	30.4
Accessibility restricted	8	10.1
Not aware of non-text-based material relating to my field	47	59.5
	79	**100.0**

4.5   PROFESSIONAL CONTEXT IN WHICH DIGITAL NON-TEXT-BASED MATERIAL IS USED

Respondents who answered positively to using digital non-text-based resources were questioned on context of use.

Table 4.11 shows that academic staff members use digital non-text material more for research only (23.2%) but most utilise it both for teaching and research purposes (66% of respondents) rather than for teaching purposes (7.4% of respondents). This is interesting because in literature (Harley et al 2006, Schonfeld, 2006) it was found that it was mostly used for teaching. This difference could be because Unisa is an ODL institution and does not have on-campus lectures for students, though academic staff is required to produce study material.

**Table 4.11   Use of digital non-text material in
professional context [n=112]**

	Frequency	Percent %
Research	22	23.2%
Teaching	7	7.4%
Research & Teaching	66	69.4%
Total	**95**	**100%**

4.6   ACCESS VIA UNISA LIBRARY SITES

Respondents who answered positively to using digital non-text-based resources were asked whether they search or access digital non-text-based resources via Unisa Library sites. Surprisingly there is not a big difference between the "yes" and "no" answers. The slight minority of respondents (48.4%) indicated that they do not access digital non-text -based resources through the Unisa Library sites. The reasons for not using the Unisa Library sites were unfortunately not investigated. This can be part of a further investigation.

Table 4.12   Use of websites through Unisa Library [n = 93]

Use Unisa Library sites	Frequency	%
Yes	48	51.6%
No	45	48.4%
TOTAL	93	100%

4.7   UNISA LIBRARY RESOURCES USED TO ACCESS DIGITAL NON-TEXT-BASED RESOURCES

This open-ended question (Question 5) was asked in order to ascertain whether respondents know of the available digital resources offered by the Unisa Library and which of these are used. There were 57 respondents but some mentioned more than one resource and these were counted separately. It seems that quite a few of the respondents either did not understand the question or did not know how to answer it as the highest response of 22 was a repeat of the explanation, or parts thereof, given in brackets as part of the question, namely "Unisa Library resources: Electronic or web-accessible information resources licensed to or created by Unisa Library". This response is disappointing, but indicates that extensive marketing of non-text-based data bases is needed as well as training of academic staff, especially new staff. Some mentioned that currently they do not use it, but would like to. They would however require help to do so. Very few digital non-text-based resources are mentioned, namely Visual Holocaust testimony in the UNISA Library data-base and Holocaust audio recordings of

lectures, interviews and testimony. The videos held by Unisa, in analogue format were also mentioned by a respondent.

Resources mentioned include (organised alphabetically, except for the last four comments):

- Academic Search Premier
- Audio recordings of lectures, interviews and testimony [of Holocaust]
- e-Journal finder, digital collections
- Electronic databases
- Electronic journals
- emerald
- Ebscohost, cinhall
- Google, google maps, Google Scholar
- Grove music online
- ISAP
- JSTOR
- Juta law
- Lexis Nexis
- NIPAD
- Oasis [the library online catalogue]
- project Muse etc
- SA ePublications
- Sabinet
- Science direct
- Search engines
- Thomsons metric box
- Unisa Library resources: Electronic or web-accessible information resources licensed to or created by Unisa Library
- Videos at the library, level 4
- Visual Holocaust testimony in the UNISA Library data-base
- I haven't used it yet but would like to.
- Currently do not use Unisa Library resources.
- I have only recently joined Unisa .
- I would need information here as to use Unisa resources effectively.

4.8   **SEARCH ENGINES USED TO ACCESS DIGITAL NON-TEXT-BASED RESOURCES OUTSIDE UNISA LIBRARY**

The question (no 6) "Which search engines do you use to access digital non-text-based resources?" was posed as an open-ended question to elicit information on search engines respondents use to find digital non-text-based resources if they do not use the Unisa Library's resources. There were 95 respondents to this question and some gave more than one option. Google and its various options were the most used (101) and this is in line with the literature where Google was mentioned as the main option for finding non-text-based resources. Interesting is the fact that Google Images (35) were less mentioned than Google (42) and it can be that respondents meant various Google applications (one respondent did mention Google and all its features). All other responses were negligible numbers. Some mentioned specific websites instead of search engines and mentioned that they were unsure. One respondent mentioned creating his/her own digital non-text-based resources.

Some search engines were mentioned in the question as examples, of which Google was one, and it is not known whether this influenced the big return of Google answers.

The responses were as follows:
- Google … (and all it futures); Google Image Search; Google maps; Google Scholar; Google Earth; Google data set, graphs and charts; Google books
- EBSCO Databases
- Flickr
- For accessing astronomical databases there are tools that have been developed by the people maintaining the databases. This is specialized software for use by astronomers but accessible to everyone.
- Jstor
- MapQuest
- MarketingWeb [= specific website]
- Open books
- photographic sites
- Picasa
- Refworks

- UNISA library

- Various other sites offering different maps (street, topographical etc)

- ViralVideoChart [= specific website]

- Web of Knowledge

- www.doh.gov.za = specific website

  StatsSA [= specific website]

- Yahoo

- YAHOO image search

- Youtube

- I created my own digital non-text-based resources..

- Not sure how / don't use

4.9   WEB-BASED RESOURCES USED FOR RESEARCH AND TEACHING PURPOSES

Respondents who indicated that they used digital non-text-based resources were offered 30 examples of such resources (in question 7) and were requested to indicate which and how often they used them. In the table 4.13 all the positive uses, namely "Every day; Several times a week; About once a week; Less than once a week" were added together. It is expected that some examples will show lower use than others as they will be for more specialised fields. The summary confirms this expectation. Not everybody responded to each choice. The example with highest percentage is "teaching materials" (79.1%), which does not specify what it might include, which causes difficulty in knowing whether it is only digital non-text-based or could also be textual resources. The next three choices were "Figures" (77.4%), "Charts e.g. bar charts, histograms" (67.9%), "Photographs" (67.5%) and the least used was "Images of circuits" (11.3%). But, as these are specialised images, this is also as expected. The summarised results are shown in Table 4.8. In the literature most -used digital non-text-based resources usually mentioned are pictures or images but none of these surveys gave respondents the wide and specific choices of kinds of images as was done in this survey and this has an influence on the results.

Unfortunately both the term Audio files and Sound files were included in the list and this might have caused some confusion. An interesting fact is that the numbers of the two choices

differ, with Audio files at 41.7% used and Sound files 37.1%. It would probably be best to take the average of the two (39.4%) as the usage for this category - which includes spoken word, music and sounds.

Respondents were offered the possibility to add resources not mentioned in the table and there were 10 responses but none was applicable or offered new resources. The only interesting response was from a respondent who said that he/she created his/her own resources.

Table 4.13   Digital non-text-based resources used

	n	Used (%)
Teaching materials	91	79.1%
Figures	84	77.4%
Charts eg. bar charts, histograms	81	67.9%
Photographs	80	67.5%
Graphs	79	67.1%
Diagrams	82	65.9%
Pictures	78	65.4%
Statistical tables	75	65.3%
Flow Charts	82	60.9%
Data sets	81	58%
Maps	73	54.8%
Video clips	74	50%
YouTube video clips	78	48.7%
Images of art works	71	43.7%
Blogs	77	42.9%
Audio files	72	41.7%
Sound files	73	37%
Equipment illustrations	73	35.6%
Schematics	74	35.1%
Images of three-dimensional objects	72	34.7%

Drawings, eg. engineering, architectural	72	26.4%
Podcasts	72	25%
Satellite images	70	24.3%
Aerial photos	71	23.9%
Blueprints	69	15.9%
Images of organisms	67	14.9%
Images of cell structures	68	13.2%
Chemical structures	71	12.7%
Gene/Protein – maps and sequences	68	11.8%
Images of circuits	71	11.3%

4.10 DIFFICULTY IN FINDING OR ACCESSING DIGITAL NON-TEXT-BASED RESOURCES

It was surprising that the response to the question on the difficulty of finding or accessing digital non-test-based resources found (Table 4.14) that 67% answered "no". It was expected that the answer would be the other way around. It might be the fact that both accessing and finding were mentioned in the question might have influenced this response in that either finding or accessing or both was answered. It can also be that as these are users of digital non-text-based resources, they know where to look for the resources they need and use.

