Factors in the Establishment of Institutional Repositories: a Case Study of the Western Cape Higher Education Institutions

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DECLARATION

I declare that **Factors in the establishment of institutional repositories: a case study of the Western Cape Higher Education Institutions** is my own work, that it has not been submitted before for any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged as complete references.

Full Name: Jill Lynn Claassen   Date: November 2009

Signed: …………………………………

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ABSTRACT

In the academic world, open access *institutional repositories* (IRs) are beginning to play a vital role in storing and disseminating scholarly communication. Through this method, higher education institutions are able to showcase their intellectual outputs and to contribute to sharing and building knowledge. This evolutionary process of scholarly communication is an important feature of knowledge societies. Furthermore, IRs allow scholars to make known the research they are involved in, which can result in their academic reputation improving, as well as the reputations of the institutions they represent.

The purpose of this study is to examine the processes of establishing IRs in the four tertiary education institutions in the Western Cape, which form part of the Cape Higher Education Consortium (CHEC). Within this consortium is the collaborative library project, the Cape Library Consortium (CALICO), which represents the four academic library services. The researcher investigated whether the four Western Cape Higher Education Institutions have established IRs and their experiences in doing so. They are examined in the light of the guidelines for successful IRs already established in the international professional literature on IRs. Throughout the study, the partnerships that are needed for the success of IRs, with a specific emphasis on the crucial role that the librarian might play in this regard, are a central focus.

The study is a qualitative case study, relying on interviews with key informants from the four HEIs and analysing policy and other supporting documents. The study confirms comment in the literature that IRs evolve in "messy" and "spotty" ways. The key findings might be summarised in the form of four assertions:

- "It is all about people"
- Philosophical differences are significant
- Context and history cannot be ignored
- The role of the university library is ambiguous.

It is hoped that the study of fledgling IR projects might provide insights useful to the broader IR research and professional literature.

Key words
institutional repositories, academic libraries, librarians, digitisation, open access, higher education institutions, scholarly communication, intellectual property, self-archiving, collection management.

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CHAPTER ONE: INTRODUCTION

The purpose of the study is to examine the processes of establishing *Institutional Repositories* (IRs) in the four Western Cape Higher Education Institutions (HEIs). They will be examined in the light of the guidelines already established in the international professional literature. Throughout the study partnerships and collaboration that are needed for the success of IRs are a central focus.

This exploratory study is timely as IRs in South Africa are still at an infant stage. Internationally, HEIs are establishing IRs, often relying on their libraries to take the lead.

1.1.   Rationale and background

The rationale for IRs is that they are essential for scholarly communication in the 21st century. The research project is based on the hypothesis that IRs offer universities an improved way to store and disseminate knowledge. According to Lynch, an institutional repository is:

> "…a set of services that a university offers to the members of the community for the management and dissemination of digital materials created by the institution and its community members" (2003).

IRs are able to make significant contributions to research, specifically in solving information visibility, management or access problems. The basic aims of universities in investing in IRs are to collect, preserve and provide access to their research output (Palmer, Teffeau & Newton, 2008: 6). IRs may include work "in progress" as well as completed: pre-prints of articles or research reports submitted for publication, the text of journal articles accepted for publication, revised texts of published work with comments from academic readers, conference papers, teaching materials, doctoral theses and dissertations, datasets resulting from research projects, committee papers, works of art and photographs and video recordings.

The intellectual output of a university is diverse, yet the "visibility" of publications increases exponentially through repositories that are open to a wide variety of users (Academy of Science of South Africa, 2006: xxv). In setting up IRs, HEIs can build a culture of sharing knowledge within their institution, nationally and internationally, and contribute to knowledge societies. IRs offer freer and easier access to a university's research production.

1.1.2. Knowledge and learning societies

Research is fundamental to the knowledge society. The concept of the knowledge society has evolved out of that of the information society. According to the New Zealand government's Digital Strategy, a knowledge society is "a society that creates, shares and uses knowledge for the prosperity and well-being of its people" (New Zealand Government, 2008). Supporters of IRs would claim that they foster the creation, sharing and using of knowledge and therefore that they are valuable in the building of knowledge societies.

According to UNESCO's 2005 World Report, *Towards knowledge societies*, "a knowledge society must foster knowledge sharing" (UNESCO, 2005: 18). In order for this society to be developed, networks need to be in existence, as well as the ethos of information sharing. As a result of the explosion of new technologies, specifically the Internet, networks can be established and maintained between societies far more easily than ever before. In 2003, it was estimated that over 600 million people were using the Internet (UNESCO, 2005: 22). The Internet overcomes geographic limits that used to confine traditional scholarly communication to academic library buildings. Now the Internet can be seen as a "global reference room" for academic output (Dowler, 1997: 138).

The expansion of knowledge can only occur through continuous research. This will ensure that knowledge evolves and influences society. South Africa lags behind the leading knowledge societies, in common with other African countries. Its research output is low and its researchers are aging (MacGregor, 2008).

1.1.3. The Open Access Movement's role in the knowledge society

Knowledge societies encourage the sharing of information and knowledge and freedom of expression. Developing countries are lagging behind developed countries with regards to access to information and, thus, cannot adequately contribute to the ethos of information and knowledge sharing.

The so-called open access movement aims at narrowing the knowledge divide between developing and developed countries through widening access to research and knowledge. It started with The Budapest Open Access Initiative (2002), which saw open access literature as:

> " … free availability on the public internet, permitting users to read, download, copy, distribute, print, search or link to the full text of articles … without

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financial, legal, or technical barriers… The only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited "(Suber, 2005).

Open access to the research literature can break down barriers. Through open access, it is possible for the community to be mobilised to combat disparities of all kinds, such as between men and women and social, economic, cultural and national groups (UNESCO, 2005: 96).

The Academy of Science of South Africa's (ASSAf) report, *Strategic approach to research publishing in South Africa,* supports open access. It argues that research is often funded by taxpayers and that its literature is a "public good":

"[open access]… is based on the philosophy that the research literature, which is not written for profit but for the advancement of science and which is largely funded by public money, is a public good and should be accessible to everyone who has a need for the information" (2006: xxii).

1.1.4. HEIs' role in the knowledge society

As the chief producers of a country's research, HEIs have a significant role in knowledge and learning societies. The summary information sheet of the Research Libraries Consortium, a group of South African university libraries involved in a project to improve their services to researchers, identifies the key challenges for research in South African universities as follows:

- the national imperative to improve and expand research
- an aging cadre of researchers
- the imperative in the post-apartheid era to expand the limited pool of researchers to represent South Africa's linguistic and cultural diversity
- competition with the private sector for a limited number of talented researchers (Research Libraries Consortium, *Summary Information Sheet*, 2007).

Arguably, all South African HEIs should be part of the open access movement to contribute to the growth and sharing of knowledge in Africa, as well as internationally. Through providing open access to their research, institutions increase the visibility of their research, as well as press forward their mission to share knowledge (Suber, 2005). Added to this, knowledge can be expanded more quickly because of the instantaneous access to the research. Evidence of the benefits of open access publishing is the statistic, quoted by Buehler & Boateng (2005), that internet articles

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were referred to 336 percent more than non-electronic journal articles. Furthermore, within the higher education sector, research and publications are the criteria for promotion, salary increases, individual, as well as institutional recognition (Dowler, 1997: 8).

In 2001 the ASSAf signed a contract with the Department of Science and Technology (DST) to advise and support a new strategic framework for South Africa's scholarly journals. ASSAf (2006: xxi) warns that there is a growing dissatisfaction over the high costs of journals and points to the disparities in journal collections between historically advantaged and disadvantaged HEIs. ASSAf's strategic framework has four objectives, of which two are linked to open access: to improve the productivity of publication through different media (e.g. electronic publications) and to ensure that South African journals are disseminated to a wider audience than just the research community itself (Academy of Science of South Africa, 2006: vii). ASSAf makes ten recommendations in the report, with the sixth explicitly saying that the DST has a duty to ensure that open access initiatives are promoted to increase the visibility and accessibility of all South African research.

1.1.5. Academic libraries' role in support of research

If HEIs have such a vital role to play in contributing to the evolution of knowledge through research, the role of the academic library has to be integral to this function, as academic libraries look after and provide the information needed for teaching and research. Dowler sees libraries as the "homes for scholarly communication":

> " ... a places, the library's buildings contain specialized collections that reflect the literature of the university's scholarly disciplines and professions, which together reflect its identity as an institution….It is through the library that members of an institution are best able to experience themselves as members of an academic community" (1997: 135).

A library is both custodian and disseminator of the research literature. Establishing and managing open access IRs might well be seen as an evolution of the research communication role of the academic library. Furthermore, academic libraries can be seen as the perfect location for IRs because of the information management aspect and the application of metadata for IR development (Basefsky, 2009). One of the objectives of this case study of IR development in the Western Cape universities is to investigate if and how their libraries are involved.

1.1.6. IRs role in higher education research

As already indicated, IRs are vehicles in the advancement of scholarly communication. The benefits of IRs available on the Internet include:

- the provision of free and open access to research output for the entire scholarly community;
- access to relevant material from any number of repositories from across the world;
- improved networking among communities of scholars; and
- the creation and expansion of new knowledge which is made possible by the increased accessibility of existing knowledge.

In the academic community, IRs have been set up to meet a variety of institutional needs, including:

- an archive of scholarly material;
- a showcase of the HEI's scholarly output;
- a relatively economical way of disseminating scholars' research; and
- a possible tool to influence the decrease of journal prices (Bell, Fried Foster & Gibbons, 2005: 284).
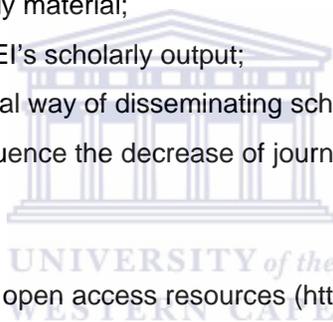
According to the directory of open access resources (http://www.opendoar.org), there are 18 IRs in South Africa. Most of these repositories consist of electronic theses and dissertations (ETDs). In 2006, the National Research Foundation (NRF) provided funding to the Committee for Higher Education Librarians in South Africa (CHELSA) to conduct a feasibility study of the requirements for implementing IRs across all academic libraries, containing the theses and dissertations for the research community in South Africa and internationally (Thomas, 2007b: 80). As a result, the NRF and CHELSA established a collaborative partnership later in 2006 to drive this initiative as follows:

- the NRF is committed to support academic libraries that do not yet have the capacity to host their own ETD IR;
- the NRF will provide funding to implement IRs at three pilot sites (two universities and one university of technology) with the expressed purpose of supporting HEIs; and
- the NRF will create a national repository that will integrate existing ETDs (Thomas, 2007b: 80).

1.2. Research problem

This project will investigate the status of IRs in the Western Cape's four universities. These institutions will remain anonymous to uphold the integrity of the HEIs, as well as to give the researcher the freedom to probe differences within the institutions. The HEIs will be represented as Institution A, Institution B, Institution C and Institution D. All four belong to the regional consortium, Cape Higher Education Consortium (CHEC), and their libraries make up the regional library consortium, CALICO. A later chapter provides more information on the CHEC institutions.

The preceding discussion serves to motivate the study. University research is vital to South Africa's aspirations to join the global knowledge economy. IRs potentially offer more effective ways to store and disseminate research and are well established internationally. Yet, so far, there is little evidence of IRs across the CHEC universities. The problem is explored by means of a qualitative case study of the status of IRs. The review of the international literature to be described in Chapter Two informs the case study. The aim is to gather information on what IR initiatives exist in the CHEC universities and to identify possible encouraging and inhibiting factors.

The researcher is a librarian who is interested in investigating specifically what role libraries play in establishing IRs in the Western Cape HEIs. It is important to note that the researcher does not work in the four academic libraries. She works in a research centre at one of the institutions.

The research problem will be returned to in Chapter Three. That chapter will state the objectives of the study and give the research questions, which arise from the research problem and the literature review.

1.3. Chapter outline

The dissertation is structured as follows:

Chapter One introduces the subject of IRs at higher education institutions and explains the rationale. It outlines the importance of IRs for the expansion and sharing of scholarly communication.

Chapter Two surveys the professional and research literature. Its purpose is to build background knowledge, which will guide the case study.

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Chapter Three returns to the research problem and identifies the research questions. It then describes the research design and data-gathering methodology.

Chapter Four gives a detailed description and analysis of the data collected.

Chapter Five provides an interpretation of the findings within the framework of the research questions. It concludes with four assertions that make up the key findings of the case study.

Chapter Six gives possible recommendations so as to provide a framework for improving IRs at HEIs in South Africa.

1.4.   Definitions of key concepts

The literature provides the definitions that follow.

Institutional repository: An IR is a central digital database of an institution's research work. It might include material such as research papers and electronic versions of documents such as theses, but may also include many of the digital assets, such as administrative documents, course notes, or learning objects. The intention is to store, index, preserve and redistribute scholarly research in electronic formats (Barton & Waters, 2004).

Digitisation: The process of converting information into a digital format. In this format, information is organised into discrete units of data (called bits) that can be separately addressed (usually in multiple-bit groups called bytes). This is the binary data that computers and many devices with computing capacity (such as digital cameras and digital hearing aids) can process (taken from www.whatis.com) (Accessed on 30 June 2007).

Open access: Resources that are openly available to users with no requirements for authentication or payment. [Taken from the 1999 manuscript of *Digital Libraries*, by William Arms, (2000) M.I.T. Press [Available at www.cs.cornell.edu/wya/DigLib/MS1999/glossary.html] (Accessed on 30 June 2007).

Self-archiving: Scholars being given the tools and assistance to deposit their refereed journal articles in open electronic archives (Bailey, 2005).

CHAPTER TWO: INSTITUTIONAL REPOSITORIES IN THE LITERATURE

In this chapter, the following themes in the literature are discussed:

- reasons for establishing IRs;
- partnerships in establishing an IR, focusing on the roles of librarians, academics and university administrators;
- factors to consider in establishing a successful IR;
- factors that can hinder the establishment of an IR;
- the role of the library in the establishment of IRs by means of two case studies; and
- technology options to consider in establishing an IR.

2.1. Reasons for establishing IRs

The literature provides three main reasons for universities to set up IRs: to showcase their intellectual work; to disseminate their research; and to save money (Crow, 2002a; Shearer, 2003; Jones, Andrew & MacColl, 2006).

Despite the motivation to advertise research output, there seems to be confusion around intellectual property amongst scholars and administrators. Several writers claim that one of the vital contributions of librarians is to deal with and demystify these concerns (Allard, Mack & Feltner-Reichert, 2005 and Buehler & Boateng, 2005).

The financial strain in purchasing scholarly journals is a major argument for IRs (Lynch, 2003; Anuradha, 2005 and Ramsey, 2006). An alliance that is very influential in the open access movement is the Scholarly Publishing and Academic Resources Coalition (SPARC), which is an international alliance of academic and research libraries to promote open access to scholarship. In their position paper, SPARC believes that by providing another method of disseminating scholarly outputs, IRs can add pressure to the existing publishers as they will no longer hold the sole key for credibility of scholars. In competition with IRs, publishing houses will have to re-think the exorbitant prices. As Crow indicates, "… the role of alternative scholarly publishing models, such as institutional repositories, in breaking the monopolies of publishers and increasing the awareness of university intellectual output grows increasing clear" (Crow, 2002a).

## 2.2.	Partnerships in establishing an IR

A thread in the literature on IRs is the need for partnerships – both to establish and sustain them. As Clifford Lynch, executive director of the Coalition for Networked Information, indicates: "An effective institutional repository of necessity represents collaboration among librarians, information technologies, archives and records managers, faculty and university administrators and policymakers" (2003). However, after listing the partners, Lynch does not expand on the responsibilities of the various partners.

In any project, there has to be a manager who is competent to co-ordinate all the responsibilities. A survey was conducted of 123 American Research Library (ARL) member libraries that had set up IRs or had plans to develop an IR in January 2006. Eighty-seven member libraries (71%) responded to the survey. In this survey, all those involved in the implementing and planning of their IR mention that the library was been the driving force in the creation and planning of the IRs (Bailey, 2006). Many other authors mention the pivotal role of the library (for example, Allard, Mack & Feltner-Reichert, 2005; Bell, Foster & Gibbons, 2005; Mark & Shearer, 2006; Westell, 2006 and Palmer, Teffeau & Newton, 2008). Furthermore, the *SPARC Institutional Repository Checklist & Resource Guide*, which provides an overview for setting up an IR, says that academics will be less sceptical of the library's motives in pdriving this institutional change than their institution's administration (Crow, 2002b).

### 2.2.1.	The role of the librarian

Overall, the consensus in the literature is that the library should be the project manager for the setup process of the IR. The library already contains many of the skills needed to set up and maintain a repository. These skills include archiving, metadata creation (cataloguing) and most importantly, managing information (Jones, Andrew & MacColl, 2006: xv).

However, the setting up of an IR also involves new responsibilities in planning, management and technical development for academic librarians. To meet these demands, new library positions have to be created, specifically a repository coordinator and intellectual property specialist. Furthermore the subject (faculty) librarian will have add-on roles as an intermediary to the faculty. For example, they

need to communicate IR developments to influence academics' scholarly communication practices (Palmer, Teffeau & Newton, 2008: 15, 16).

Specific tasks undertaken by the library to establish an IR should include:

- taking the initiative to build the IR, which includes dealing with the technical aspects, such as a strong working knowledge of the software and of the design that best fits the institution's specific needs;
- taking responsibility for the metadata and developing communication networks within the different disciplines;
- ensuring archival stability;
- promoting discussion on the advantages of IRs amongst the higher education institution's upper management and academia;
- providing demonstrations to scholars as to the benefits of wider exposure of research via open access. These demonstrations should include performance indicators such as counting downloads and citations of articles; and
- coordinating and supporting academics on copyright issues (Correia & Teixeira, 2005: 360).

Westell (2006) highlights specifically the role for librarian initiators of IRs in promoting the concept to the university's administration so as to receive their support.

Section 2.5 will return to the role of the academic library in IR development in a discussion of two case studies of libraries setting up IRs.

2.2.2. The role of academics

Academics play an important role in IRs as it is their work that makes an IR successful. It is imperative that academics understand this, as without scholarly content, an IR is defunct.

However, the literature reveals that academics are slow to change their routine habits to get involved in IRs. It seems that the phrase "if you build it, they will come" does not yet apply to IRs (Foster & Gibbons, 2005). Research shows that, even though academics are persuaded of the benefits of an IR, they still do not feel compelled to deposit their work into it. They use the excuse that depositing their own work is time-consuming. Identifying potential early adopters to submit their research into the IR is a method to solve this hesitancy (Palmer, Teffeau & Newton, 2008). Through this

method, the reputation of these early adopters will be promoted by virtue of the visibility of their research output. By implication, the other staff's reputation will be negatively affected (Suleman, 2006). The library can play a critical role is finding these early adopters, assisting them in depositing their work, as well as training them to ultimately do it themselves.

2.2.3. The role of the university administration

Given the pressures on universities to improve their research rankings, the power of IRs to strengthen, improve and raise the visibility of the research enterprise must appeal to university leaders (Thomas, 2007a: 134). Some university administrations have created an incentive policy (Soong, 2006; Ferreira et al., 2008) or have implemented a mandatory policy (Mark & Shearer, 2006) for academics to deposit their work.

The main role of the university administration is to make the IR an integral part of disseminating research output as, without the backing of the administration, the IR will be a failure. The *SPARC institutional repository checklist & resource guide* highlights this importance by saying that, "The perceptions and attitudes of university administrators are critical to gaining the support necessary to validate a repository's standing within an institution" (Crow, 2002b: 7). The university's administration provides the framework. Furthermore, through the support of the university administration, additional resources and funding can be allocated for IRs. Ultimately, it is the university policy- and decision-makers who will judge the 'success' of the IR in terms of its impact on the individual and communal research community.

In 2007, a survey of South African university leaders found that six out of 11 Deans of Research and Deputy Vice-Chancellors (Academic) reported that open archives and IRs had not yet been discussed at their meetings (Fullard, 2007: 47). Librarians need to be aware of this and market the benefits of IRs accordingly.

2.3. Factors in establishing a successful IR

A strategic plan needs to be put in place for an IR to be a success, bearing in mind that establishing an IR is not simple or clear-cut. Davis and Connolly warn that the success of IRs has been "somewhat spotty" (2007: 4). In the literature, the blueprint of setting up an IR has facets that must consist of determining costs beforehand, gathering scholarly content (which includes the librarians' role and the academics'

role), advocacy of IRs amongst academics and university administration and copyright and intellectual policies.

2.3.1. Costs of establishing an IR

There are various costs that need to be considered when establishing a repository. Sufficient budgeting needs to be calculated in advance for the longevity of IRs. The costs will include both technical and staff time allocation:

- two servers (one to run the service and other to provide a test environment);
- the cost of technical support (customisation of the software takes approximately six months of a developer's dedicated time);`
- metadata costs (because of the complexity of the cataloguing an experienced cataloguer is required); and
- a strategy to acquire the content (Jones, Andrew & MacColl, 2006: 37).

The Association of Research Libraries' (ARL) review of 37 articles on IRs highlights the need to calculate adequately time, space and other intangibles, as well as monetary commitment. Of the 37 articles, only 20 percent thoroughly discuss costs. The ARL survey brings to light that only 44% of those institutions with IRs had a dedicated start-up costs budget and only 48% have an allotted budget for ongoing operations. The respondents without a dedicated budget, say that the costs for staff, equipment, etc. were either supported by general library operations or by the re-allocation of existing budget lines or by a third party (Bailey, 2006).

One of the reasons that there is a slow growth in content in IRs is that they are run as short term projects and do not have sufficient budgets for the time needed to gather content (Mark & Shearer, 2006). Ultimately, it is the institutional administration who should be alerted to its role in providing a budget for IRs. The administration needs to recognise that its financial support for an IR is a long-term investment in the distribution of scholarly material. The university administration also needs to know about the myriad of other reasons for permanently budgeting for IRs; specifically institutional prestige and visibility (Crow, 2002a).

2.3.2. Gathering scholarly content

A successful IR can be viewed as one that has depth and variety of scholarly content, such as conference presentations, monographs, working papers, peer-reviewed research papers (published or pre-published), course material and audio and video clips (Crow, 2002a: 25). When librarians are involved in gathering

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scholarly content, it is known as content recruitment. Content recruitment strategies include:

- promotional activities (such as conducting presentations to academic staff, passing out brochures and publishing articles in the campus newspapers);
- content harvesting (looking through academics' and departmental websites); and
- citation/usage information (statistics can be downloaded to ascertain the usage of information for scholarly papers in IRs) (Mark & Shearer, 2006).

2.3.2.1 Advocacy and marketing

Since the success of IRs depends on their scholarly content, it is imperative that IRs are actively promoted throughout the university community. Methods of encouraging academics are through training academics to use the IR, interviews, presentations, promotional materials websites and using the campus press for IR news (Ferreira et al., 2008).

One of the most effective marketing tools is demonstrating how the increased availability of scholarly work impacts on academics' reputation. Academics want their work read and commented on by their peers. Ultimately, academics want to receive credit for making a contribution to the knowledge world. According to Jones, Andrew & MacColl, librarians should be the ones who alert academics to these benefits (2006: 25). An example lies in the usage statistics of open access journals. Even though only 2% of ISI journals (accredited journals) are open access, they are cited 20-40% more than closed access. It is this kind of information that might persuade academics to join IRs.

Academics might be unwilling to change their schedule to fit librarians' ideals even though they understand the benefits of IRs. Hence an effective means of advocacy might be rather to take a top-down approach, which means lobbying for support at the highest levels of the university's senior management (Jones, Andrew & MacColl, 2006: 118).

Another method of recruiting content is getting academic staff to self-archive.

2.3.2.2. Self-archiving

The literature has two strategies with regards to content recruitment. One states that academics should archive their own work and the other is that librarians should archive the output on behalf of the academic staff.

Academics can deposit their own work into an IR. The argument to persuade academics to self-archive is that an IR collects the institution's intellectual assets into an environment that will assure future access and their preservation. Some authors say that there has to be a mandatory self-archiving policy in place for academics (Pinfield, 2005; Sale, 2006; Suleman, 2006; Ferreira et al., 2008). It is apparently highly unlikely that academics will archive their own work if it is voluntary, as it is a foreign concept to most academics (Anuradha, 2005 and Davis & Connolly, 2007). However, Pinfield argues that, even though academic staff might be resistant to being forced to archive their research, funders, institutions and other agencies already require academics to do certain things to show research output, for example, produce a research report. In the light of this type of obligation, depositing an e-print into an IR will not be very demanding, especially if academics are given sufficient training and support (2005: 33). A study, undertaken over a period of two months, dispels the myth of the time-consuming nature of self archiving. It found that active researchers take approximately 40 minutes per year to load their work into an IR (Carr & Harnad, 2005).

Another strategy to overcome academics' reluctance is to allow librarians to intervene by offering a depositing service (Allard, Mack & Feltner-Reichert, 2005; Chan, Kwok & Yip, 2005; Joint, 2006). The Canadian Association of Research Libraries found that academics were more willing to participate in an IR if they were able to email their content to the library staff, who then deposited the material on their behalf (Mark & Shearer, 2006: 6).

Once the content is emailed to the librarian, metadata (a form of cataloguing) is added to the paper. According to Joint, for the metadata quality and digital preservation standards to remain high, librarians should be the mediators of uploading the scholarly content, rather than academics. She states that librarians have been cataloguing and dealing with preservation issues for a long time and have had a record of success in this area. Furthermore, a standard can be maintained for

this type of bibliographic description, so that ultimately, items can be retrieved by users (2006: 83).

2.3.3. IR policy-making

According to the American Research Libraries survey on IRs undertaken in January 2006, 75% of the institutions with IRs and 71% of the institutions that are in the process of establishing an IR indicate that they have or will have written policies and procedures for their IRs (Bailey, 2006). The two crucial policies that academics grapple with in this regard and should be approved by the university council are the copyright and intellectual property policies.

Educating academics on copyright and intellectual property issues can be undertaken by librarians. This type of education can be an extension of the user training that librarians have always provided. According to a literature survey by Allard, Mack and Feltner-Reichert, 90 percent of the 30 journal articles surveyed encourage the involvement of the academics in intellectual property issues (2005).

Most academics sign copyright-transfer agreement forms that hand copyright over to publishers. As publisher copyright agreements are a complex issue and academics need assistance in understanding their rights, librarians can complete this service on behalf of academics. Surveying 542 academic authors in 57 countries, Gadd, Oppen-heim, and Probets (2003) report that 49% of academics reluctantly assign copyright to publishers and 41% do so freely. Librarians need to train authors to scrutinise their copyright agreements with publishers to make sure they retain the right to publish the work or the last prepublication version electronically (Markey et al., 2007).

Two types of open access copyright policies are the Creative Commons license and the Project RoMEO (Rights MEtadata for Open archiving) journals. The Creative Commons is a non-profit organisation that was founded in 2001 with the support of the Centre of Public Domain, CC, to provide a balance between the extremes of "all rights reserved" (total control) and "public domain" (open utilisation) [taken from http://creativecommons.org/about/history/]. It provided a license, which allows authors the ability to retain some rights, as well as informing consumers about what they are able to do with a piece of work without finding its owner or negotiating permission. It grants a right to reproduce work, ability to create an offshoot of the work and distribute copies thereof. The Creative Commons license is for authors who

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want to make their work openly accessible and is ideal for authors who want to publish their works on websites or in repositories (Seadle, 2005).

Project RoMEO informs authors about which journals allow their work to be accessible on course websites or in repositories. This project started in 2002 at Loughborough University. Its task was to investigate the copyright issues surrounding self-archiving of research under the Open Archive Initiative's Protocol for Metadata Harvesting, initially for the UK research community (Seadle, 2005: 133). The SHERPA/ RoMEO [www.sherpa.ac.uk/romeo.php] now has a copyright checking service list. This list uses a colour-coded system to identify publishers' policies on copyright transfer agreements with authors who want to archive a copy of their work locally. The four colour-coded categories are:

- *Green:* allows authors to archive pre-prints as well as post-print copies;
- *Blue:* allow authors post-prints (after work has been peer-reviewed);
- *Yellow:* allow authors pre-prints (before work has been peer-reviewed); and
- *White:* does not allow authors to archive (Seadle, 2005: 134).

By 2005, 46% of the 107 publishers listed fell into the green (archive-friendly) category and 34% fell in the white category. Publishers which fell in the green category included Blackwell's Cambridge University Press, Elsevier, John Hopkins University Press, Kluwer, Springer, Sage and Emerald. Publishers which fell into the white category included the American Chemical Society, the Royal Society of Chemistry, the Royal Society of Medicine and the University of Chicago Press (Seadle, 2005: 134).

2.4. Factors that hinder the establishment of an IR

In a report of deployment status of IRs in 13 countries as of mid May 2005, the respondents were found to have common issues, which revolved around resource limitations, as well as difficulties surrounding informing academics about the benefits of IRs and finding methods to get them to contribute their research work. Furthermore, there was general confusion around intellectual property, as well as the notion that the material available was of a low quality. The respondents reported that the time-consuming procedure of academics submitting their work to IRs was a major barrier (van Westrienen & Lynch, 2005). This lengthy procedure of submission was a common problem that academics experienced (Crow, 2002a; Foster & Gibbons, 2005; Carr & Harnad, 2005; Davis & Connolly, 2007).