Table 4.14   Difficulty in finding digital non-text-based resources [n = 93]

Hard to find	**Frequency**	**%**
Yes	26	28.0%
No	67	72.0%
TOTAL	**93**	**100%**

4.11 FRUSTRATIONS OR PROBLEMS ENCOUNTERED IN FINDING AND/OR ACCESSING NON-TEXT DIGITAL RESOURCES?

Respondents, who answered "yes" to the previous question, were given the opportunity to illuminate frustrations in this open-ended question.

There were 40 respondents to this question. Not surprisingly the highest number of responses (14) was about problems/frustrations in finding, accessing and downloading resources. This is in line with the literature as Green (2006) and Pisciotta (2005) noted. The responses included:

- "It is often hard to find exactly what you are looking for." (i.e. searches might yield many sources that are either commercial or low quality);
- "Lack of relevance - Not sufficiently catalogued/organised . Have to search a whole day long to find one or two usable items. It is difficult to find the exact thing you are looking for."

Seven respondents also mentioned time as a factor, with download-time being a major hurdle and three mentioned the time it takes to search and find relevant material. Another frustration was bandwidth or slow downloads (4).

Copyright was also an issue mentioned by three respondents. This is in line with findings by Harley et al (2006), Pisciotta (2003) and Green (2006). The respondents were uncertain about the copyright or were worried that they might infringe copyright. One respondent said: "Not able to use them because of the ambiguities of copyright" and another "Cannot find what I want - copyright problems- therefore I generate my own."

Lack of knowledge and skills in using these resources were mentioned by some respondents and this again points to the amount of training academic staff need in order to utilise digital non-text-based resources to the full.

B.   FUTURE USE

From this section for the rest of the questionnaire the users were reunited to ascertain possible future requirements.

4.12   IMPORTANCE OF WEB-BASED RESOURCES FOR RESEARCH AND TEACHING PURPOSES

In order to ascertain what kind of digital non-text-based resources academic staff might use if they have access to, the question (question 10) was posed and respondents were asked to rate it as "Unimportant; Not so important; Neutral; Important; Very important." The same 30 choices were offered that were used in question 7, as well as the opportunity to add some more at the "Other" option.

The "Important" and "Very important" numbers were combined to ascertain which resources would be most likely to be used. Not surprisingly the ambiguous "teaching materials" was once again the highest percentage (84.5%). This indicates that academic staff has a great need for digital teaching material whether non-text-based or text-based. The next highest scores are for "Figures" (70.7%), "Diagrams (68.7%) and "Pictures" (68.7) with "Photographs" at 66.4%. It must be kept in mind that not everybody ticked all 30 choices. Table 4.15 summarises the responses with the three categories "Unimportant; Not so important and Neutral" combined.

It is interesting that the same choices feature in the 12 top spots of both table 4.13 and table 4.15 below, though they are in slightly different order. They cannot be directly compared as table 4.13 was answered only by the users of digital non-text-based resources and table 4.15 could be answered by everybody - potentially 181 respondents.

The category "other" was again offered and 13 responses were entered which mostly concluded that resources needed would depend on the subject they taught or area of research. Other resources mentioned were:
- Full-length videos on management and leadership (1)
- Geographic Information systems (1)
- Historical material such as timelines (1)

Table 4.15   Preferences in future use of digital non-text-based resources

	n	Important & Very important
Teaching materials	142	84.5%
Figures	147	70.7%
Diagrams	147	68.7%
Pictures	147	68.7%
Photographs	144	67.4%
Graphs	143	67.1%
Statistical tables	138	65.9%
Charts eg. bar charts, histograms	141	64.5%
Data sets	143	60.1%
Flow charts	138	59.4%
Video clips	142	54.9%
Maps	140	52.9%
Sound files	137	48.9%
Audio files	137	48.2%
YouTube video clips	136	45.6%
Images of art works	135	37.8%
Blogs	143	37.1%
Podcasts	135	36.3%
Drawings, eg. engineering, architectural	134	34.3%
Equipment illustrations	135	32.6%
Schematics	135	32.6%
Satellite images	133	32.35%
Aerial photos	137	32.1%
Images of three-dimensional objects	134	30.6%
Gene/Protein – maps and sequences	131	26.7%
Images of organisms	134	26%
Images of cell structures	133	23.3%
Blueprints	131	22.9%
Chemical structures	134	21.6%
Images of circuits	134	20.9%

4.13   REQUEST FOR UNISA NON-TEXT-BASED RESOURCES CURRENTLY NOT DIGITISED TO BE MADE AVAILABLE IN DIGITAL FORMAT

This open-ended question endeavoured to ascertain what other material owned by Unisa can possibly be made available to academic staff in digital format, by the library This resulted in 61 responses, but unfortunately most were non-responsive (not applicable, not sure or none). One respondent replied, "This very idealistic and far removed from operation reality - nice to have at this stage".
Disappointingly there were not many specific resources or collections mentioned. This could be because they do not know of any available analogue resources that can be digitised and made accessible. Other responses indicated material not owned by Unisa such as "YouTube" and "latest business magazine"

The only fairly specific response was that the "newspaper archives currently on microfilm" should be digitised. These, however are commercial products and Unisa Library does not own the copyright. Other possibilities mentioned were (quoted verbatim):

- Library archive film footage, photos, and other images

- Speeches of historical figures from the liberation struggle

- Archives

- The research results from bureau of market research, a bureau of Unisa
- Study guides, Contents of the study materials, especially study guides content. With patent rights.
- Marks sheet must be digitalised and emailed to lecturers
- THE LIBRARY ITSELF. Year-planners, Digital equipment
- The whole payroll system, for example, switch to SAP.

4.14   DIGITAL SERVICES THAT UNISA LIBRARY COULD INCLUDE IN ITS RANGE OF SERVICES

No guidelines or examples were given in this question in order to leave respondents free to make a "wish list". It was expected that some suggestions would fall outside the remit and

parameters of the library's services and that some would not be about digital non-text-based resources, but it was an opportunity to obtain information about a desired service.

There were 52 respondents and disappointingly most of these (32) gave non-responsive or not usable answers, such as, "not applicable, none, not sure, it is fine as it is" and "all of them". The rest of the responses are summarised as follows (verbatim):

- "Book downloads

- Business School data information

- Creating blogs and video clips

- Digital format of prescribed text books to perform searches

- Digital maps (1:50 000 topographical, ortophotos, etc). Usually available from the surveyor general's office.

- Economics data sets, diagrams and graphs

- History

- History of anthropology

- I would like all journals Unisa has to be digitised - as it is, some are difficult to find in electronic format.

- Information relating to the students' guides just as the students receive them when they have registered. In other words, whatever material – with its content - they received when registering , should be available on line as well ; of course with necessary restrictions, like copy rights.

- International one-on-one digital video connections

- Life Cycles

- Maps and GIS data

- Museum & heritage

- Private Security (CForporate investigations)

- Topographic maps and aerial photos

- Video clips of one's research area if available/accessible.

- Video digital, You tube; ability to copy You tube material

- Web-accessible information of the budget of Unisa

- Westlaw

- Wider range of academic texts+ articles and data sources

C.   TRAINING

It was expected that academic staff might require training in the finding, accessing or using of digital non-text-based resources. It could also give an indication of some of the impediments respondents face in possible use of digital non-text-based resources.

4.15   IMPORTANCE OF TRAINING IN THE USE OF DIGITAL NON-TEXT-BASED MATERIAL

The respondents had to rate training needs by indicating "Insignificant; Of lesser importance; Neutral; Important; Very important" for three aspects , namely "finding, accessing and using digital non-text-based resources." In the light of the results of previous responses it was not surprising that the overwhelming majority of respondents (average of 75%) rate training in all, namely "finding, accessing and using" as important or very important. This confirms that the Unisa Library has a very important information and training assignment to plan and execute. It is interesting is that 15% of staff feel neutral about training.

Table 4.16 illustrates the responses reduced to three categories and shows the preferences very clearly.

Table 4.16   Training in how to find digital non-text-based resources

Training in how to:	n	Important & Very important
find digital non-text-based resources in my field	173	75.1%
access digital non-text-based resources	171	74.9%
use digital non-text-based resources	172	75.6%

Respondents were asked to indicate their preferred mode of training with 9 choices offered, as well as the open-ended option "Other" to specify a choice not mentioned. Expectedly most respondents (24.3%) preferred a blended mode of training with various online training methods. Significantly, a course that they can complete in their own time is most acceptable to 39.3% but divided between those preferring text only (21.4%) and respondents who would

like to have training as a video (17.9%). The least preferred method (1.7%) is "Interactive training (not live): e g. blog, message board". The open-ended section of the question resulted in seven responses of which four preferred a face-to-face training option. One would like a CD course and one gave a non-responsive answer.

Table 4.17   Methods of online training preferences

Blended learning (an integrated mix of different online training methods)	24.3%
An online course that I can complete in my own time, presented as text only	21.4%
An online course that I can complete in my own time, presented as a video, eg. YouTube type video	17.9%
Interactive training (live): chat, instant messaging, application sharing	11.0%
Uncertain: I don't know any of these online training methods	7.5%
Not applicable: I do not need training	6.9%
Interactive training (live): audio or video conferencing	6.4%
Training delivered as an audio or video podcast (for listening or viewing on your hand-held device or suitably-equipped cell phone)	2.9%
Interactive training (not live): eg. blog, message board	1.7%

Table 4.18 shows the 9 possible choices of kinds of training by college.

Table 4.18   Online training preferences of/ by Colleges

	n	CAES	CEMS	CHS	CSET	LAW	OTHER
An online course that I can complete in my own time, presented as text only	37	2.7	18.9	40.5	10.8	24.3	2.7
An online course that I can complete in my own time, presented as a video, eg. YouTube type video	28	7.2	32.1	32.1	10.7	14.3	3.6
Interactive training (live): chat, instant messaging, application sharing	18	5.6	27.8	44.4	5.6	11.1	5.6
Interactive training (live): audio or video conferencing	11	0	9.1	45.5	9.1	0	36.4
Interactive training (not live): eg. blog, message board	2	0	0	50	0	50	0
Training delivered as an audio or video podcast (for listening or	5	0	0	40	40	0	20

viewing on your hand-held device or suitably-equipped cell phone)						
Blended learning (an integrated mix of different online training methods)	39	5.13	35.9	41	12.9	2.6	2.6
Uncertain: I don't know any of these online training methods	11	0	27.3	63.6	9.1	0	0
Not applicable: I do not need training	11	9.1	18.2	18.2	18.2	27.3	9.1

4.16   OTHER COMMENTS

The final question (20) was open-ended and included whether an academic staff member should wish to refine some of the answers given before or add to matters already mentioned. It is also an opportunity to comment on any problem or other matters.

There were 27 respondents to this question and of these seven were very positive about the library and the move towards more digital resources. The responses did not yield any new information on digital non-text-based resources and this was not an unexpected result as respondents had ample opportunity at most questions to give personal input.
There were comments such as:

- "Thank you for being an excellent department."
- "Uplifting digital services at Unisa will be good for both its image and the students at this university"
- "Very grateful to the library for discovering new resources for lecturers".

There were 11 non-responsive answers which included comments such as "not applicable" and "none".

4.17   SUMMARY

This chapter revealed that more than 50% of academic staff do use digital non-text-based resources but of those who do not use it nearly 60% do so because they are not aware of any resources in their field and this should be investigated further. The desire for training was expressed by 75% of all respondents. Most would prefer a blended mode of training though

many would prefer to complete a training course in their own time. The data has also revealed that Google is a very popular search engine, but that library databases are used by nearly half of the respondents who used digital non-text-based resources.

CHAPTER 5
SUMMARY, FINDINGS AND RECOMMENDATIONS

5.1   INTRODUCTION

The purpose of this study was to ascertain the use of and requirements for digital non-text-based resources of a group of the academic staff complement of a South African open distance learning (ODL) institution.

The study was conducted by using a self-administered questionnaire as survey instrument. One hundred and eighty one (181) valid responses were received from 415 solicited respondents, a response rate of 43.61 %. The demographic data showed that 54.7% of respondents were male and 45.3% female. The age bracket 40 to 59 years contained 62.6% of respondents while 30.7% were below 40 years and only 6.7% over 60 years of age. The respondents represented all 5 academic colleges of the university. The largest component amounting to 39.8% of the total were drawn from the College of Human Sciences (CHS) which is the largest college. Second was the College of Economic and Management Sciences (CEMS) with 26.7% respondents. Next came the Law College with 12.5% and the College of Science, Engineering and Technology (CSET) with 10.8%. Finally the smallest component namely 5.1% represented the College of Agriculture and Environmental Sciences (CAES). Respondents were asked to state their post level (professional position) and were grouped accordingly into two levels, the first comprising the Senior Positions, of Professor, Associate Professor and Senior Lecturer which amounted to 58.9% of the respondents while the second comprised the Junior Positions.

The main findings and the results of this investigation will be discussed in this chapter according to the research question set out in 1.3.1.

5.2   THE MAIN ROLE PLAYER

The academic staff members and their use of digital non-text-based material in teaching and research are the main role player in this study. In order to understand the complexities of especially their teaching environment, an understanding of their students' learning preferences and information seeking behaviour was established.

5.2.1   The student

Studies revealed that the millennial generation (people born after 1982) are now part of the higher education environment and the workplace. They are skilled in the use of various computer applications and feel comfortable in the digital environment, often more so than in the print world. However, when looking at the Unisa student it is clear by no means all of them are comfortable with the digital world and many lack the basic skills and access to utilise the richness of digital resources. This has to be kept in mind when preparing lectures and study material for them. Aspects of the generic millennial student described in chapter1, paragraph 1.2.1, and the reality of the Unisa student are summarised in Table 5.1.

Table 5.1   Computer literacy of students in the Higher Education Environment

Students described in literature	**Unisa students** [Unisa Library 2008]
High computer literacy levels.	Computer literacy levels vary from high-level information technology competency to no knowledge and experience whatsoever.
Spend much time online.	Time spent online varies greatly among students. Those with unlimited and/or unrestricted internet access also spend much time online. Students who are computer literate but do not have their own computer at home must rely on an internet café, library, etc. These constraints limit the student's time spent online.
Regard internet as an access tool.	Internet access and the amount of time spent online may determine to a significant extent whether a student uses the internet as an access tool. Students coming from a school environment with computer and internet access are in a much more favourable position than students entering a university with little or no computer literacy.
Comfortable in an image-rich environment.	No applicable information is available in the library and information science environment.
Inept use of technology frustrates them.	Studies done at Unisa Library showed that those students with high computer literacy levels expressed their frustration with inept use of technology by Unisa staff.