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Another hindrance is librarians' not making sense about IRs to academics. Librarians need to speak the same "language" so that they can convince them that IRs are beneficial to them, "the features of an IR that are most exciting to librarians, such as persistent URLs and metadata schemas, rarely register the same enthusiasm for faculty. The resulting 'Tower of Babel' is a significant hindrance to the increased use of IRs by faculty" (Mark & Shearer, 2006). This could mean that re-training of librarians is needed in this area of communication.

2.5. Two case studies of the role of the librarian in the establishment of IRs

In Chapter One, the author acknowledged her special interest in the role of the library in IR development. This section focuses on two reports of IR development led by university libraries: at the Hong Kong University of Science and Technology and the University of Pretoria, in South Africa. Hopefully the case studies provide real-life examples of the issues highlighted in the preceding sections.

2.5.1. The Hong Kong University of Science and Technology's (HKUST) experience

When the library staff first emailed faculty for submissions to add to the HKUST IR in September 2003, only two papers were received. The librarians then became proactive and scanned the departmental and personal websites of faculty members and learnt that 89 of the 450 posted some of their publications on the web. The university librarian then emailed the authors and obtained their permission to post approximately 150 files into the IR (Chan, Kwok & Yip, 2005). The librarians even focused on the retired and emeritus professors to recruit content.

The HKUST librarians developed guidelines for different publications. Straightforward documents were included in their IR immediately after the academic's consent. These included presentations, working papers and technical papers. The librarians had to seek the publishers' permission for conference proceedings though. As publishers' policies were more difficult to cope with than international policies, the HKUST librarians formulated working guidelines for the research community to set out the implications and actions called for in different scenarios, such as the pre-refereed version, the post-refereed version and the publisher's version (Chan, Kwok & Yip, 2005). HKUST librarians had high expectations from the publishers, seeking permission from them by explaining the

value of open access and the HKUST IR in detail. The authors reported that their collection development manager negotiated with 40 publishers in 2004 of which 19 gave approval for 120 journals and conference papers.

With regards to marketing, the librarians were serious about the promotion of the IR. They reached out to the university administrators, department head, centre directors, researchers and graduate students in various ways. They published articles on the development of their IR in library and university newsletters, as well as local and international newspapers. When the HKUST IR reached the milestone of 1000 documents, the librarians had an anniversary celebration by giving prizes to their top ten contributors. The event gave the librarians a chance to interact with faculty members and for faculty to discuss the issues among themselves (Chan, Kwok & Yip, 2005).

2.5.2. The University of Pretoria's experience

The IR at the University of Pretoria (UP) is referred to as *UPSpace*. One of its aims is to increase the visibility, usage and impact of research by UP researchers. It was decided that its marketing strategy would be a bottom-up approach (Smith, 2008). Thus, finding an academic of influence for the IR content development was what Elsabé Olivier, the Education librarian, did. She lobbied the Dean of the Faculty of Education, Prof. Jonathan Jansen, to have his intellectual output preserved in digital format. Prof. Jansen served as the Dean until March 2007. He was regarded as an eminent scholar who had published 35 media columns and 8 research articles during January 2005 to July 2006, which were in high demand from scholars to governmental departments and private individuals. The Dean sent these requests to Elsabé Olivier, who then decided to develop the Jonathan Jansen Collection in the University of Pretoria's IR (Olivier, 2007). The IR benefitted the Dean in the following ways:

- it showcased all his work and research over the years;
- it increased his visibility;
- it increased the dissemination of materials that would have previously remained hidden;
- it increased the communications amongst scholars and served as a source for ideas and information; and
- it served as a long-term preservation of his research output in an electronic form (Olivier, 2007).

The benefits of having Prof. Jansen's research in a centralised space influenced other academics to also make their research more visible for the international scholarly community. Even though he has since left the University of Pretoria, his research output is still available on *UPSpace* at https://www.up.ac.za/dspace/handle/2263/108 [assessed on 11 November 2009].

2.6. Technology factors to consider when establishing IRs

It is of primary importance that a tailor-made technological framework is created for each HEI. This framework will not change easily in the future, as in some senses it will be the back-bone to the IR.

2.6.1. Digital preservation

As digital material as little as ten years old is already becoming obsolete, it is important that sufficient research goes into digital preservation when considering the design of an IR. There are no best practice criteria in performing digital preservation to date. Nevertheless, there are four key functional goals behind digital preservation. These goals are:

1. the data are maintained in the repository without being damaged or lost;
2. the data can be retrieved and used;
3. the data can be interpreted and understood. This implies that the period between importing the data and access allows the user to make sense of the digital object (item), even when there has been a technology change in the interim; and
4. the goals of 1, 2 and 3 mentioned above can be achieved in the long term (Wheatley, 2004).

2.6.2. Guidelines/ standards for IRs

When an IR is established, it is important that the content survives the system itself and can transfer to new technologies as they evolve. Applying standards must be central to the development of the system. Some of the standards are the Open Archival Information System (OAIS) Reference Model, the Open Archives Metadata Harvesting Protocol (OAI-PMH), and the Dublin Core (DC) metadata schema. The OAIS Reference Model, the OAI-PMH, as well as the DC metadata schema (referred to in Table 1 below), offer standards and guidelines on the architectural issues in building an IR and ensures its interoperability with other systems. Interoperability

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allows the retrieval of information via multiple search engines. The metadata harvesting protocol allows third party services to find the metadata from various repositories and perform searches against the assembled metadata to identify and ultimately, retrieve documents (Crow, 2002b). Table 1 lists these standards, with its specific features and tasks that are needed when developing an IR.

Standard for IRs	Characteristics	Responsibility
Open Archival Information System (OAIS) Reference Model	• It became the ISO standard in 2003 (ISO 14721: 2003); • It is useful for a physical or digital, institutional or disciplinary archive • It provides a strategy for managing digital assets for long term use (Brainin, 2004)	• Agree to and accept information from information manufacturers; • Obtain sufficient control of the information to meet long-term preservation goals; • Ensure that the information can be understood by users without the assistance of the information manufacturer; • Follow policies and procedures to ensure the information is preserved and to enable dissemination of genuine copies of the preserved information in its original form, or in a form that can be traced back to the original; and • Make the preserved information available to the user community (Lavoie, 2004).
Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH)	The main objective is to combine scholarly archives all around the world.	• It gives guidelines to providers on how to structure and format their metadata in a way that allows service providers to harvest the metadata so that it is searchable on the internet. • Digital materials between institutional and archival repositories can be imported and exported as a result of OAI-PMH,

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		allowing for the possibility that different repository software might be in use (such as DSpace and Fedora) (Bell & Lewis, 2006).
Metadata: Dublin Core (DC)	The key component of interoperability architecture is the use of unqualified DC. It comprises of 15 elements. This unqualified DC is a minimum standard for OAI compliant repositories.	• The DC serves as a unifying set of metadata to allow the retrieval of information in IRs. • This metadata created at the beginning process allows for the later retrieval via OAI compliant search engines (Horwood et al., 2004).

Table 1: Standards for IRs

2.6.3. Digital asset management

Institutions need to make decisions as to which system (hardware and software) they will use to establish an IR. This is known as digital asset management. According to Open Society Institute's *Guide to institutional repository software*, the software system has to satisfy three criteria:

1. the software is available via an Open Source license;
2. the software complies to the latest version of the Open Archives Initiative metadata harvesting protocols; and
3. the software system is currently released and publicly available (Open Society Institute, 2004).

Software systems that comply with the criteria mentioned above is Archiméde, ARNO, CDSware, DSpace, Eprints, Fedora, i-Tor, MyCoRe and OPUS.

Only the more commonly used software systems will be looked at in Table 2 below. The Table does not intend to promote one software system over another, as the best software will be one that meets the institutional requirements. The characteristics of each software system listed below are an overview and offer some indication as to the capabilities needed. Hardware systems will not be dealt with in this study.

Software name	Characteristics
DSpace	• It accepts research in many different digital formats. It adopted the OAI-PMH so as to support interoperability; • It allowed batch load submissions to ease the load of existing

	collections and to cut costs; • It can support a group of IRs. This design supports the participation of schools, research centres and other units distinctive of a large research institution; and • It is designed to integrate with third-party software, allowing it to be coupled with other components (Crow, 2002b; Open Society Institute, 2004).
E-Prints	• Specifies document types and formats; • Allows institutions to identify content as "published", "in press" or "unpublished"; • The integrated advanced search, extended metadata and other features indicates that the system can be readily customised to meet local requirements; and • The size of the installation base allows an institution to get up and running relatively quickly and with limited technical expertise (Crow, 2002b; Open Society Institute, 2004).
Archiméde	• As the text for the system's user interface is independent on the software code, it allows the interface to be in the local language of choice; • It can accommodate any language; • The indexing process allows for two types of documents: a) a Dublin Core metadata record in XML; and b) the full text of the document(s) described by the metadata; • Supports the import and export of various types of metadata; • Based on Java technology, Archiméde is able to run on many operating systems (Windows, Linux, etc.) and can be used for many types of relational databases. This allows an institution the freedom to install the software on its existing technical infrastructure; and • All the data uploaded to Archiméde are independent from the application, which makes it possible for the data to migrate to another system if desired (Open Society Institute, 2004).

Table 2: Software packages for IRs

2.7. Conclusion

Establishing an IR is an investment by higher education institutions. This investment includes hardware equipment and software systems that are developed for individual institution's needs and sufficient support to sustain these systems are in place. Another asset is of course the human resource investment. The literature review highlights the need for support from the university leadership, academic staff and the library as crucial for the success of establishing IRs. Each group have specific roles and responsibilities in the process. Some of these responsibilities include the backing from the university leadership, academic staff open to changing its mindset on the traditional publication model and the library providing the framework and support for IRs. These roles and responsibilities, as well as other aspects to IRs, will be

"unpacked" in more detail in the follow-up chapters within the context of the Western Cape universities.

CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY

The establishment of IRs in the Western Cape universities has many facets. A preliminary internet search showed that all four universities in the Western Cape had established different types of repositories. Hence all four HEIs in the Western Cape share the same phenomenon. The phenomenon of IRs is examined within the framework of a qualitative study, using interviews with key informants to gather data to explore the research problem that was introduced in Chapter One. The multi-faceted situation of IRs has to be unpacked and illuminated to provide a better understanding of where the Western Cape universities are in making their scholarly communication available.

3.1. Research problem and objectives

As mentioned in Chapter One, this research aims to explore and evaluate the current status of IRs in the Western Cape HEIs. As shown in the previous chapters, internationally, academic libraries have taken the lead in IR development. It seems that the literature assumes IRs to be an extension of the traditional library roles of knowledge storage and dissemination.

In order to achieve the research purpose, the case study has the following objectives:

1. To analyse the infrastructure of capturing scholarly output at each Western Cape HEI in IRs and the sustainability of IRs.
2. To examine the policies and procedures undertaken in setting up IRs and assessing them in terms of the best practices identified in the literature review in Chapter Two.
3. To undertake an in-depth overview of the key role-players involved in IRs at each HEI and to explore how they conceive of IRs.
4. To investigate collaborative efforts in IR development in the Western Cape HEIs.

These objectives and the review of the literature in Chapter Two lead to the following research questions:

- How far advanced are the IRs at the four HEIs?
- Who is driving the IR projects at each HEI? And why?
- Given the existence of CHEC and CALICO, are there signs of joint collaborative initiatives across the four institutions that might lead to a

regional IR?

- What role is the library playing in the IR projects?
- What partnerships exist inside the institutions at present or are envisaged?
- What are the existing policies that pertain to the Western Cape HEI IRs?
- How are academic staff encouraged to contribute to this storage of scholarly output?
- Who are the IR software developers and how involved were they in the choice of software used?
- How sustainable are the IR projects?
- What factors inhibit and encourage the establishment of IRs and do these factors apply to each of the Western Cape's HEIs?

3.2. Research framework

These questions, as well as the fact that IRs are still at a fledging stage in the Western Cape, and indeed in South Africa, imply the need for a exploratory and descriptive interpretive case study.

For this study, the researcher is influenced by the constructivist paradigm. In this paradigm, the researcher seeks to understand the world in which participants live and work (Creswell, 2007: 20). The aim of this study is to understand the participants' points of view towards their role in establishing IRs and the potential success and hindrance factors that influence their work. Creswell states that, "…we need a complex detailed understanding of the issue. This detail can only be established by talking directly with people, going to their homes or places of work, and allowing them to tell the stories unencumbered by what we expect to find or what we have read in the literature" (2007: 40).

According to Creswell, researchers have to be cognisant that their own background and experiences (personal, cultural and historical) can shape their interpretation of the participants' data (2007: 21). Thus, as a research librarian, this researcher could have been biased towards the potentially important role the library plays in establishing IRs. Any possible partiality dissipated as she realised that the academic libraries were playing only a minor role in the IR establishment processes.

3.2.1. Qualitative case study

The research methodology that suits this exploratory small scale study is a qualitative one, as it best answers the research questions of "what", "how" and "why" with regards to the establishment of IRs at HEIs in the Western Cape. The case study looks at Western Cape IRs in their natural setting, which means interviewing the participants at their work place and, if possible, gaining access to relevant materials.

Since IRs are at an early developmental stage, it is too early for quantitative surveys, although the qualitative case study might well, it is hoped, identify the questions to be asked in a later survey. A quantitative survey would have been inappropriate as IRs are only at the beginning stages. The purpose is not to survey users of IRs, which might be suitable at a later stage of their development.

A case study investigates a "specific, unique, bounded system" (Stake, 1995: 2). The "system" in this dissertation is the four universities that make up the Cape Higher Education Consortium (CHEC). The term "bounded system" indicates that the case should be an integrated system, "a specific, a complex, functioning thing" (Stake, 1995: 2). Creswell (2007: 74) might label it as an "instrumental" case study as its focus is on one issue (the establishment of IRs) across CHEC.

3.2.2. Phenomenological approach

The case study also has roots in phenomenology. The phenomenological approach applies to this research project as it looks for meaning from individuals' experiences of a concept or phenomenon (Creswell, 2007: 57). Thus this phenomenological study attempts to understand people's conceptions of an IR. Phenomenological research interviews key informants in order to map out different conceptions of a phenomenon and the connections among various nuances (Leedy & Ormrod, 2001: 153). Bruce's PhD study of information literacy is a rare example of phenomenology in the field of library and information science (1997).

Given the newness of IRs, it is important for the reader to understand the nuances in establishing IRs in the South African context, specifically within the Western Cape HEIs. The aim in phenomenology is to put together the pieces of analysis or nuances to achieve an integrated interpretation of the situation. As Moustakes indicates, "Phenomenology is concerned with wholeness, with examining entities from many sides, angles, and perspectives until a unified vision of the essences of a

phenomenon or experience is achieved" (1994: 58). Ultimately, the focus is on the common themes in the experience, despite a variety of individuals and surroundings studied (Leedy & Ormrod, 2001: 154).

3.2.3. Case study site

The Western Cape has four HEIs, which form one unit under the CHEC group. Furthermore, the four HEI libraries form a coalition in the Western Cape called Cape Library Consortium (CALICO). One of the research questions asks about possible collaboration among the four campuses.