The literature from the USA and the UK does not always reflect the situation the academic staff member at Unisa has to keep in mind. The following table compares the main aspects of the Unisa student profile and the students described in the literature and summarised in chapter1, paragraph 1.2.1.

Table 5.2   Information seeking behaviour of students in the higher education environment

Students described in literature	Unisa students [Unisa Library 2008]
Prefer online resources.	Unisa students who are highly computer literate prefer online access. Less fortunate students in this regard need to access information in traditional way, eg reading books and periodicals.
Want faster service and usable results.	Faster service and usable results are preferred, but the mode of delivery varies with computer facilities available and the student's proficiency.
Do not want to search too deeply for information.	Both the computer literate or not, students do not want to search too deeply for information.

It is clear from the above that the academic staff member at Unisa deals with a complex teaching situation that requires knowledge delivery by means of traditional teaching methods, as well as delivery requiring high computer literacy levels and innovative thinking in teaching and learning.

5.2.2   The academic staff member

Academic staff members globally, including those from South Africa, find themselves in a fast-changing learning, teaching and research environment. Libraries are less visited in person, and especially scholarly articles, and e-books to a lesser degree, are accessed electronically from the office or home. The behaviour of South African academic staff conforms to the pattern described above. The web is widely used for information gathering, but library e-resources are used more frequently (Naudé, 2008, p. 204).

Studies found that email is the highly favoured way of communicating with peers and students (Jones & Johnson-Yale, 2005). The same preference is shown and encouraged at Unisa.

Beside being highly computer literate academics should also be proficient at helping themselves to find reliable and scientific information on the web. This includes not only text-based resources but also digital non-text-based resources.

Academic staff need to be able to enhance learning material in supporting students to understand complex concepts, and to that end finding, accessing and using digital non-text-based material is a tool to enable staff to accomplish this more fully. At the same time the academic staff need to keep in mind that many of their students do not have access to computers and their non-text-based material needs to be converted to the print-based version. This will start to change as the Unisa ODL model is fully implemented and more digital routes and aspects are implemented.

5.3   SUMMARY OF THE MAIN FINDINGS

The main findings are discussed according to the sub-problems listed in chapter 1 at 1.3.1. Sub-problems that emerged are:

1. What kind of digital non-text-based material do academic staff incorporate into their research and teaching?
2. Where do staff find relevant digital non-text-based material?
3. What digital non-text-based resources do academics require/ would they like to have future access to?
4. Are there differences between academic disciplines?

5.3.1   Use of digital non-text-based material

The literature shows that many academic staff use digital non-text-based material, including such resources as photographs, pictures and drawings, but also maps, GIS systems, simulations, animations, data sets and video and sound clips (Harley, 2006; Green, 2006; McMartin, 2006; Kemp & Jones, 2007). They use these resources widely usually to enhance classroom lectures, illustrate concepts and as discussion points. Such resources are also used

in course packs or as part of assignments where students have to study the non-text-based material in order to complete assignments (Harley et al, 2006; Green, 2006, Roda, 2006). The literature mainly dealt with teaching applications, and only vestigially with research.

Unisa staff indicated that the resources they used most were teaching materials, figures, charts, photographs, graphs, diagrams and pictures. It must be kept in mind that 30 choices were offered, but only to the respondents who indicated that they use digital non-text-based resources, and not every respondent engaged all the choices.

Pisciotta (2005) and Green (2006) found that the most important uses of digital non-text-based resources were compiling lectures, group viewing, seminars and other teaching situations.

The respondents of this study indicated that 53% use digital non-text-based resources and most (69.4%) use it both for research and teaching. Using it for research alone (23.2%) received more responses than teaching only (7.4%). It could be that preparation for and finding of resources to use in new study material are included in research. It must also be kept in mind that the staff of this ODL institution do not present classes every day. They often never see their students and teach via study guides, course packs and tutorial letters. Discussion classes are held in designated regions of South Africa, but attendance is not compulsory.

Some participants in this study indicated that they do not use non-text-based resources because such resources are irrelevant to their field or because they experience difficulty with gaining access. However, the largest component of nearly 60% indicated that they were not aware of the existence of digital non-text-based material relating to their field. One respondent indicated: "I haven't used it yet, but would like to". Waibel and Arcolio (2005) support the fact that academic staff are not always aware of resources available to them, not even if they are present on campus. Some staff do not use digital non-text-based resources because they are incompatible with their teaching style (cf. Harley, 2007). The respondents involved in this study were not given an option about teaching style as a choice to respond to. A large number of the academic staff surveyed in the literature indicated that lack of skills or training in the use of digital resources or lack of technical skills are preventing them from utilising digital non-text-based resources (Green, 2006). This is confirmed by the present

study as 75% of the respondents indicated that they require training in finding, accessing and using non-text-based resources.

Research variables in this study that could affect the research outcome in regard to the use of digital non-text-based material by academics were identified as academic seniority, age, gender, and college association. Table 5.3 shows the outcome of each of these variables.

Table 5.3   Variables that may influence the use of digital non-text-based material

Variable	Research outcome
Academic position	There is no significant difference between academic staff from senior position and those from junior positions. However, for both positions, only 52% to 54.3% use digital non-text-based material. Keep in mind that the term "use" can vary from extensive use including a variety of digital non-text-based material to using only one type of digital non-text-based material once in a while.
Age	As expected, respondents above 60 years of age were the least likely users while the rest of the age groups fell in the range of 51% to 27% with the most active users being 30 to 39 years old and not those under 30, as expected.
Gender	It was found that less female (36.8%) than male respondents use digital non-text-based resources (63.2%).
College association	The smallest college (CAES) had the highest proportion of use, ie 77.8%, with CSET at 73.7%. The lowest proportion of use is made by the LAW College.

5.3.2   Finding of relevant digital non-text-based resources

Literature revealed that most academic staff used resources from their own private collections or from those of colleagues (see also Harley et al, 2006; Green, 2006; Schonfeld, 2005; Waibel & Arcolio, 2005). This was not given as a choice for respondents in the survey, and only one respondent mentioned creating own resources. These private collections were

accumulated by various means, including, taking digital photographs, scanning photos or images from books, swapping with fellow academics and downloading from websites.

The choice way of finding material was by word of mouth from colleagues, and everybody used Google as first port of call for material on the web (see also McMartin et al, 2006; Harley, 2007; Waibel & Arcolio, 2005 and Othman, 2005. This trend was confirmed by the present study as Google and several of its applications (eg Image Search and Google Maps) were listed numerous times by respondents.

Use of free material on the web or from specific digital collections or digital libraries were also favoured in the literature (Schonfeld, 2005; Green, 2006; and Naudé, 2008) and they also found that licensed sites were not used that often, while resources accessed through the library websites were seldom used (see also Green, 2006 and Waibel & Arcolio). In contrast, 52% of the respondents engaged in this study stated that they used digital non-text-based resources via the Unisa Library site.

5.3.3   Digital non-text-based resources needed

All respondents were given 30 choices to rank in order importance for future use, and the top ranked choices in regard to importance included teaching materials at 79% of respondents who answered that choice. As noted in chapter 4 (paragraph 4.8), the term "teaching materials" is not clearly defined. It could include combinations of various resources such as graphs, tables, diagrams and pictures, or it could also include textual resources. Should one leave "teaching materials" as a category aside, the next highest chosen resource (then the highest ranked) are figures (77.4%), followed by charts, then photographs, graphs, diagrams and pictures. These same resources were also the top scorers mentioned in the question on use (question 7).   The literature does not mention specific digital non-text-based resources required by academic staff, but concentrates instead on requirements such as good technical support and stable, high quality, pedagogically sound resources mentioned as of importance to academic staff. They would like to have a digital delivery system that will enable them to acquire digital non-text-based resources effortlessly and either save time or reduce effort (Pisciotta, 2005; Kemp & Jones, 2006; Green, 2006).

Uncertainty about copyright was an important barrier to academic staff, and the handling of this problem by knowledgeable staff is on their wish list (Borgman 2005 and Green 2006). This was not offered as a choice to respondents in the survey under review, but some mentioned lack of clarity around copyright as a barrier to using digital non-text-based resources.

5.3.4   Differences between academic disciplines

The literature, especially Pisciotta (2005) and Kemp and Jones (2005) reveals differences in use between academic disciplines and problems involved in organising such resources it as there is no coherent way of classifying the various disciplines which differs from university to university and even from campus to campus.

Table 5.3 already indicated that the smallest college (CAES) had the highest proportion of use of digital non-text-based resources (77.8%), with CSET in second place at 73.7%. The LAW College proportion of use is lowest, with CEMS second lowest. The high proportional use by the College of Agriculture and Environmental Sciences (CAES) and the College of Science, Engineering and Technology (CSET) is in line with findings by Penn State (Pisciotta, 2005) who found that earth and mineral sciences are higher users of digital non-text-based resources than the faculties of arts and architecture. Wolf (2007) established that the life and physical sciences "show the highest use of these visual materials" (p. 500).

This sub-problem was not pursued since the p-value is smaller than 0.05 in some of the cells, but it should nevertheless form the subject of a future study.

5.4   LIMITATIONS OF STUDY

A self-administered survey study may be biased and though the response rate was 43% it might be that some recipients of the questionnaire did not answer it because they are not using digital non-text-based material at present and therefore considered it irrelevant to themselves.

Since this was a first and general exploration of the use of and requirements for digital non-text-based resources in an ODL institution further exploration would have to be done to gain

more detailed and rich insight into the said use and requirements characterising academic staff.

Though there were 30 choices in the questions on use (question 7) and future requirements (question 10), simulations and animations were not offered as choices and were not mentioned by staff in the open-ended part of the questionnaire. The choice of own material was also not offered and the literature (Harley et al, 2006) confirmed that is a big source of use for academic staff. This is a limitation that will have to be explored in a following study.

5.5   RECOMMENDATIONS

The study has shown that 53% of academic staff uses digital non-text-based resources, but that there is also a great need to know more about finding, accessing and using these resources as 75% of respondents indicated that they require training in all three aspects of utilisation. This also indicates that a high percentage do not use digital no-text-based material at present, mainly because they are not aware of non-text-based material related to their field (Chapter 4.4), and in this regard it became clear from open-ended comments that non-users would like help in searching, finding, accessing and using such resources.

Recommendations:
- The Unisa Library should advertise the existing digital non-text-based resources it has available in a more focused way to academic departments.
- Staff who work directly or indirectly with the marketing of the Unisa Library services should be made more aware of available digital non-text-based resources, and they should search for high-quality digital non-text-based resources, establish all the conditions of use, and make the lists or sites available to academic staff and students for ease of use.
- Subject-specific training provided by personal librarians should include training in finding, accessing and using digital non-text-based resources.

5.6   FUTURE RESEARCH

This study was of limited scope and there are various matters that could be studied further.

For example focus-group interviews could be laid on with specific departments to explore their requirements where digital non-text-based resources are concerned and to ascertain the role that the library can play in this regard.

The use of digital non-text-based resources in research was not widely discussed in the literature, hence a deeper study of this aspect of usage is warranted as universities are assessed on research output (among other criteria) in South Africa and elsewhere.

It would also be interesting to compare the digital non-text-based usage pattern at Unisa with those of other large and mega ODL institutions.

It could also be useful to the use of digital non-text-based resources at all universities in South Africa and ascertain whether it would be feasible to establish a higher-education non-text-based resources digital library to which all the universities could contribute and that could be utilised by all contributors.

The study could become part of a longitudinal study if the same concepts are revisited in two or three years' time when the Unisa ODL model has been fully implemented, the technology has expanded even more, and academic staff have been made more aware of and trained in the finding, accessing and use of digital non-text-based resources.

5.7   CONCLUDING COMMENT

The mandate for this study was to investigate whether academic staff members in an ODL institution use digital non-text-based resources and what their future requirements are. Although in a limited manner, this investigation was successfully completed and it was confirmed that academic staff do use digital non-text-based resources, and that they require a variety of digital non-text-based resources for use in research and teaching.

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17 February 2009

Members of the Library Executive Team

Dear Dr Mbambo-Thata

Permission requested to take part in a Unisa Library survey

I plan to start with the research for my thesis, as partial fulfilment for the degree *International Master in Digital Library Learning (DILL)*. The degree is offered by a consortium of three European universities, namely Oslo University College, University of Tallinn and Parma University. I am doing the thesis under the supervision of Oslo University College.

I would like to ask permission to take part in the survey on the 21st Century Research Library, Florida. I would like to concentrate on the possible digital needs of the academic staff.

I request permission to get access to official Unisa Library documents and to have discussions with staff during the course of study.

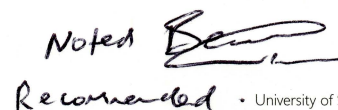The advantage for the Unisa Library would be in the form of research output, resulting in a thesis that I would donate to the Unisa Library. I am willing to do a presentation about the results to my fellow library staff members.

Would it be possible to have a response by Wednesday 25 February 2009.

Annette le Roux
Directorate Customer Services
Library Archives
Staff number 1102443

Noted

Recommended

CURRENT AND PROJECTED USE OF DIGITAL SERVICES PROVIDED BY
UNISA LIBRARY

INSTRUCTIONS
a) **Please read each item carefully and click next to your choice.**
b) **Write the required response in the space provided.**
c) **Answer all the questions to the best of your ability. Your response is vital for the success of this survey.**
d) **Please read definitions given to clarify concepts.**

Non-text-based: Nonlinear forms of representing ideas (as images), including, but is not limited to figures, maps, graphs, charts, data sets, photographs, other images and multimedia resources. (For more examples see CSA Illustrata categories at http://www.csa.com/factsheets/supplements/OB_cat.php). It is accepted that some, graphs and charts among others, include some text.
Text-based material includes e-journals, e-articles, e-books, e-reports, and etc.

A.   CURRENT USE

1.   Do you use any digital non-text material in research or teaching?
        Indicate your response by marking the relevant box with a 'cross' (X)

Yes	
No	

If yes, please proceed to question 3
If no, please proceed to question 2

2.   Why don't you use digital non-text-based material?
        Indicate your response by marking the relevant box with a 'cross' (X)

Not applicable to my field	
Not available in my field	
Accessibility restricted	
Not aware of non-text-based material relating to my field	
Other, please specify	

Please proceed to question 10

3.   In which professional context do you use digital non-text-based material?
        Indicate your response by marking the relevant boxes with a 'cross' (X)

research	
teaching	
other, please specify	

4. Do you search or access digital non-text-based resources via Unisa Library sites?
    Indicate your response by marking the relevant box with a 'cross' (X)

Yes	
No	

5. Which Unisa Library resources do you use to access digital non-text-based resources?
    (Unisa Library resources: Electronic or web-accessible information resources licensed
    to or created by Unisa Library).
    Insert typewritten answer below

6. Which search engines do you use to access digital non-text-based resources? (eg.
    Google Image Search, Google Maps, MapQuest etc)
    Insert typewritten answer below

7. Which of the following web-based resources do you use for research and teaching
    purposes?
    You may mark (X) one box per line.