The CHEC represents the four HEIs in the Western Cape. In 1993 the Councils of the then five institutions formed a legal body called the Western Cape Tertiary Institutions Trust. The member universities and technikons were to be the 'beneficiaries' of the Trust, which was established to "facilitate and expand co-operation between the beneficiaries with regard to the sharing of infrastructure, such as libraries, information technology, training of personnel, as well as any other form of co-operation which may be beneficial to any of the parties . . ." The Vice-Chancellors of the then five institutions signed a compact of behaviour on 3 December 2001. The Compact committed their institutions to work together to build a coherent higher education system in the region through academic programme collaboration. On 1 January 2005, two institutions merged to form the Institution C of this case study, thus reducing CHEC from five institutions to four (taken from the CHEC website, http://www.chec.ac.za/index.asp).

Despite the commitment of the four HEIs to the CHEC Compact, it is important to provide a brief historical background to the HEIs. The case study's Institutions A and D were classified as white universities under the Apartheid dispensation, which meant that the government of that time provided resources to enable them to compete with other HEIs on an international scale. A perusal of Institutions A and D's websites shows that these two HEIs still benefit – having more academic staff, better established facilities and bigger budgets than Institutions B and C. Institution B was branded as a disadvantaged coloured university, which meant that the Apartheid government provided limited resources to this institution. Today, this university is still lagging behind the two other HEIs with regards to, for example, library resources. Institution C is still working through some of the teething processes of the merger that took place in 2005 between a previously classified white institution and a previously

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classified coloured institution. Also, Institution C is now seen as a university of technology, rather than a technikon.

This historical context cannot be ignored in the case study of IRs since it has impacted on the research output of the four universities, their academic prestige, their degree programmes, their student bodies and their ICT facilities. Furthermore, the background of the HEIs has a direct impact on the academic libraries and their role within the institution.

The Cape Library Cooperative (CALICO) was established in 1992 and was the first library consortium in South Africa. CALICO's mission at inception was to promote information literacy and economic development of the region by providing information to users in the form they want, when and where they need it, at an affordable price. The Cape Library Cooperative (CALICO) changed its name to Cape Library Consortium (CALICO) in 2004. Collaborative agreements amongst CALICO libraries facilitate access to information by the sharing of library resources either directly or by means of inter-library loan. Rapid and cost-effective delivery of materials amongst CALICO libraries is provided by means of a daily van delivery service (taken from the CALICO website). An IR perhaps by definition belongs to one institution. Yet the collaborative aims and shared mission of the libraries of CALICO suggest room for regional cooperation in the development of IRs. One of the research questions, as given above, asks if there is any sign of such collaboration.

3.3.   Research methodology

The chief data gathering method was interviews. The interview protocols are given in Appendices 1 & 2, although, as implied by the inductive and iterative nature of qualitative research, many fresh insights were gained from their open-endedness.

The researcher also examined and analysed public documents of some of the HEIs, such as the institutions' newspapers, annual reports, correspondence and minutes of the meetings which focussed on IRs. The documents answered questions such as the argument for the establishment of IRs at the individual HEIs, who would be in charge of the IR and the long-term commitment to archiving scholarly communication

Ethics

Before interviews were conducted, it was important that the participants gave informed consent. Following guidelines in the research literature (Leedy & Ormod, 2001: 108; Creswell, 2007:123), on initial contact the researcher gave the following information:

1. The exact nature of the study;
2. A description of what kind of participation was to be involved and the duration thereof;
3. A statement indicating that participation was voluntary and could be terminated at any time; and
4. An offer to provide information about the study (e.g. a summary of findings) upon its completion.

Preliminary and follow-up correspondence occurred mainly via email, with telephone calls to set up meetings and verification of appointments. The interviews took place in the workplace of each participant, as well as in one participant's house on a public holiday.

As explained in Chapter One, the four HEIs and the case study participants will remain anonymous in this dissertation in order to protect their integrity. Thus the institutions will be referred to as Institution A, Institution B, Institution C and Institution D.

Interviews

In order for the researcher to acquire and interpret the data necessary to answer the research questions, the case study required data collection through one-on-one, open ended interviews.

Each of the CHEC HEIs is at a different stage of setting up IRs and the key informants varied at each HEI. Table 3 summarises the key informants on each campus. As is common in qualitative research, the interviewing followed an "iterative" process with one participant leading the researcher to another. It was also iterative as follow-up questions were sometimes needed to clarify or expand on points. The list reveals that the range of informants varies from campus to campus. The original aim was to interview all four library directors and indeed preliminary introductory

interviews were conducted with all four by phone. However, three referred the researcher to other senior staff in their libraries, the IR project managers.

Institution	Participant*	Position
Institution A	Participant A1**	Librarian, project manager for institution's Electronic Theses & Dissertations (ETD) project
	Participant A2**	Senior Librarian, responsible for IR policy development, raising funds & running workshops
	Participant A3	Administrator, maintains the research centre's repository
Institution B	Participant B1	Librarian, project manager for institution's ETD project (until he left the institution in the course of the case study)
	Participant B2	Senior Library Manager and IR project manager
	Participant B3	Senior IT Manager, responsible for software choice at institution for all projects, (until he left the institution in the course of the case study)
	Participant B4	Librarian, project manager of disciplinary archive, independent from institution's activities
	Participant B5	Senior university academic administrator, responsible for research development
Institution C	Participant C1	Librarian, part of the library repository's working group
	Participant C2	Librarian, project manager for institution's library project
	Participant C3	Senior Manager of the Research Directorate
Institution D	Participant D1	Senior Library Manager, project manager of digitisation of library material
	Participant D2	Academic, administrator of his/her Department's repository
	Participant D3	Scholarly publisher, consultant researcher at Institution D

Table 3: List of participants

* The people interviewed are key informants on setting up the institution's repository at each institution.
** Participant A1 and A2 chose to be interviewed together

The participants might be described as key informants and role-players in IR development in the Western Cape. However, it is quite possible that the study missed some. IR development is in its early stages and in a state of flux. For example, the analysis of data in the following chapter will show how the situation changed as people resigned in the course of the study.

As one-on-one, open-ended interviews were the primary method of data collection it was important for the researcher to cover all the aspects to the topic (Creswell, 2007: 132, 133). The term "IR" is used quite broadly in the case study interviews. Strict definitions from the literature are not appropriate at this early stage of IR development in the Western Cape. So "IRs" include eTheses and Dissertations repositories, a disciplinary archive, departmental archives and a research portal.

Thus, the questions focussed on whatever research repository existed at the institution. This situation also illustrates the novelty of the research topic.

Although open-ended questions are valued in qualitative research, issue-orientated questions were imperative (Stake, 1995: 65). Stake cautions that when conducting interviews it is quite difficult to steer the interviewees towards the issues that pertain to the research project, as participants have their own issues. He suggests that most people like to be listened to.

At Institution A, the library set up the IR. Hence, the key informants were two librarians; one is the IT librarian and the other is in senior management. They requested to be interviewed simultaneously as they felt that they would be duplicating information if they were interviewed separately. At the same institution, a repository administrator of a research centre was also interviewed.

At Institution B, five key informants were interviewed. These key informants included two librarians who worked in the academic library; the IT librarian and the senior library manager. A senior administrator in the university management was then interviewed as the project management of the IR shifted to him. A senior IT manager was also interviewed, as he has a strong influence on software choice at this institution. Institution B also has a disciplinary repository, so the librarian, who was also the project manager and worked for a research centre at the institution, was interviewed.

At Institution C, after a preliminary conversation with the manager of the Research Directorate, two librarians were interviewed: one was a technical librarian and the other a senior librarian, who manages the institution's repository. As this is the only known research repository at the institution, and no other key informants were involved in setting up the repository, no one else was interviewed.

The library is establishing a research portal at Institution D. A senior library manager referred the researcher to a senior librarian who is in charge of this project. She was the key informant interviewed from the library's side. The administrator of a departmental repository, who is also an academic, was also interviewed. At an informal occasion, the researcher's supervisor became aware of another key informant from this institution. The researcher set up an interview at this participant's house. She is a scholarly publisher at the Institution. No key informant was

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mentioned within Institution D's university management, thus no senior administrator was interviewed.

Questions varied according to the position of the key informant and the specific institution dealt with at the time of the interview. General questions posed to the library staff were mostly around the library's role in establishing the IR, as well as the day-to-day running of the IRs, the policies that have been put in place for this to occur, the possible success and hindrance factors of establishing an IR, who co-ordinated the IR project and what future role will the library play in the sustainability of IRs. Questions on the hardware and software of setting up an IR were also posed to the library.

At appropriate institutions, the questions posed to the academic staff and the key informant of Institution B's university administration centred on the mindset of academics towards IRs, obtaining buy-in to support IRs, the role of the university management and what future they see IRs having in their HEI. In addition questions around their perception of the role of the library in setting up IRs were also asked.

As most authors encourage trying out questions in pilot form (Stake, 1995; Creswell, 2003 & 2007 and Leedy & Ormrod, 2001), the researcher undertook interviews with an academic outside the realm of the case study, Prof. Jonathan Jansen, an acknowledged pioneer in the IR at the University of Pretoria, as well as Ms Susan Veldsman (Content Manager, Electronic Information for Libraries). These two interviews preceded the study proper and served to build the researcher's background knowledge.

The interviews were recorded using a Sony digital dictaphone. They were transcribed by the researcher soon thereafter and copies then sent to the research participants.

3.4. Data analysis procedures

It was important that the researcher viewed every statement relevant to the topic as having equal value. Units of meaning were clustered into common categories. From these themes, textual descriptions of the experience developed, which led to an integration of structures into the meanings (Moustakes, 1994: 118). Creswell's description of qualitative data analysis guided these processes (2007: 150). The researcher was aware that data collection, data analysis and report writing were not

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distinct steps; rather they were interrelated and often times went on simultaneously. Added to this, the researcher engaged in analysing qualitative data by a process of moving in analytic circles rather than a predetermined linear approach.

Thus, for the purposes of this research project, the organising framework related to Creswell's data analysis spiral (2007: 151). These spiral loops consist of:
- data managing;
- reading, memo-ing;
- describing, classifying, interpreting; and
- representing, visualising.

The researcher thus started the process by managing the data through organising the data onto index cards initially and later, as the topics became too much for manual cards, computer files were used. The researcher used all the field notes made from observation and read and re-read the transcripts, as well as took note of the memos in the margins. The reading and memoing loop moved into the describing, classifying and interpreting loop (through coding and classifying). At this stage, the researcher formulated her own views and corroborated the data with what was available in the existing literature on IRs. The researcher then packaged the findings in text form (Creswell, 2007: 153-154). This phenomenology research approach brought out the "essence" of the experience, which was the culminating aspect of a phenomenological study; telling the reader "what" the participants experienced with the phenomenon and "how" they experienced it (Moustakes, 1994).

3.5. Evaluating qualitative case study

A small scale qualitative study can make no claim to be statistically representative. The list of participants in the previous section shows that the case study analysis relies on interviews with only 14 people, although the preliminary reconnoitring and strategising included several other shorter conversations. The 14 people cannot be said to "represent" a population. Qualitative research has different measures of quality from quantitative. Hart (2005: 120) lists the factors that influence the "dependability" and "coherence" of a qualitative study. These include: researcher status, informant choices, the following-up of disparities among data, clear delineation and definitions of data categories, clear reporting of data-collection methods, the generous provision of verbatim accounts of conversations and interviews (raw data) to support interpretation, and the presence of different researchers.

The qualitative perspective is that the task of the researcher is to identify methods, data categories and context so explicitly and thoroughly that comparisons can be made across sites by the reader (Stake, 1994). If a case study is, in Stake's terms, "instrumental" in building or refining theory, theoretical generalising has to take place. Therefore, that enriched theory should serve to provide new insights into other contexts as well as theory. Klein and Myers contend that so-called generalisable knowledge is "often neither relevant nor meaningful, in which case we are better off understanding specific contexts" (1999: 82).

Once an analysis had been made by the researcher, it was important to then validate the findings as there was an ethical obligation to minimise misrepresentation and misunderstanding (Stake, 2005: 109). One of the methods of validation is through a process of triangulation, as tabulated in Table 4. Triangulation is when "multiple sources of data are collected with the hope that they all converge to support a particular hypothesis or theory (Leedy & Ormrod, 2001: 105). Stake (1995: 112) provides the following table in his discussion of triangulation.

Data Situation	Need for Triangulation
Uncontestable description	needs little effort towards confirmation
Dubious and contested description	needs confirmation
Data critical to an assertion	needs extra effort towards confirmation
Key interpretations needs extra effort towards confirmation	author's persuasions, so identified needs little effort towards confirmation

Table 4: Data source triangulation

Hence, the researcher corroborated the findings from the transcripts by sending the transcripts to the participants, comparing interviews and following up ambiguities in emails. Another form of triangulation took place in her meetings with her supervisor who acted as a sounding board for tentative interpretations. Furthermore, the existing literature on the topic added to the corroboration of evidence.

3.6. Conclusion

Through this qualitative study, the researcher was able to gather data consisting of "what" participants experienced and "how" they experienced it (Moustakes, 1994),

with specific reference to the establishment of IRs in the Western Cape HEIs. It is also through this study that it was deduced that some of the findings differ from those in the literature. This analysis of the data findings within the themes of the topic will be discussed in more detail in the next chapter.

CHAPTER FOUR: SUMMARY AND ANALYSIS OF DATA

As described in the previous chapter, the chosen methodology for the investigation into the establishment of IRs in the Western Cape universities is a qualitative case study. Through the interviews of key informants, some common threads on their experience of setting up a repository emerged. These common themes support the theory building of a case study.

Qualitative research is reluctant to generalise from cases (Creswell 2007: 74) and has no claim to statistical representativeness. The number of interviewees in the qualitative case study is limited and one participant cannot be said to "represent" his or her colleagues. As stated in Chapter Three, at this tentative stage of IR development a survey of academics or librarians would be meaningless.

The one-on-one interviews with key informants aim to describe first of all, in Wolcott's words, "what is going on" in the Western Cape universities with regard to establishing IRs of research and factors that might affect it. The next layer in examining the data answers more analytical questions like "How do things work?", "What is not working?", "How might things work better?"(Wolcott, 1994: 12). This implies looking for interrelationships and contradictions among the data. The purpose in this chapter is to engage in this kind of description, summary and analysis.

The Chapter begins with a list of the participants (as in Table 3 of Chapter Three) and a table analysing the status quo of IRs in the Western Cape HEIs. It then goes on to explore themes that emerged in the case study analysis. These are as follows:

- philosophies and rationales
- software choices and challenges
- roles and responsibilities, with specific reference to the role of the academic library
- faculty and university management "buy-in"
- partnerships and collaboration
- success indicators and hurdles.

4.1. Case study participants

Table 3 in Chapter Three summarises the key informants on each campus. Referring to Table 3, the researcher interviewed three key informants at Institution A, five key informants at Institution B, three key informants at Institutions C and D.

4.2. Status quo of Western Cape IRs

Table 5 provides the researcher's analysis of the state of IRs on each campus at the time of the interviews. The breakdown categories come from Chapter Two's review of the attributes of successful IRs. It has to be said that the situation is fluid and might well have changed since the completion of the study. An illustration is the evident risk of too much dependence on the enthusiasm of individuals which is a major finding of the study. In Institution B, for example, the resignation of the IR project manager in the library halted progress. It took over a year for the person to be replaced.

Attribute	Institution A	Institution B	Institution C	Institution D
Fully-fledged IR	No	No	No	No
Scattered Repositories	Yes	Yes	No	Yes
ETD repository	Yes	Yes	Yes	No
Departmental/ Disciplinary /Faculty repository	Departmental	Disciplinary	None	Departmental and Faculty
Software Platform	DSpace	Chisimba	Digital Commons	DSpace; ePrints
Open Source Software?	Yes	Yes	No	Yes
Test Piloting Software	Yes	No	No	*Departmental Repository*: Yes
Cross Campus Steering Committee	Yes	Yes (until 2007)	No	No
Library played a role in setting up?	Yes	Yes	Yes	No
Project Manager	Library	Library (until 2007) University Manager (from 2008)	Library	Academic in department
Content areas	ETDs Music finding aids; biodiversity and geospatial info	ETDs; African higher education research	ETDs; research reports	Music finding aids; photographs, newspapers; Law ETDs; Computer

				Science Research
Mandatory self-archiving repository	Yes	No	No	*Department*: Yes *Faculty*: No

Table 5: Status quo of repositories in the Western Cape HEIs

As shown in Table 5, none of the Western Cape HEIs has a fully-fledged IR. All four universities are at different phases of establishing an IR. The Table reveals the importance of the library's role in establishing repositories of ETDs in three of the four sites. These are often the first step.

The Table gives the facts; but the interviews uncovered the human aspects involved in the establishment of repositories. They reveal the importance of individual enthusiasm, relationships among campus role-players and strategising. For example, one strategy is to forge ahead, set things up and then present the community with a fait accompli. Another is a more cautious waiting for "buy-in" and the assurance of management support. The quotes below illustrate the two extreme strategies in setting up systems for an IR:

> C1: "One of the things we want to do this year, we've been thinking, we can't wait on these guys [university management], they might still drag their heels for another six months, maybe a year. We can't wait forever for them, so one of the things we've got to do this year, is maybe digitise our theses collection. Or maybe make a decision that we would digitise everything that's been published over the past five years. That kind of decision. The whole idea, get the stuff in digital form, in the right format and so on so that when at admin level, people start thinking, ok, we can just run with it" (Institution C, Participant 1).

> D1: "….that's why we haven't done ETDs ourselves without the University saying, we want them done, we'd like the library to do it, here are the resources. The library is already over-committed as far as staffing and I think it's a good strategy.
> JC: So the University management must say we agree with it, but … the library says, yes, but resources need to be added.
> D1: For the library to do it, you've got to have resources" (Institution D, Participant 1).

As shown in Table 5, Institutions A, B and C have a fully-fledged ETD repository. Institution B was the first in the Western Cape to launch an ETD repository in 2007, with Institution A the same year. The ETD repository of Institution C went live in April 2009 after a short testing period:

> C2: "We told them about it at DITCHE [Development of IT Capacity in Higher Education] … we introduced it to them at the workshop, we didn't do a demo. [He] did an allegory and at the end of it we just showed them and I think they

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were a little bit surprised to see that we went up live in two months, considering how long other people take and spend developing their products" (Institution C, Participant 2).

The library of Institution C planned and established its ETD repository without waiting for the go-ahead from the university management. The library decided to go with propriety software, Digital Commons, which is a hosted repository platform, because of poor IT support at Institution C. Participant C2 provides an interesting insight into their choice:

C2: "in October/ November ... Digital Commons contacted me and he wanted to do a demo of the Digital Commons software ... and basically the library executive decided this was it and we were going to go for it. We signed the contract in January, we started setting up in February and by April we were live ... So an IT support issue was the reason why we decided to go for a hosted solution…What we do is they have all the hardware on that end and all the software for the digitisation. We upload our documents; they will put it into pdf format for us, they will OCR it for us, they will store it for us, they will make it available in the latest software … Basically we leave them with all the headaches" (Institution C, Participant 2).

Institution A's ETD repository is managed by the library, and the institution has a workflow process in place, which stipulates the specific roles and responsibilities of students, faculty staff and other staff in making ETDs available. Unlike all the other institutions, the institution's management took the responsibility of presenting the ETD repository to the academic staff to get their input and support:

A1: "Through the [Deputy Vice-Chancellor] who has since left the university, we sought approval for this initiative and the process was as follows: we stated our need for a theses and dissertation database and then it was circulated by that vice-rector amongst all the faculties to get their input on how this process should work in order to implement a ETD on campus and who is responsible for what. For example, what does the student take responsibility for, what does the supervisor take responsibility for, what does the library take responsibility for, what does the printing press take responsibility for? That was very well documented at faculty senate and adapted slightly and approved in April 2007" (Institution A, Participant 1).

Institution A is the only institution in the Western Cape that has progressed to this extent, where the ETD repository is owned by the students, supervisors and university management, although managed by the library:

A1: "With effect from 2008, ... it became mandatory to upload it in electronic format … We went through this whole process for the December graduation, which was last week, of which the final submission date online onto DSpace was the last week of November and we uploaded 274 theses and dissertations using this methodology" (Institution A, Participant 1).

Initially Institution B's ETD repository was driven by the library because of the strong drive of an individual librarian with the support of library management:

B1: "I like to run with things, I don't like red tape … I think the project was personality driven, but the institutional repository obviously cannot be"(Institution B, Participant 1).

The library was moving towards evolving the ETD repository into an IR when this person resigned. Owing to a critical library staff shortage, the ETD repository process then stalled, as acknowledged by the senior library manager in the following words:

> B2: "because the library has been understaffed, we decided to shelve the project, we cannot do anything about the project right now until we resolve our staffing problems …. … We will set up a meeting once we are ready to embark on a project. And the library can only be ready once …our staffing issues … are sorted out" (Institution B, Participant 2).

With the process stalled, Institution B's new senior administrator took over as project leader. The senior library manager claims he has a "passion" for the project:

> B2: "he is the main person in terms of driving the process at institutional level … it's part of his portfolio in ensuring that the research output is disseminated … What I can say is that he has a passion for this project and that says it all" (Institution B, Participant 2).

The library at the fourth HEI, Institution D, is resolute that it will not make its ETDs publically available until its university management shows support through providing extra resources, such as additional staff and money:

> D1: "we're one of the only institutions which doesn't yet have our ETDs out even though it's one of the most obvious things that you would want to put out there and make available" (Institution D, Participant 1).

> D1: " … as far as the theses go we've insisted that that's a university decision about doing that... it couldn't just be something the library took on without support and some sort of manpower, funding. We weren't being given any extra staffing to do that so she [librarian] felt that the university had to have some buy-in" (Institution D, Participant 1).

Despite their decision not to set up a public ETD repository too quickly, Institution D has been engaged in a major research support project since 2006 with a grant from an international foundation. The project includes the digitisation of a portion of its collection, as well as the establishment of a research commons. At the time of the interview, the library had not made a decision on a software platform for its digitisation project. Participant D1 believes that their choice might serve to fast track the university's IR, as the technical infrastructure will then already be in place:

> D1: "I think once we get up our platform that might then be the next step to get this traditional form of institutional repository with staff putting in their own and so one … once the theses and dissertations go up, those might be the core, other things can follow" (Institution D, Participant 1).

Participant D1 says that she is aware that one entry point is needed for online access to Institution D's research output, as users will not want to go to websites of individual departments, faculties or libraries to search for the research output:

> D1: "Ideally in the end one needs one portal because people don't want to go see what is the library doing … what is happening at Archaeology. Inevitably that,

there will be that sort of portal. It might happen after the library has selected the platform and that might be a good model" (Institution D, Participant 1).

The library also believes that their digitisation projects will hone their skills to be ready for when digitisation becomes one of the core functions of the library:

> D1: "We'd grow our skills based on what we were digitising, black and white photographs, colour slides, glass-plate negatives, newspaper clippings, ordinary manuscript material so that we could prove that we could do it and that the stage it then became a core part of what the library did; we'd be ready and that's where we are now" (Institution D, Participant 1).

This echoes the response of a librarian at Institution C: "Become skilled whilst the management decides when the research output will be digitally available in a repository".

Institution D does have two departmental repositories: a department repository and a faculty's repository. Participant D1, a librarian, claims that the administrator of the departmental repository, an academic, convinced his fellow academics to make their research digitally available by publishing his own research online and proving to them that his work were being cited more because of availability online:

> D1: "I understand from him [Participant D2] that it wasn't absolutely straight forward. He came in very strongly believing in institutional repositories and he's been part of the whole open source movement. Not all his colleagues were convinced and he put his own stuff out there and they could see. His papers were being cited and it was a success. He brought them around by example" (Institution D, Participant 1).

The academic she mentions, Participant D2, echoes the comments of the librarian:

> D2: "The important need was to manage our technical reports. That was the first thing, first most important thing. There's a need for computer scientist to be very visible online and to have all their research available otherwise it will be questioned if we're doing anything useful. With computer scientists if you don't have it online you have no argument that you don't know how to do it. ...The expectation is there that the documents are electronically available" (Institution D, Participant 2).

The departmental repository is a dynamic repository that is administered by Participant D2. The main function of the repository is to make available the department's research output, specifically its technical reports, in a centralised space. The academics in the department self-archive their research and sort out copyright issues themselves.

Both Institutions A and B, like Institution D, have other repositories apart from their ETDs. However, two major differences are that these repositories were planned from

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the beginning to share the same software platform and the library's input was asked for:

> A1: "It was one of the centres of excellence themselves. They approached IT and the library to help them implement a repository … We took the DSpace software, we installed it and adapted it to suit their needs" (Institution A, Participant 1).

> B1: "At the same time, the [disciplinary] project started, which I was also involved in, … the same programmer did both, using exactly the same database and everything, so there was consistency in terms of how they approached it, same standards. If I made a change to the ETD database to some standard, it was affected on the [disciplinary project] side as well. It's not separate entities, it's actually completely integrated, what's different is the interface" (Institution B, Participant 1).

4.3. Philosophies and rationales

None of the four institutions has performed a formal needs assessment within their communities. Participant A1, a librarian, acknowledges that in future they will have to institute a needs assessment, known as the digital audit framework, at their institution. This framework is an international standard developed by institutions to conduct an audit of the institution's digital needs:

> A1: "... it's an international standard developed by institutions to do an audit of institutions digital needs for preservation... because we can't really do a thorough implementation of something that will eventually become an institutional repository ... without doing such a formal needs assessment" (Institution A, Participant 1).

Despite her institution not performing a formal needs assessment, Participant B2, a librarian, is very clear as to what an IR should contain, based on her observation of another university:

> B2: "For this particular institution, what I have observed in the first place, there are publications developed by the university staff members and there are faculty journals that have been published and there are conferences that have been facilitated by the university whereby many papers have been presented. Those conference proceedings, those research articles by staff, those papers presented by our staff either, international conferences or written by our staff, or published on our staff in accredited journals, to me those records form a component of our IR" (Institution B, Participant 2).

Motivating factors across all the institutions include:

- To create a centralised and accessible space for research output
- To facilitate communication among scattered groups of researchers
- To enhance the institution's and department's online profile
- To make research available to a wider audience than traditional print publishing.

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Occasionally, the librarians in the case study seem to be motivated as much by a desire for "plant their flag" on a new domain as altruism. There is a hint of beating off competition in these words of a librarian at Institution C:

> C1: "… the library has been speaking about this thing for a long time … At the time we thought that we should drive this thing harder because now they almost grab the momentum and the thing is now out of our hands. What we are going to do, we're positioning now ourselves already" (Institution C, Participant 1).

The "they" referred to in this extract is the university management.

A question across all interviews asked why participants are involved in IR development, trying to uncover philosophical differences and common ground. The question led to much talk over the purpose of scholarly communication and over the dissemination of research. The academic informants all claim to desire to have their research available to the public. But there were differing views on how much control there should be and how open access should be.

Participant B3, Institution B's IT manager but also a leading academic and researcher, has strong open access convictions to the point that he will not publish any of his research if it will not be available under the Creative Commons license. He believes that he would rather withdraw his journal article from a prospective publisher than sign away copyright:

> B3: "I got a paper now [for]... an international journal ... and I told them I wanted to publish it under the Creative Commons attribution-share alike license. So they sent me this contract which effectively signs the copyright over to them .... So I said, Look, I would rather withdraw the article from the journal. I'm old enough, I don't need the publication. I'd rather just put it on my website than put it out there under a license which doesn't allow people to share" (Institution B, Participant 3).

There can at times be a tension between the desire for open sharing and the wish to present a good institutional face. Oddly contradictory is Participant B5's assertion that screening is essential in an IR:

> B5: "If you release everything and anything without a screening, and some lame piece of work goes out there in the name of the university, what they have done, they have done to the image of the university as a centre for new knowledge production. In the public domain is a copious over guard because they will say they're from … and they will label the entire institution over one piece of work. So my response to that is, it will be fine, but it has to go through a quality screening process to ensure that we take ownership of what we're putting out there and in something that we as a university feel really doesn't do justice to the quality of work within the university we must say to the person, we cannot put this out because it's really not up to standard" (Institution B, Participant 5).

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Librarians also seem to have felt the impact of the international open access movement and the "sharing" ethos, as shown in the following extract:

B1:   "… we took a stance, myself, and the Director from the beginning to say that everything is open, for public, until being told otherwise … Based on international standards, and also based on the intent of the project…it's fairly useless to make things accessible within the institution only" (Institution B, Participant 1).

B4:   " … round about 2004, I became aware of open source. I went to a … conference at [Institution B] and heard for the first time about Creative Commons…. So this was a huge eye-opening thing, the idea of people sharing … and I thought, "wow" that was really interesting and that's the way I want this thing to go. This digital library of [disciplinary repository], it must be full text, open access" (Institution B, Participant 4).

Participant D3, a scholarly publisher and still active in Institution D's research circles, has strong views on how the Department of Education (DOE) has manipulated the thinking around the publishing of research in South African HEIs. She believes that the DOE's system has hindered the dissemination of research and its impact on society by not having a national rewards process in place that uses the capabilities of new technology. The result is that universities are more interested in rankings than in the dissemination of their research and its impact on society:

D3:   "The biggest hindrance is the Department of Education's policy for rewarding journal publication because it puts money behind prestige. Prestige and money pulled in one direction. … That's the myth that if you get your universities to publish in the ISI index, by some kind of magic, research is going to have impact in the country. What the magic is, I don't know. It's never questioned … universities haven't focussed on dissemination and it doesn't regard dissemination as its job, it's quite a major shift to go to open access. And that's the key. South African universities do not regard dissemination as their role. They regard it as the job of Elsevier to publish that, not them "(Institution D, Participant 3).