	Every day	Several times a week	About once a week	Less than once a week	Not used
Aerial photos					
Audio files					
Blogs					
Blueprints					
Charts eg. bar charts, histograms					
Chemical structures					
Data sets					
Diagrams					
Drawings, eg. engineering, architectural					
Equipment illustrations					
Figures					
Flow Charts					
Gene/Protein – maps and sequences					
Graphs					
Images of art works					
Images of cell structures					
Images of circuits					
Images of organisms					
Images of three-dimensional objects					

Maps					
Photographs					
Pictures					
Podcasts					
Satellite images					
Schematics					
Sound files					
Statistical tables					
Video clips					
YouTube video clips					
Teaching materials					
Other, please specify					

8.   In your experience are digital non-text-based resources hard to access/find?
      Indicate your response by marking the relevant box with a 'cross' (X)

Yes	
No	

      If YES, proceed to question 9.
      If NO, proceed to question 10

9.   What frustrations/problems do you encounter in finding and/or accessing non-text
      digital resources?

      _____

      _____

      Please proceed to question 10.

B.   FUTURE USE

10.   How important would you rate the following web-based resources for research and
      teaching purposes?
      You may mark (X) one box per line.

	Unimportant	Not so important	Neutral	Important	Very important
Aerial photos					
Audio files					
Blogs					
Blueprints					
Charts eg. bar charts, histograms					
Chemical structures					
Data sets					
Diagrams					
Drawings, eg. engineering,					

architectural					
Equipment illustrations					
Figures					
Flow charts					
Gene/Protein – maps and sequences					
Graphs					
Images of art works					
Images of cell structures					
Images of circuits					
Images of organisms					
Images of three-dimensional objects					
Maps					
Photographs					
Pictures					
Podcasts					
Satellite images					
Schematics					
Sound files					
Statistical tables					
Video clips					
YouTube video clips					
Teaching materials					
Other, please specify					

11.　　What non-text-based material of Unisa, currently not digitised would you like to have available in digital format?
Insert typewritten answer below

12.　　Which digital services would you like Unisa Library to include in its range of services?

_____

_____

_____

C. TRAINING

13. Please indicate how important you would rate training in the use of digital non-text-based material
You may mark (X) one box per line.

	Insignificant	Of lesser importance	Neutral	Important	Very important
Training in how to find digital non-text-based resources in my field					
Training in how to access digital non-text-based resources					
Training in how to use digital non-text-based resources					

14. Which method of online training would you prefer?
Mark (X) one box only

An online course that I can complete in my own time, presented as text only	
An online course that I can complete in my own time, presented as a video, eg. YouTube type video	
Interactive training (live): chat, instant messaging, application sharing	
Interactive training (live): audio or video conferencing	
Interactive training (not live): eg. blog, message board	
Training delivered as an audio or video podcast (for listening or viewing on your hand-held device or suitably-equipped cell phone)	
Blended learning (an integrated mix of different online training methods)	
Uncertain: I don't know any of these online training methods	
Not applicable: I do not need training	
Other, please specify	

D. DEMOGRAPHIC INFORMATION

15. Gender
Indicate your response by marking the relevant box with a 'cross' (X)

Male	
Female	

16.   Age
        Indicate your response by marking the relevant box with a 'cross' (X)

Below 30 years	
30-39	
40-49	
50-59	
60+	

17.   Post level
        Indicate your response by marking the relevant box with a 'cross' (X)

Professor	
Associate Professor	
Senior Lecturer	
Lecturer	
Research Fellow/ Researcher	
Research Assistant	
Other, please specify	

18.   College

19.   Academic department/Bureau/Institute/Centre

20.   Any other comments

        _____

        _____

        _____

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS QUESTIONNAIRE

Dear Academic staff member

Academic staff - digital needs survey

As a customer-focussed facility, Unisa Library invites you to participate in this survey of digital resources you require and use, (other than text-based material such as e-journals, e-books, e-reports, etcetera). The mainly **non-text-based material** forming the subject of enquiry here includes, but is not limited to figures, maps, graphs, charts, data sets, photographs, other images and multimedia resources. It is accepted that graphs and charts among others will of necessity include some text.

Your input in response this questionnaire will be appreciated.

The purpose of this survey is:
- To establish your use of various digital non-text-based resources
- Your prospective requirement for non-text-based resources
- To determine if the Unisa Library can help you to gain access to a variety of digital media

Your participation in this survey: Participation in this study is entirely voluntary. We did not sample the staff of the various departments, however, as comprehensive input from each and every academic staff member is critical for the present purposes.

Confidentiality: The anonymity of your response is guaranteed and no attempt will be made to match respondents to their forms. Your answers will be summarised so that your individual responses cannot be identified in any report. You may certainly identify yourself, however, should you wish to do so or if you have specific issues to which you would like to receive a personal response from the library.

Questions concerning this survey: Please contact Esté Retief (012) 429 3083 or retiee@unisa.ac.za

Results of this survey will be available on the Unisa Library website.

Due date for completing this web-based survey questionnaire is Wednesday 27 May 2009.

Please click on the following link to access the survey
http://www2.unisa.ac.za/questionaire/5/ds.asp

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS QUESTIONNAIRE

COLLECTIONS OR RESOURCES MENTIONED IN CHAPTER 2

A short description about the collections that mentioned in Chapter 2 as quoted from the literature. The descriptions at each source have been copied from its website.

Alexandria Digital Library (ADL)

http://www.alexandria.ucsb.edu/ ; http://alexandria.ucsb.edu/adl/about_adl.html

The Alexandria Digital Library (ADL) is a distributed digital library with collections of georeferenced materials. To provide a federated spatially searchable digital library of geographically referenced materials. The library's components may be distributed (spread across the Internet) or coexist within a single network or desktop. Geographically-referenced means that all the information objects in the library will be associated with one or more regions ("footprints") on the surface of the Earth.

Artchive (Mark Harden's Artchive)

http://www.artchive.com/

The Artchive offers browser access in HTML format to the archive for all of my fine art scans. There are now more than 2,000 scans from over 200 different artists.

The images, text and articles included at this site are for private, non-profit use only. Other usage is strictly prohibited.

The museum is divided into several galleries:

- The Artchive
- Glyphs Art Reviews
- The Galleries
- Theory and Criticism
- Juxtapositions
- Art CD-ROM Reviews
- Art Links

The Art Museum Image Consortium (*AMICO*)
http://www.amico.org/

The Art Museum Image Consortium (AMICO) was a not-for-profit organization of

institutions with collections of art, collaborating to enable educational use of museum

multimedia. AMICO operated from 1997 to 2005.

The AMICO Library

The AMICO Library™ was a licensed digital educational resource available under

subscription to universities and colleges, public libraries, elementary and secondary schools,

and museums. It represented works in the collections of AMICO Members.

Subscriptions to The AMICO Library are no longer available.

ARTstor
http://www.artstor.org/index.shtml
ARTstor is a digital library of nearly one million images in the areas of art, architecture, the
humanities, and social sciences with a set of tools to view, present, and manage images for research
and pedagogical purposes.
The ARTstor Digital Library is used by educators, scholars, and students at a variety of institutions
including universities, colleges, museums, public libraries, and K-12 schools. The Digital Library
serves users both within the arts and in disciplines outside of the arts. This includes historians of art
and architecture and others engaged in the visual arts, as well as individuals in fields as diverse as
American Studies, Anthropology, Asian Studies, Classical Studies, Literary Studies, Medieval
Studies, Music, Religious Studies, and Renaissance Studies, all of whom find the images in ARTstor
to be relevant to their teaching and research. To learn more, please see our section on Interdisciplinary
uses.

Associated Press Multimedia Archive (A service of the Associated Press)
http://accuweather.ap.org/
The AP Photo Archive contains some 400,000 images, most of which are contemporary
photos made since late 1995. Hundreds of spot news and feature pictures enter into the
Archive each day, and a selection of historical images are scanned in weekly.

The Archive features state, regional and national photos from North America, as well as the
best of the international photo report. A second database, available through this web site,
features the regional European and Asian daily picture reports, along with a selection of their
historical photos. The Archive uses Personal Library Software to search for photos in as little
as 30 seconds.

BEN: Biological Sciences Pathway (BEN)
http://www.biosciednet.org/portal/
The National Science Digital Library (NSDL) Pathway for biological sciences education. The
BEN Portal provides access to education resources from BEN Collaborators and is managed
by the American Association for the Advancement of Science (AAAS). Over 13,063
reviewed resources covering 77 biological sciences topics are available. BEN resources can
help you engage student interest, shorten lesson preparation time, provide concept updates,

and develop curricula that are in line with national standards for content, use of animals and humans, and student safety.

Birds of North America Online (BNA)

http://bna.birds.cornell.edu/bna

In two centuries of American ornithology, The Birds of North America (BNA) is only the fourth comprehensive reference covering the life histories of North America's breeding birds. Following in the footsteps of Wilson, Audubon, and Bent, BNA provides a quantum leap in information beyond what those historic figures were able to assemble. The print version of BNA was completed in 2002 – 18 volumes, 18,000 pages -- a joint 10 year project of the American Ornithologists' Union, the Cornell Lab of Ornithology, and the Academy of Natural Sciences. Now as an online project of the Cornell Lab of Ornithology, BNA is becoming a living resource.

Grove Dictionary of Art   (Oxford Art Online - Home of Grove Art Online)

http://www.oxfordartonline.com/public/

Grove Art Online includes numerous articles on the materials and techniques used by artists and craftspeople from ancient to modern times.

The most authoritative resource for all aspects of western and non-western art

 More than 45,000 signed articles on painting, sculpture, architecture, decorative arts, textiles, jewellery, design, furniture, and more

More than 5,000 art images, maps, and line drawings from major collections such as The Metropolitan Museum of Art, The Museum of Modern Art, and The British Museum

Over 40,000 image links to museum and gallery websites

Educational resources include world art timelines, MoMA lesson plans, and thematic guides

Links to ARTstor and ArtResource

History of Costume slide set

http://www.slidepresentationsdvd.com/

HISTORY OF COSTUME and *ARCHITECTURE, INTERIORS AND FURNITURE* are used nationwide and abroad in many costume studies, fashion, and theater programs, and in libraries and other departments in universities. They are also used in education departments and libraries in museums worldwide.

HISTORY OF COSTUME DVD! Created from the unique *HISTORY OF COSTUME* slide presentation. 1,500 color images and the original 450-page text of notes, sketches, and commentaries. Seen through beautiful works of art, the history of clothing for women and men throughout Western civilization. From ancient Egypt to 1992. Exclusive features include a close-up detail option and indexes of artists and terms.

JSTOR

http://www.jstor.org/

JSTOR's overarching aims is to preserve a record of scholarship for posterity and to advance research and teaching in cost–effective ways. We operate a research platform that deploys information technology and tools to increase productivity and facilitate new forms of scholarship. We collaborate with organizations that can help us achieve our objectives and maximize the benefits for the scholarly community.

Today, academic journals comprise the majority of the content in the archive. Journals are always included from volume 1, issue 1 and include previous and related titles. The most

recently published issues (past 3-5 years) are not available. However, users can search this material and link to the publisher's site or other online source for access

Library of Congress Digital Collections & Services

http://www.loc.gov/library/libarch-digital.html

The Library of Congress has made digitized versions of collection materials available online since 1994, concentrating on its most rare collections and those unavailable anywhere else. The following services are your gateway to a growing treasury of digitized photographs, manuscripts, maps, sound recordings, motion pictures, and books, as well as "born digital" materials such as Web sites. In addition, the Library maintains and promotes the use of digital library standards and provides online research and reference services.

The Library provides one of the largest bodies of noncommercial high-quality content on the Internet. By providing these materials online, those who may never come to Washington can gain access to the treasures of the nation's library. Such online access also helps preserve rare materials that may be too fragile to handle.

National Aeronautics and Space Administration (NASA)

http://www.nasa.gov/

Nasa has a wide variety of digital resources for various categories of users. They have pages for the Public, Educators, Students, Media, Policymakers and Employees.

National Science Digital Library (NSDL)

http://nsdl.org/

The National Science Digital Library (NSDL) was created by the National Science Foundation to provide organized access to high quality resources and tools that support innovations in teaching and learning at all levels of science, technology, engineering, and mathematics (STEM) education. As a national network of learning environments, resources, and partnerships, NSDL seeks to serve a vital role as STEM educational cyberlearning for the nation, meeting the informational and technological needs of educators and learners at all levels.

NSDL is designed primarily for K-16 educators, but anyone can access NSDL.org and search the library at no cost. Access to most resources discovered through NSDL is free; however, some content providers may require a login, or a nominal fee or subscription to retrieve their specific resources.

Perseus Digital Library

http://www.perseus.tufts.edu/hopper/

The Perseus Project is a digital library project of Tufts University that assembles digital collections of humanities resources. It is hosted by the Department of Classics. The project was founded in 1987 to collect and present materials for study of ancient Greece. It has published two CD-ROMs and established the Perseus Digital Library on the World Wide Web in 1995.

Perseus has a particular focus upon the Greco-Roman world and upon classical Greek and Latin, but the larger mission provides the distant, but fixed star by which we have charted our path for over two decades. Early modern English, the American Civil War, the History and Topography of London, the History of Mechanics, automatic identification and glossing of technical language in scientific documents, customized reading support for Arabic language, and other projects that we have undertaken allow us to maintain a broader focus and to

demonstrate the commonalities between Classics and other disciplines in the humanities and beyond

Prometheus
http://www.prometheus.org/
Founded in 2003, the Prometheus Institute for Sustainable Development is a US-based non-profit focusing on collecting and disseminating information on all types of technology and processes used in promoting global economic, industrial, and societal sustainable development. Our goal is to accelerate the deployment of socially-beneficial sustainable technologies, including those of energy, water, and food, by educating industry participants, advocates, and policymakers about their benefits. The Institute strives to be the world's leading source of publicly available primary data on the photovoltaic (PV) supply chain and end-markets.

RLG   Cultural Materials Initiative
http://worldcat.org/arcviewer/1/OCC/2007/08/08/0000070519/viewer/file2813.html
The project was spearheaded by the **Cultural Materials Alliance**. The RLG Cultural Materials Alliance was a subset of RLG members who joined together to create a resource for research and education and to establish best practices for making digitized cultural heritage collections accessible via RLG Cultural Materials. The conclusion of this initiative was announced in early 2007 as part of the merger and transition of RLG and OCLC products and services
One outgrowth of this initiative was the development of RLG Cultural Materials, a rich multimedia collection of digitized manuscripts and images from leading institutions such as the Library of Congress and the Smithsonian Institution. This database gave users a means of searching rare and varied collections that were otherwise unavailable to museum or library visitors.

Saskia
http://www.saskia.com/
Saskia, Ltd. is the leading provider of high-quality images for the teaching of art history. Saskia was founded in 1966 by Ron Wiedenhoeft, then doctoral candidate in art and architectural history at Columbia University, and his wife Renate. By photographing each summer over a period of thirty-eight years and during sabbaticals, the archive has now grown to 30,750 images. The Saskia archive is used successfully in introductory courses as well as specialized seminars of Art History and has enhanced a broad range of art history pedagogy and many other disciplines.