She comments on the contradiction between the success of her institution's e-Learning initiative and its lack of interest in digitising its research. She claims that researchers still work in isolated silos:

D3:   "… it [the E-learning system] has been hugely successful...more than 90% of the students at [Institution D] use it and, if I remember rightly, something like 9 000 or 10 000 students online all the time… And one big question is - does one need something similar for research…there's nowhere central you can go. [Institution D] does not have a centralised approach to that. It has a silo'd approach. Every Faculty does its own thing" (Institution D, Participant 3).

Participant D2, a computer scientist at the same university, is of the opinion that it is vital to have an online presence in *his* field:

D2:   "It's because our approach needs little convincing with the people here…Computer Scientists tend to be ready to use technological solutions to solve their problems. It's unfortunate that most other places in the country

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have not exploited the natural tendency of computer scientists to get involved in things like this" (Institution D, Participant 2).

He agrees that the model of scholarly communication needs to change. In so doing, the availability of research output will be readily available online and academics will own the dissemination of their research:

D2: "... scholarly communications is really what needs to evolve and some people recognise that this is what needs to evolve ... It has to be possible for people to, lets say, manage their documents and their references using electronic tools. It must be possible for people to engage in conferences and all the processes surrounding conferences and journals using electronic tools. So those are traditional things that academics have done. There are now new tools for these things"(Institution D, Participant 2).

He was one of the younger academics at the time of establishing his department's repository. He proved to his colleagues that his academic papers were cited more than most of their research papers, even though he had not published as much as they had because he was putting his research in a repository. He has shown his colleagues that every document in the repository gets read by six people overseas every hour and that interest does not quickly drop off as in print publishing.

Talk of open access leads to intellectual property and copyright issues. They have been dealt with differently at the four institutions and even inside the institution. The participants in charge of adding content to the repositories either deal with these issues themselves (Participant A2) or have the authors contact the publishers themselves (Participant C2, Participant A3 and Participant D2):

JC: "And are you involved in any kind of copyright ...
A3: The students do, the students put on their datasets and those are copyrighted for five years. So for the five years that they're on the system, anyone who wishes to use the datasets can ask the student or the core team members perhaps if the student has already left and moved on and it's then up to them to decide whether they are going to allow access. What I do is I just direct them to whoever are the providers of that data, or the creators of that data. I don't decide" (Institution A, Participant 3).

JC: "In terms of copyright and intellectual property issues, has that at all been dealt with by the library?
C2: Yes, we have looked at it. We have an author note which ensures that they have made sure that there's no copyright on their item or that they've cleared the copyright to anything that's uploaded and we've also said that if the lecturers want to upload anything, they will be welcome to, but they must ensure that the copyright clearance for those things. So it's their responsibility" (Institution C, Participant 2).

D2: " 'Who is responsible for managing the repository's intellectual property rights?' So I am the repository administrator, but if something's not right I put it back to the submitter. The submitter must go out and I send them a note

saying did you get permission to put this image online or publish the paper, if you didn't then go fix it yourself" (Institution D, Participant 2).

Participant B4, project manager of a disciplinary archive, says that publishers give copyright permission to institution's repositories, but not to disciplinary repositories as it is seen as more of a threat to their commercial interests:

B4: "...the publishers won't give us permission, where copyright belongs to the publisher. In some cases we're allowed to put the authors post print, rather than the public pdf but some publishers won't even allow that, in a central disciplinary archive. They will allow it to be put in an institutional repository. Many publishers, Elsevier, all the big ones, will allow authors to self-archive in their institutional repository, but they will not allow it within a central disciplinary repository. As that repository gathers more papers and content, it starts to be a severe competitor for the journal" (Institution B, Participant 4).

Even though Institution D does not have a research repository, Participant D1 is also involved in arranging permission for the intellectual property of the library collection that they are digitising:

JC: "So you're responsible for the intellectual property?
D1: Yes, I make sure that that's ok.
JC: And you do that, how?
D1: Well most of our stuff just goes out there. On our … collection, the ones that we put up, we made, I don't know if you've looked at it, people have to agree to use things only for certain ways, use for research. In fact the low resolution in which things, photographs and so on, people can't publish from those really. And we put water marks on some of those early ones. It was our first thing out there, we were sort of giving them away. We haven't put watermarks on any other. The other side of the intellectual property, do we have the right to put stuff out and that we do need considering to what we're doing. I think what we've put out so far has been fine" (Institution D, Participant 1).

4.4. Software choices and challenges

Table 6 summarises the software in use across the case study repositories – categorising the comment into the data themes of the issue of open source versus proprietary software, capacity doubts, and selection criteria. The selection of quotations in the Table gives insight into the thinking and decision-making processes, which can be, as one participant puts it "very political".

Theme	Subtheme	Selected quotations
Open source or proprietary software?		"I think if we go with software solution that is not open source, then it means that a lot of the work is done for us ..."It's less painful and even fairly cost effective too because sometimes one goes with the open source solution but that also costs money" P C1. "We don't have reason to move away from DSpace also taking into consideration we've built up a competency base over the last couple of years" P A1.
Capacity Issues	Lack of specific	"Our problem was not the product; our problem was the

| | skills | support on the product... We have a very difficult, very political IT situation" Participant C2.

"Why have we not used the software? Because we don't have the DSpace skills... If you're going to do any development on it you need Java skills. We don't have Java skills" Participant B3. |
|---|---|---|
| | Only one metadata schema is available | "DSpace doesn't allow for any metadata schema other than Dublin Core … and that can be a bit limiting because we deal with biodiversity information and sometimes its geospatial information... and the metadata schema doesn't allow for us to submit information that's relevant for a geospatial data" Participant A3 |
| | Customisation Difficulty | "You can customise it [Perl] far more than you can customise with DSpace. DSpace customisation is a nightmare" Participant D2.

"DSpace is a big bucket...It's just a big bucket that you throw your stuff in to" Participant B3. |
| | Lack of in-built Preservation | "they say you get DSpace and you do digital preservation. That's not true at all" Participant A1.

"… what's more important is how do we keep on preserving. It's fine to have an ETD system in place but who is going to end up preserving all the preservation aspects of this" Participant B1. |
| Selection Criteria | Capability for managed or restricted access | "As you know that data in not going to be freely available because they're still manipulating the data for research output" Participant A2.

"The reservation was really only one major area, and that was to make everything open accessible, and therefore in order to address that reservation, we adapted the requirements of the system. Once a student's final work that has been uploaded onto DSpace has been accepted by the study leader/ promoter/ departmental official, then they are required to associate a specific status with that final work, which can be either, open accessible or only accessible on the [Participant A] campus network, or under embargoed, or published or earmarked for publication" Participant A1.

"We also had to bring in ..the request for embargos …under what circumstances do you not make available, research content, especially in terms of theses and dissertations" Participant B1. |
| | Self-Archiving | DSpace automatically prepares the space for the student to upload ...Once the theses/ dissertations are finally approved [it] is used to consolidate the graduation list" Participant A1.

"I also want authors to deposit from wherever they are ... remotely, from across the world" Participant B4. |
| | Interoperability | "I think the total is about six or seven things that we stipulated must be part of this… If you want to make your information harvestable, if you want to share it, or made accessible, you have to adhere to those standards" Participant B1. |

		"Formulating metadata for digital documents - there we still need to do a bit more work. ... we're going to have to pin the metadata requirements down ... because it's very important for future purposes" Participant A1.
		"It's interoperable as far as I know. We took on a whole lot of different metadata standards, which I configured initially" Participant D2.
		"As I said the technical support, they do everything. We don't have any problems; they adhere to all the current standards, so all the standards are there" Participant C2.
	Stability	"I had some student set up the [DSpace] software a few years ago and the ... Faculty paid him. And then if they had in problems with the software they contact him... The software is not changing. It's DSpace version something. It's reasonably stable. I don't see the point of updating just for the sake of updates" Participant D2.

Table 6: Software criteria and choice

The most common choice has been for open-source packages such as DSpace. However, there is doubt over in-house capacity challenges that might affect IR sustainability. As mentioned earlier, concern over weak IT support led Institution C to purchase a proprietary product.
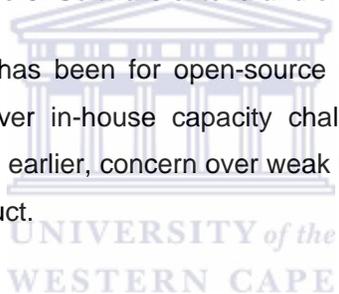
Institution A uses DSpace, the open source software, for their ETD repository as well as the repository at the disciplinary research centre. DSpace was found to have better features for theses and dissertations. Furthermore, DSpace was the software that had a big international user community. The disciplinary research centre, however, wanted restricted or managed access to the information in its repository and DSpace was able to comply with this requirement.

Institution B uses a software platform called Chisimba for its ETD repository. This software was developed by 13 African universities using a language called PHP and is a webpage focused platform for developing web applications. At this institution all digital projects have to use this software platform if in-house IT support is required:

JC: "And the Chisimba framework is it working ....?
B3: Yes. Extremely well. It's running ... eLearning site, ... ETDs ... it's running the seminars, ...it's running the alumni portal, it's trying to upgrade to the newest version. It's about 15 different implementations.
JC: It connects all the projects of the university so they're not silos on campus.
B3: They're not silos. They're silos in that they're independent applications, but they're not silos in the sense that you have a completely different set of skills and competencies for each of them" (Institution B, Participant 3).

Participant B1 mentioned that the library was not given an option with regards to using another software platform by Participant B3, the IT Manager. This decision meant that the ETD repository would be integrated into the institution's current architecture:

> B1: "They wanted us to develop software that's completely integrated within our current systems which we agreed to, because obviously we had no choice" (Institution B, Participant 1).

Participant B3, the IT Manager, defends his insistence on Chisimba and on uniformity across the campus, saying that he was concerned that DSpace would not be easy to maintain:

> B3: "There's nothing wrong with the [DSpace] technology, but I just don't think it's the right technology for [us]. ... It will be more costly to implement as we'll have to buy the skills from outside … most of our work we do in PHP.. For us it's a no-brainer. PHP developers are easier to get, they're easier to train" (Institution B, Participant 3).

He further says that it made sense to add the Library project to others:

> B3: "... Look, at the time we were trying to do all of our infrastructures on this application primary, PHP and it made sense to me to do the ETD in such a way that it could be simply plugged into whatever else we were doing. If we were going to do something else then we would have no skills with which to do it. That's why we developed the skills and capacity. So you don't go to Toyota and ask them that you wanna buy a Volkswagen, so we used the skills that we had which is kind've logic" (Institution B, Participant 3).

The impact of personality and "politics", referred to earlier, might well be evident in the recent decision to return to DSpace for the IR – after the departure of Participant B3, the IT Manager, who leads the Chisimba project internationally. Apparently, the reason is concern over capacity to sustain Chisimba.

4.5. Roles and responsibilities, with specific reference to the role of the academic library

In the international literature, the role of the library is paramount to setting up IRs. It is thus important to test how important this role is in the Western Cape HEIs. At each Western Cape HEI, the library's role in establishing repositories has differed; but at three institutions there is an assumption that the first step to an IR is an ETD repository. Once completed, theses must be deposited in the university libraries and it is only natural that the libraries take control of their digitisation. Institutions A and D stand on opposite ends of a continuum perhaps. With a high profile research portal being built and large scale digitisation of library assets, Institution D's library is in no hurry to establish an ETD repository or to lead the IR processes. However Institution

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A has taken the ETD project on as a way of enhancing the library's visibility and indeed the success of the ETD seems to be leading to a leadership role in IR development.

The interviews provide useful insights into how ETD repositories might evolve into fully fledged IRs and thus also in to the potential role of the libraries. The following extracts reveal the leadership role of the libraries at Institutions A, B and C:

A1: "… it will be fair to say that if the library weren't part of this process we wouldn't be making a lot of progress. We really push it from our side" (Institution A, Participant 1).

B1: "… I mean would have been seen as one of their [IT] projects, and I said initially, we said: "Sorry, we're heading this project". And I'm very glad that we did. This way we can control it, we can manage it, and because I think it's us, it's our scope, anyway, it fits our profile" (Institution B, Participant 1).

C1: "You see from the library side there's a lot of planning… the library has been speaking about this thing for a long time" (Institution C, Participant 1).

C2: "From the library point of view we felt that we needed to get something out there, there was a need to get things digitised" (Institution C, Participant 2).

C3: "This is the library's project" (Institution C, Participant 3).

Institution D is the only Western Cape institution that does not have an ETD repository. In the meantime, the library is digitising some of its library material, which forms part of the new research portal. It has set up an adhoc committee of interested partners to assist with this project:

D1: "It's kind of an ad-hoc committee. I just called together people I thought who would be, should be there. And that consists of me, ... people from IT, ... the head of collections development in the library … And then there is a librarian who is involved with purchased electronic resources so we thought it was an idea to invite her (Institution D, Participant 1).

What is noteworthy about the composition of this ad-hoc digitisation committee is the absence of the administrator of that institution's departmental repository. All three librarians (Participants A1, B1 and B4) who were integrally involved in the development of their repository software mentioned him in the light of being the South African ultimate authority on IR software options and design of IRs. Also, this person has been asked by the National Research Foundation to lead a national ETD project because of his expertise. The implication is that perhaps the assumption that libraries will take the lead in IR development through an ETD project is open to question.

The case of Institution B also throws doubt on the assumption that initiating an ETD project implies a leadership role in IR development. Its ETD project seems to have been at first an in-library project led by one person. He saw the ETD project as the first step to a university-wide IR, believing that librarians rather than IT experts should lead the way because of their information management skills:

> B1: "… the original intention was to develop a repository for all research on campus. Knowing that you have to start somewhere, we started with the theses. That is research output that we do have access to currently. ..We saw fit to spearhead this project, based on the fact that we are information specialists, we understand information flow, we know how to do the analysis of information management" (Institution B, Participant 1).

However, he soon discovered that there was no uniform, institution-wide, workflow process for the submission of theses at Institution B. Hence Participant B1 failed in setting up the framework for the information flow for the roles and responsibilities of the faculties, supervisors and even the students, because each faculty had its own process of submission. Just before he left the Institution, he drew up a draft policy for a uniform process. The fate of this document is not clear.

Participant B2, the senior library manager, arrived at Institution B in 2007. Part of her portfolio she believes is to lead the library in disseminating the research output of the institution. This role is thus seen as larger than just the ETD repository:

> B2: "So my role is to facilitate, to be a project manager ensuring that the research output of the university is served amongst the future stakeholders, which is what I believe to be my role in terms of the IR … Because IR requires us to participate actively in acquiring documentation, discussing with people and then doing also benchmarking, what other institutions are doing and what models can we follow, what software should we patent or which software can we use at institutional level" (Institution B, Participant 2).

Participant B2 talks at length about getting the library ready for the implementation of the IR. She said the faculty librarians already know what their specific roles will be when the IR is established. Even though the library has a staff shortage, some roles have already been identified within the library:

> B2: "Some [faculty librarians] have started engaging on discussions with the faculty staff on getting the documentation that have been published by faculty, but we haven't been serious on ensuring that we make follow up in asking for progress reports because we knew that at this stage we aren't ready to embark on the main project" (Institution B, Participant 2).

The library hopes to hire librarians with the specific skills needed for the establishment of an IR, rather than expect existing staff to take on new tasks. She believes that this is the same direction that Institution A's library has taken.

Indeed, it is interesting to compare the case of Institution A. From the start, it planned for the ETD project to lift the profile of the library. It proactively sold the project to management who then sold it to academics. Resources were allocated to it and senior staff with appropriate experience were hired. Unlike Institution B, this university had already uniform and rigorous workflow procedures for the submission of theses. The library made sure its system follows these flows and that it conforms to all the existing criteria and quality checks. Moreover, it does not upload the theses. Rather it provides training for students to self-archive – thus enhancing the library's visibility and value:

A2: "Our process is more evolved than that. As of next year there's no hard copy submission at all. Students upload their theses/ dissertation themselves or their promoter. The library provides support in this process and conducts workshops in terms of that" (Institution A, Participant 2).

A1: "This process was developed according to all the criteria the university needs to adhere to…auditors do check, or are capable of checking, the submission of theses and dissertations at an Institution at any point in time if they want to. ..." (Institution A, Participant 1).

The library has created a culture of sharing research through establishing an ETD repository that has the support of the university management. To this end, the library has now decided to embark on expanding their ETD repository into a library repository that will in time evolve into a full IR. It is their intention to continue growing their staff component specifically for this purpose. Furthermore, Participant A2 is specifically involved in policy making, writing up documentation that deals with copyright and generally co-ordinating this process from the library's side:

A2: "I am writing policies for, not institutional repository, but for a repository and this is part of the bigger scheme of creating an open access culture at the university. My sense is that we need to demonstrate to the academics that putting the material up there for everybody to harvest, it would increase visibility and to do that, the first step would be a repository" (Institution A, Participant 2).

This extract shows a blurring of the concept of "digital library" and IR – common among the librarians in the case study. Another example lies in the following extract from an interview with a librarian at Institution C:

C2: "We've gone a short route, straight to the repository and we clearly state that we do not have an institutional repository, we have a library repository and we sell it like that to the institution.
JC: A library repository - meaning it's an ETD?
C2: Mainly an ETD but also for other materials you would normally put into a library. It could be articles; it could be whatever you want it to be. The idea is that it's an online library" (Institution C, Participant 2).

In common with Librarian participants in both Institutions A and D, this librarian sees digitisation of library collections as paving the way for an IR. No academic or administrator in the case study made this connection.

Not all participants agree that libraries should lead IR development. Participants B3 and B5 from Institution B, as well as Participant D2 from Institution D - academics - see the role of the library as supporting rather than leading and developing:

B3:   "Well, the library. What often happens is that the library plays its role because no one else does because it's where the thinking happens, but that doesn't mean that that's the right thing. The library should be just the resource just like any resource. I don't think it [the IR] should be driven from the library because then it's seen as being something else" (Institution B, Participant 3).

JC: "And in terms of the institutional repository, what role will they play?
B5:   They will manage it, as part of it. For me, the head of library services must be in a position to answer any inquiry from outside the university. What is available at [Institution B] in terms of repositories, reading material, museums, archives, etc. That person must be able to answer. Maybe not physically located where the person is sitting, but I expect that person to have the answers" (Institution B, Participant 5).

Librarians might question the narrow-minded conceptions of libraries revealed but, if widespread, these conceptions among influential role-players will hinder attempts by libraries to lead IR development.

Participants B3 and D2 elaborate by saying that the only reason that academic libraries are taking on leadership responsibilities for IRs is that researchers and academics are abdicating their responsibility as owners of their research. They even blame libraries for the slow take up of IRs, claiming that the library interventions only confuse academics:

D2:   "So I think, the big thing here is that academics need to recognise change, embrace it and be in charge of it. They will need support from some people. Support from people who understand a bit more about the management of the institutional repository, but basically they're in charge of it" (Institution D, Participant 2).

D2:   "… the librarians put things into the repository and it has made no change in the way that scholarship work and the way that the core functions of research in a university works. This is what needs to change. So making them in charge of it, doesn't solve the problem it just kind of defers the problem and gets the academics confused with the way that they were doing things for 20, 50, 100 years or whatever... Innovation has to happen in academia itself so....Our country has adopted a similar approach of having librarians do the work for the academics, which does not work because academics don't always cooperate" (Institution D, Participant 2).

B3:   "That's because people in those other offices are abdicating their responsibility. The library is taking it on because they know that it is a

valuable source of information. But one of the reasons why it has not been all that successful in a lot of institutions is that it is driven from the library and it's seen as something that they do" (Institution B, Participant 3).

Participant B3, IT Manager for his institution, also suggests that librarians lack the required knowledge to work with the research office:

"...because they probably don't have enough knowledge to be able to do that and work with the research office to get the whole thing working. But ultimately, if it's only the library that's doing it, it's not going to work. It'll always be a little thing with about 5 percent [on board]" (Institution B, Participant 3).

One view is that the university's research development office should lead the process:

B3:   "... what often happens is that the library plays its role, because no one else does because it's where the thinking happens, but that doesn't mean that that's the right thing. The library should be just the resource just like any resource. I don't think it should be driven from the library, because then it's seen as being something else. Whereas if it's driven from the line that is responsible for research, then it's a business process linked to research, not another thing that the library runs.

JC: Very interesting. According to the many journals I read thus far, worldwide it seems like it comes from the library.

B3:   That's because people in those other offices are abdicating their responsibility. The library is taking it on because they know that it is a valuable source of information. But one of the reasons why it has not been all that successful in a lot of institutions is that it is driven from the library and it's seen as something that they do" (Institution B, Participant 3).

Despite this view from a research leader that librarians should not be at the forefront of the setting up of IRs, it is of interest that South African's national research body, the National Research Foundation (NRF), has decided to embark on training workshops nationally to train librarians to develop their skills in this regard from 2008 onwards.

4.6.   Faculty and university management "buy-in"

The view quoted just above that academics will not climb on board and be part of an IR if they see it as a library project has to be considered seriously. One of the strong threads in the interview data is the question of "buy in" from academics and from university management.

4.6.1. Faculty "buy-in"

As mentioned earlier, one strategy is to build on the ETD repositories as Institution A has done. It has marketed its ETD repository to the faculties and university management with specific roles and responsibilities for the students, supervisors,

faculty administrators and librarians. The result is that the ETD repository has its institution's full support and they are now turning towards developing a strategy to obtain the academic community's research output. In order to do this, from 2009 onwards the library will formalise workshops on the meaning of an open access culture at the institution and will tackle specifically the research funding formula problem that academics struggle to understand within the open access culture. Participant A2, a librarian, believes that once they see that an IR need not contradict existing research rewards procedures, academics will be willing to make their research publically available in an IR. At the time of the interview, he was developing a policy in order to prove to the academic community how important it is to have their research visible online and contribute to the open access philosophy:

> A2: "The major stumbling block is research rewards. So through research rewards you get visibility. For us to demonstrate visibility, we have to put something tangible together to demonstrate increased visibility .... All academics strive to be better researchers so that is what we're trying to do in this process. To ensure increased visibility and the policy would work towards increasing visibility, that is the backdrop of the policy…We're hoping to have a substantial workshop next year on open access, and hopefully have policy statements taken there to administer it to change their funding formula" (Institution A, Participant 2).

Some academics might question his naivety in seeming to believe that a workshop can lead to a change in long-established nation-wide policies. However, as mentioned earlier, others agree on the need for change. As one puts it, "So they [academics] are driving this high prestige thing, they're [academics] only interested in peer-reviewed stuff ... they're only interested in the ISI indexes and that's the dominant theme" (Institution D, Participant 3).

Another strategy suggested is to capture the interest of the younger academics who might be more open to change. When the reticent group see why younger academics' research get referenced more than theirs, then there is a chance that they might want to be a part of this open access culture:

> A2: "I think what we need to do is to capture the group that has the greatest potential, which, unfortunately will have to be the younger ones. And if you can capture that interest, then sooner or later, the older researchers will say, you know what, our younger researcher's articles are getting referenced more than mine, because mine is in a highly accredited journal with very few people accessing it" (Institution A Participant 2).

He seems to believe here that publishing in "highly accredited" journals may be incompatible with publishing in IRs. But Participant B1 realises that research reports can be placed in an IR, even if they are to be published in accredited journals:

B1: "And part of phase three was to identify what's next, and we've identified other research, whether its pre-prints, post-prints, non-printed or non-published items …. Where we will have to hone in more on in terms of the academic himself, they will play a pivotal role in all of this" (Institution B Participant 1).

His library director feels that a snowballing effect should be used; first targeting one faculty, which will test the effectiveness of the IR, and then other faculties will become aware of it too. She describes a "'tactical" approach" :

B2: "… prior to dealing with the academic you need to pilot the project first, you co-ordinate one faculty and then you create a platform and then once you've created platform for that faculty and then other people can test and try your project. Other faculties will easily get convinced but if you come with theory that hasn't been tested, you won't convince the academics. I'm sure the approach that we have to use, we will have to be very tactical … Obviously we have to take it bit by bit. If we want one faculty we can't expect to do IR for all the faculties at the same time"(Institution B, Participant 2).

Furthermore, she wants to use a master list of the institution's research output to target a specific faculty:

B2: "In my understanding, because we have a research unit, under the research dean, the assumption is that all the research output of the university, knowledge or lists of that are held somewhere. Then what we will need to investigate further, obviously we are talking about records that have been word processed…Our first point would be identify the list of records that have been published and conference proceedings and everything and then once we identify that then we deal with the faculty co-ordinators in ensuring that they deploy our requests. They will send our requests to individual academics" (Institution B, Participant 2).

The "non-librarian" interviewees made no mention of a role for the library in persuading researchers to contribute and use an IR. The IT Manager and ex-academic of Institution B, Participant B3, believes that academics have to be obliged to place their research in IRs as "people won't do stuff unless they have to". Funding can be withheld until preprints are in the repository:

B3: "All institutions should have an institutional repository and part of the research funding process within an institution should require that the preprints are in the repository. So you don't get your money unless they are. Simple.
JC: So you believe in mandatory archiving?
B3: Yes, otherwise it won't work" (Institution B, Participant 3).

He also feels that that the academic community will not archive their research if they do not understand the benefits and so fear of losing funding has to be the incentive:

B3: "They don't do things, unless there's an immediate benefit for doing them. I see the benefit because I've been interested from other institutional repositories. So for me, the benefit is obvious. I don't need to be convinced... To my year, that it takes me, to put my two or three papers a year in an institutional repository. One needs at least three minutes a year. That's not

too much to give up. But most people don't see the value and so they won't do it, even though it's only three minutes" (Institution B, Participant 3).

He believes that the institution's research faculty should be responsible for the repository and that research funding should not be awarded to the academics unless their research is available in the institution's repository:

B3:   "… Cause you just say, the vast research grant that you had, part of your report is what papers have you published and provide links to an institutional repository. No links to an institutional repository, we're withholding our grant until the institutional repository is populated with the content and then you can have your grant. Look, we're talking, at the most, half a minute's work… if they know they won't get their research grant or won't get that promotion if their papers are not in the repository then that makes it a whole different kettle of fish" (Institution B, Participant 3).

This mandatory archiving of what he points out is publically funded research should include raw data:

B3:   "I think data should be available. I mean one thing we don't have in South Africa is a national data archive, which actually should contain all the publically funded research data in its original format, which after a certain period of time, obviously you need to allow people time to publish their work and all of that, but after a certain period of time there should be accessible to anyone under a pre-sharing concept. That's my opinion… If you write a paper ... data should then be available somewhere, linked to a paper so that someone who reads the paper can say, oh that doesn't look right and can go back to the original data and redo the calculations or use them for something else… information is only valuable when it's shared … And built on. So if you keep it to yourself, you're retaining its worthlessness" (Institution B, Participant 3).

It perhaps should be noted that in fact South Africa does have a data archive, the South African Data Archive, managed by the NRF.

The storing of raw data is what occurs at one of Institution A's disciplinary research centres. This data is not publically accessible, but has limited in-house access:

A3:   "We've got a number of researchers who are core team members of the centre and then we also have students and post doctoral associates who also contribute to the repository. They contribute different types of data ... Likewise our students when they've completed their theses or dissertations, they then upload those together with their datasets onto our repository" (Institution A, Participant 3).

The Computer Science academics at Institution D archive their research themselves. The reason is that the repository has a reporting function, so the academics are aware that, if they do not deposit their work in the repository, it will not be reflected in the Department's reports that are generated from the repository. This might well have a negative impact on their annuals reports and promotion prospects:

JC: "And the staff contributes willingly?

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> D2: Erm. Sometimes willingly. It depends on the person. Sometimes they'll need me, sometimes they realise this is the official record of research, they have to put it in there, otherwise it doesn't get used for various different purposes. But being the official statement of research that we could use, they will put it there....they understand the value of having something which is actually a complete snapshot of our research, which is usually difficult otherwise" (Institution D, Participant 2).

As the library is in charge of Institution C's repository and has been live for a relatively short while, a formalised system has not been put in place to get the academics on board. Participant C2, a librarian, recognises that academics might be "possessive" but once they see the reports on how their work is being accessed, she does not think that there will be serious problems. The motivator will be the increased online requests for their research. She quotes the case of an Afrikaans thesis that has already been accessed 54 times:

> JC: "So at this point it's a bit early to talk about challenging the academics mindset, about making their research output available.
> C2: I don't think they have a problem with it. A lot of them are thinking about it. But I think there's a lot of uncertainty about where and how. Hopefully the library, with this product, will be able to answer some of those questions, but it's also, I get the impression that there's a little bit of possessiveness. They don't actually want to give up anything. But what we are hoping is that, what happens in this system, ... at the end of every month they get a usage report to say how often their things are being accessed and we're hoping that once some of the lecturers start seeing that then it will push them to put more things on. ... We want to be practical. We don't want to promise them the world and be unrealistic. They must get to see and feel what it's all about" (Institution C, Participant 2).

Participant C2 makes a rare comment on the need to market IRs to library staff, especially faculty or subject librarians, and the difficulty in maintaining their interest:

> C2: "… I think almost the most difficult thing to do is keep the librarians interested at this point in time. We got some librarians who are working very hard at getting things on board but there are those where it's not that important and you have to keep people interested.
> JC: You're talking about faculty librarians?
> C2: Yes, because they've got to market it out there. They're the contact person. Even when we visit the faculties, we take the faculty librarian with. It's the faculty librarian who is the contact person" (Institution C, Participant 2).