Science Direct
http://www.info.sciencedirect.com/about/
ScienceDirect contains over 25% of the world's science, technology and medicine full-text and bibliographic information in both books and journal formats.
Journals: Over 2,500 authoritative titles. The collection includes high-impact-factor titles such as THE LANCET, Cell and Tetrahedron.
Journal Backfiles : A historical archive of titles from 1994 and older, many going back to Volume1, Issue1. Together with more recent Backfiles there are more than nine million articles.
Online Books: The continuously expanding books collection on ScienceDirect includes eBooks, Major Reference Works, Book Series and Handbooks. Over 10,000 titles in total including backfiles.

APPENDIX 5
SUMMARY OF LITERATURE ON IMAGES - USE & TEACHING

Author(s)	Publication date	Title	Respondents	Methods	Subject of study	Main findings
Nitecki, DA & Rando, W	2004	A library and teaching center collaboration to assess the impact of using digital images on teaching, learning, and library support	14 faculty members American Studies Yale	case study method, interviews and course exercises	Reports on the Electronic library initiative ELI of Yale Teaching using images . how faculty members use images in teaching; . how students learn to think about and think with images.	*Devised rubrics for teaching and learning; * Practical insights into the role of digital images in teaching, learning & service support, * Requires & achieves high levels of faculty engagement
Roda, C. Borel, AM. Gentchev, E & Thomas, J	2005	Digital image library development in academic environment: designing and testing usability	Faculty & students Dept: computer science, art history, and international communication	Usability studies	Main usability issues raised by development of a digital image library project Main aim: preserve & digitize art history slide collection	* To meet users expectations – augment DL services with a set of functionalities supporting collection management and resources reuse * user centred approach was successful
Waibel, G. & Arcolio, A.	2005	Out of the Database, Into the Classroom. Final Report from the RLG Instructional Technology Advisory Group	Faculty (9) - Humanities 3 campuses: Univ of Southern California: Classics, Art History, English, History; Univ of California, Berkeley : Anthropology, Art, Technology & Culture, Art History; Stanford Univ History, Center for Teaching & Learning	interviews	To test assumptions about how digital images are discovered, acquired and used—and about preferences for the future	* Image databases need to offer breadth and simplicity of online search engines such as Google Image Search to have higher use * Supply the functionality for users to unravel content for reaggregation

Pisciotta, H., Dooris, M., Frost, J., & Halm, M.	2005	Penn State's Visual Image User Study (VIUS)	faculty & students Penn State 68 departments - arts, humanities, environmental studies	29-month – * Web and paper surveys * 10 focus groups, *>45 individual interviews * 20 think-aloud observational analyses * Analyses of authentication logs	*assess needs for digital image delivery at Penn State *provides an overview of the results of the study **current and expected use of pictures by students and faculty	*High expectations of image delivery system – content is king *digital library development must operate in the wider context of other university initiatives. *In the virtual world, the classroom, the library, and the private study can all be the very same place
Green, D	2006	Using digital images in teaching and learning: Perspectives from liberal arts institutions	>500 faculty and staff 31 liberal arts colleges - northeast and mid-Atlantic states & Yale and Harvard Universities Art & Humanities: Performing Arts Visual Arts Literature Classics Area Studies Languages History Sciences: Life Sciences Earth Sciences Math Physical Sciences Social Sciences	1. Literature review 2. Online survey of faculty 3. On-site face-to-face interviews – faculty & staff	How is the use of these new digital formats contributing to changing practices in teaching and learning in higher education? Survey had questions in 7 areas: 1. The digital elements of the courses they taught 2. Characteristics of the sources for the digital images they used 3. Details of how they used digital images—including comparisons to analog images and the perceived advantages of using each, both for faculty and students 4. The technology and tools faculty used and what other tools they needed 5. The technical support they received 6. The chief obstacles to their effective use of digital images 7. Any other comments they had about their use of images	*List of online image resources *Using images made teaching easier for many faculty. Versatility. Teaching with images skill - to be learned - institutional preparedness. *3 areas of competency need to be addressed: 1. the ability to analyze or read images (Image Literacy); 2. the ability to handle and manipulate images (Digital Literacy); and 3. the ability to create and communicate through images (Image Composition) *Users must be able to regularly and efficiently find the best image for the job— with accompanying metadata attesting to its identity, authenticity and integrity and enabling citation. *The technology must display images with ease in the appropriate resolution. * The technology must allow users to catalogue, store and manage images effectively for later retrieval and sharing. * Students must acquire fluency in reading, interpreting, manipulating,

						and managing images and in communicating effectively
Harley, D., Henke, J., Lawrence, S., Miller, I., Perciali, I., & Nasatir, D., Kaskiris, C & Bautista, C	2006	Use and Users of Digital Resources: A Focus on Undergraduate Education in the Humanities and Social Sciences	Faculty humanities and soc sci (H/SS) Univ of California campuses, liberal arts colleges, & community colleges in California visual arts, art history, archaeology, architecture, anthrop, political science, history, languages and literature, writing classics, geography	literature review and discussions Surveys - transaction log analyses and online surveys Interviews stratified random sample	map digital resources available to undergraduate educators in the (H/SS), and examine how understanding use and users can benefit of the integration of digital resources into undergraduate teaching	* Broad spectrum of user types * Use all kinds of resources * Importance of personal collections * Investment in digital resources is worthwhile * List of projects for better undergrad teaching 3-6
Schonfeld, R	2006	The Visual Resources Environment at Liberal Arts Colleges	faculty, librarians, IT professionals, and campus administrators 7 liberal arts colleges	Interviews Not random selection anecdotal or case study approach	Examine the role images play in teaching and learning Image use and provision at each campus, along with the structures and strategy that support the use and availability of images. Many of the findings are relevant for other types of digital assets and broader efforts at digital asset management as well	*Organizational structure and campus culture - most important success factors in seizing the opportunities associated with digital images for teaching *Visual resources are used differently by arts and art history than in other disciplines *Transition to digital images, as well as to other types of digital assets, is well underway *Users need support
Tenopir, C., Sandusky, RJ.,	2006	The Value of CSA Deep Indexing for	Academics & researchers -	Lit review pre- and post-search	Report describing functionality & usability testing of CSA images	Scientists identified many potential uses of tables and figures indexing

Casado, MM., Hodges, JC		Researchers	science	questionnaires to describe potential observation sessions structured diaries of searches performed	database	to their work * Teaching/lectures/presentations for which they would download figures directly into presentation software locating and retrieving data in particular formats or particular object types * an be used to help them find information and specific objects for teaching, presentations, research, and learning
Wolf, A., Iverson, E., Manduca, C, McMartin, F, Morgan, G, Morrill, J.	2007	Use of online digital learning materials and digital libraries: comparison by discipline	more than 4500 instructors from 120 higher education institutions – nation wide	Focus groups Online survey		
Harley, D	2007	Use and Users of Digital Resources: A survey explored scholars' attitude about educational technology environments in humanities	Faculty Graduate students	Discussion groups survey	map the universe of digital resources available to undergraduate educators in a subset of users in the humanities and social sciences (H/SS),	*Different disciplines & institutions have different needs * Technology is a barrier *Google search *Table of digital non-text-based choices p15
Kemp, B & Jones, C	2007	Academic Use of Digital Resources: Disciplinary Differences and the Issue of Progression revisited	academic staff 19 / 9 1 University	longitudinal study interviews	* to identify the conceptions of digital resources held by advanced users of digital technologies for teaching. * to contribute to our understanding of changing roles and practices in academic teaching	* Discipline and subject area is a significant factor affecting the use of digital resources in teaching and learning in Higher Education