4.6.2. University leadership

University leadership or management can facilitate or inhibit the establishment of IRs. It can assist a mindset change amongst academics about making their research publically available and perhaps challenge the traditional way knowledge is disseminated.

Participant D3 is of the opinion that every institution needs a champion at management level who believes in sharing research output and acts as a driving

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force to pull people in silos together. Institution D had such a person, who was one of the vice-rectors, but who has since left the Institution. The result, in her opinion, is the Institution's thinking is fragmented with regards to repositories. She suggests that the Institution's desire to keep its "high-flying" status might be used as an argument, pointing out that an IR is part of a larger process of building integrated cyber structures:

> JC: "Why do you think the ...management have not yet come out in support of an institutional repository or even just ETDs which is the first point of putting your research out there.
>
> D3: On one level because they simply don't understand; simply don't understand that it matters. On another level, that sort of line of thinking is so fragmented that nobody ever gets it together to look at that on an institutional level…. I don't think it'll happen, unless there's a driving force at the top. We're chipping away at it and one of the chips is saying to them, you're going to lose your status as a high flying university unless you engage with the issue of an integrated cyber structure for the whole university and that investment requires central funding and a central view of the role of ICTs in research and it's much more than repositories, it's integrated data, it's high speed computing systems that work across the university and not in silos" (Institution D, Participant 3).

Institution C has come out of a merger process; hence the indecisiveness of its university's management to fully support an IR or the ethos of open access is understandable. Other things have had to be prioritised. However, impatient with the delay, the library decided to work alone:

> C1: "I would say they've been thinking about it for the past three or four years actually … As long as about two years ago already, at the admin level, university level, they tried to put together a little committee. There was a person who had to supervise this committee and then she was given another job and then the whole thing just died a natural death. The kind of thing that they had to look at was this whole policy issues and that at the moment is stranded. There's no movement there right now" (Institution C, Participant 1).
>
> C2: "I can give you a bit of background on that because I've been working for the last about two years with the group, institutional wide, looking at document delivery systems and all that type of thing. So I know where they're busy going and at the moment they're not going anywhere very quickly. So we decided that it was important to start building a repository of some sort. To get things digitised" (Institution C, Participant 2).

The library's decision to work alone was illustrated by Participant C3, Manager of the Research Directorate, repeated in her interview, "it's the library's project". Furthermore, whenever she was stuck in answering, she called the research librarian involved in the IR process and asked for the answer. During the interview, she called him five times. The interview and actions of Participant C3 proved that the university management did not know much about the setting up of the IR.

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Institution A, who had the university management's support from the beginning, with a top-down management approach towards making theses and dissertation electronically available, seems to have been able to penetrate the entire institution's community. Although top-down, there was a consultative process in the establishing of the ETD repository and the different sectors of the institution were given specific roles and responsibilities. Management was aware that the library was developing a repository for one of the disciplinary research centres, which gave them the credibility they needed for support from the university management. It was against this background that the Deputy Vice-Chancellors of Research and of Innovation and Commercialisation circulated the idea of an ETD repository amongst all the faculties to get their feedback and to decide how the responsibilities would be divided in the ETD process:

> A1: "... we sought approval for this initiative and the process was as follows: we stated our need for a theses and dissertation database and then it was circulated by that vice rector amongst all faculties to gather their input in how this process should work in order to implement a ETD database on campus and who is responsible for what" (Institution A, Participant 1).

The library believes that the support they received from their university management to establish the ETD repository was due to the manner of their approach with management:

> A1: "It must be adapted to the institution's specific culture, structures and politics even of the institution. We will get the buy-in of everyone if you approach it right and if you work through the right channels. This is something that we formulate and adapt as we go along" (Institution A, Participant 1).

Just as Institution A's library, Institution B's library initiated the ETD repository process. However, Institution B's university management did not seem to use its influence to assist the library by taking this process to the faculty heads themselves. Instead they left it to the library to finalise it with these role-players. This meant that the library had to convince the faculty, about the role the faculty had to play in having an ETD repository. The process might have run smoother has the idea come from the university leadership:

> B1: "We first managed to put forth the proposal and have it agreed to, at a senate level. So the senate level agreement was signed, I think in November 2003, if I'm correct … Thereafter, we then took the proposal to the various deans of departments, Head of [IT], all the role players on campus, anybody who is involved with research output, as well as building an infrastructure for this "(Institution B, Participant 1).

Not having a champion within the university management, as Participant D3 alluded to, for the institution-wide changes that are necessary for setting up a successful ETD repository, with distinct responsibilities for the role-players, was problematic for Institution B. This was especially evident when the library discovered that faculties have different methods of submitting theses and dissertation. Had the champion tackled the problem, it would have been resolved quicker and so expedite the ETD repository process. Institution A had a champion in two of their deputy Vice-Chancellors, who took the ETD repository idea to the faculties.

If the institution's management has not made a decision about making its research electronically available in a centralised space, like an IR, it hampers the speed at which the institution's research can be showcased to the world. This has occurred at two of the Western Cape's HEIs, which influenced the library's decision to digitise library material only. Institution C was open to having ETDs available in their library repository, yet Institution D made a sector decision that it will not include ETDs in the primary library source material that they are currently digitising:

JC: "… Do [you] need any other buy-in from the Senate and so on, when it comes to digitising primary material?

D1: No [we] don't. It's really a library decision but as far as the theses … will require that the university commits, they don't just leave it to the library to do without giving us resources to do it" (Institution D, Participant 1).

C2: "… we clearly state that we do not have an institutional repository, we have a library repository and we sell it like that to the institution.

JC: A library repository meaning it's an ETD?

C2: Mainly an ETD but also for other materials you would normally put into a library. It could be articles; it could be whatever you want it to be. The idea is that it's an online library….We said what we're putting on here is actual academic information. It's library type of information" (Institution C, Participant 2).

4.7. Partnerships and collaboration

Participants are aware of the need for buy-in. However are they or other role-players forming partnerships inside and across the four institutions? That is the question that the participants struggled to answer as they seemed more tunnel visioned in how they viewed partnerships, especially collaboration.

There is a view that there is no need for partnerships within the institution for the departmental and disciplinary repositories. Besides IT support, consultation with other sectors within the university on the content is not needed:

D2: "How many people are involved?" Technically me and the technical staff who sometimes setup up the servers and manage things.

JC: So you have to train them?

D2:   No. Our technical staff know how to set up servers...
JC: Ok. So and then everything else you do?
D2:   Yes, because there isn't much to be done (Institution D, Participant 2).

Institution D's Participant D2, the academic, feels his departmental repository is better than anyone else's and that others, on his campus and outside, have nothing to contribute to his department's repository. Rather than be swamped by requests for help, he would rather keep his repository quiet:

JC: "And then collaborations?
D2:   About what?
JC: About another repository with another department, or collaboration with that department or collaboration with other computer science departments?
D2:   Lets put it this way. We do it and I'm sure we do it better than other departments on campus who know anything about doing it or other computer science departments in the country. So if you look for somebody else they would collaborate with us. .
JC: So you're ok with being a silo, being on your own ...
D2:   Well, what are we going to get out with collaborating with somebody else? Nothing. We're going to have to do for them and that's the thing here, so why would we want to collaborate and [indistinct] We have to get something out of it. But sure it's great to say ya, we're collaborating with other people, I'd love to say that that we will set up other repositories for other people too but we can't, it's not our job. We don't have the resources to do that and we would continually get swamped by people who want us for something. We might as well be quiet about it and not tell people about the repository thing" (Institution D, Participant 2).

The absence of this widely recognised expert from Institution D's library digitisation committee has already been noted.

Institution C's library has so far made no effort to bring in partners in its repository project. The library bought the software package independently and no in-house IT support is needed. Furthermore, the library has a group of librarians who decide what should go into the repository, so no other sector's input is needed. It is perhaps significant that it is hesitant about marketing the library repository as an IR, as they "don't know what else is out there":

C2:   "… we don't want to call it an IR because we don't know what else is out there. There are various faculties and groups of people who might be looking and doing their own thing, without our knowledge and without interacting with us. So we felt that if we say it's an IR then everybody feels obliged to only use this product. It would be an institutional decision that this is the product that is used. That hasn't happened; this is a library decision to use this product" (Institution C, Participant 2).

However the institutions that have an ETD repository, and even the library at Institution D, which is in the planning stages of digitising large parts of their library's collection, know that if the repositories expand into an IR, partnerships are needed within the university for it to succeed. Consultation and ownership are crucial from all

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the sectors within the university for the establishment of an IR. Possible partnerships are the research units, ICT sections, higher degrees committees, faculty deans and those who are currently administering departmental repositories:

A2: "You have to include the different stakeholders in that process. It's not a process that is monopolised by the library, but it should be a collaborative process within the institution for it to become an institutional repository. Because of the different outputs of an institution, it becomes too big... So the various stakeholders will be IT, it will be the research office. They will be representing the different centres ….and the research office" (Institution A, Participant 2).

B1: "… we went to all the Deans, Head of Research, or Dean of Research, Chief Director of ICS, and we had a workshop with them, looking at all the aspects, of what we would like to do…. At the workshop, it was decided to look at or to identify people in the various faculties and departments, to form a Committee, a working group, looking at this whole project" (Institution B, Participant 1).

B2: "when it comes to the university institutional repository I think we are at the stage where we have to start by identifying partnerships around the university because we can't expect the library, on its own to run the IR because you are talking about the research output of the university. So which means we must form partnerships with the academics who are the custodians of that [indistinct] records as well as the research unit, which I believe is the main owner of our research production" (Institution B, Participant 2).

The case study found no evidence of partnerships to establish IRs amongst the Western Cape HEIs, despite the existence of the library consortium, CALICO. The main reason is that each institution has its own history of how it established its repositories and they were set up in ad-hoc ways.

The disciplinary repository at Institution B went beyond its country borders to develop content that was reflective of African higher education. The repository has a partnership with the East African centre for higher education. As a result of this partnership, the content now has a continent flavour, and not merely South African research on higher education:

B4: " ... there's too many South African papers, but that's just how it is on the Continent. We are publishing more than all the other countries. So what we did to overcome that bias if you like – it would be seen as a bias, there's another Centre for Higher Education in Uganda at Makerere University … and I went to their Institute and spoke to them. They knew that we were going there with a view to ask them to be co-partners with us...So besides our South African papers, we have a lot of Ugandan papers.
JC: Has it helped? Having another partner?
B4: Definitely. The plan now is to try and get other regional partners. We want to try and get someone from West Africa" (Institution B, Participant 4).

All the other interviewees, besides Participant D2, are relatively optimistic about the idea of collaborating with other HEIs. The library of Institution A will be collaborating with the University of Pretoria on DSpace in 2009. There are also hopes of using the expertise of the administrator of Institution D's Computer Science Department:

> A1: "… a lot of collaboration can be done, even if it's not on a software level but on content building and standards, etc harvesting metadata between repositories", (Institution A, Participant 1).

Participant B2, a librarian, has a philosophical notion of collaborating with another higher education institution but common ground and uniform standards have first to be evident. Participant C1, also a librarian, shares this thought:

> B2: "… before we collaborate, we have to adhere to certain research and … [indistinct] for example, research management standards. We have to agree, what should we expect when we see digital content and record from the system, we have to standardise that, develop each individual catalogue. Before we share, we agree on the standards same as we have done with the catalogue of our books. We have to adhere to MARC fields for example and then once we do that, then obviously we will be able to share" (Institution B, Participant 2).

> C1: "… it's a web environment so collaboration shouldn't be a problem, as long as it's web environment, it's standardised , so communication like linking, sharing can happened .. Whatever we do, if we should go with someone, we'd look at our metadata, what kind of standards we would like, those kinds of things we will definitely control. We wouldn't take just anybody. It must be proper international standards in case we want to export six months down the line, if we don't like that anymore." (Institution C, Participant 1).

For collaboration to exist among the institutions it should consist of the CHEC universities, a representative from the NRF and perhaps a key consultant from the University of Pretoria, who, as mentioned in earlier chapters, leads the way in IR development. Perhaps by definition an IR is based in one university and there is no room for collaboration. Participant B1 admitted that there was not a culture of sharing within the South African universities, "Keeping in mind also that we are in a unique situation in South Africa where we don't have a collaborate ethic between institutions".

4.8. Success indicators and hurdles

This concluding section analyses the data for evidence of successes and problems, as perceived by participants, who are the pioneers of IR development in their HEIs.

4.8.1. Success stories

Even though the open access culture through establishing IRs has not been in existence for a long time in the Western Cape, there have already been instances of expertise being built up and sought after by other institutions. Most comments on the success revolved around the content of research available, as well as being asked for technical advice from other institutions.

Institution A's Participants A1 and A2 said that an achievement has been the expertise to manipulate the software of choice, DSpace, to meet the institution's needs, as well as gaining the support within their institution. The success of Institution A's ETD repository rests on the mandatory archiving by the students.

 The greatest compliment to Institution A's library has been the NRF request for advice on the process of establishing an ETD repository:

> A2: "I think over the years ... they [two librarians] done enough working work on DSpace to look at the different problems, find their own solutions, write their own scripts, to the extent that they are considered to be the leaders in terms of DSpace technical support, to the extent that the NRF is soliciting … guidance in this process. So I think over the years they have developed between the two of them, that level of expertise that's basically feeding into a national process … It's not the repository itself, it's the capacity to manipulate the software has been very successful. … I think what [he] and his colleagues have done has come to grips with the software and manipulated the software to suit the institution's needs" (Institution A, Participant 2).

One of the disciplinary research centres at the same institution also had requests about infrastructure and advice on the use of DSpace in handling geospatial data:

> A3: "… it's definitely has received attention from people who want to use it and from people who are interested in setting up their own repository
>
> JC: Just one more question about the organisations who are coming to you for advice. What kind of advice are they asking?
>
> A3: They are particularly concerned with the geospatial data side of things because I think the limitation that a lot of people are experiencing with DSpace is that DSpace is great with its metadata and you can define, there's a lot of, the core provides elements that you can describe your data but it doesn't allow for the geospatial data that a lot of our datasets do and need to make sense of things and that's the kind of information that, especially the CSIR were asking" (Institution A, Participant 3).

Despite its later stalling, the development of Institution B's ETD repository was adopted by the university's software developers unit. Its strength was its use of international standards, which then were transferred to other digital projects:

> B1: "…if you ask most of the [IT] people what are they most proud of, they look at the ETD system, and I think the reason is that one cannot expect the developers to understand exactly what's going on, one should tell the

developers more or less what you want and obviously doing a lot of research for them, explaining to them. I think that's the real success behind this whole ETD system that we have, and obviously they are willing to listen" (Institution B, Participant 1).

4.8.2. Inhibiting factors

Participants all agree that progress towards institution-wide repositories has been slow.

The existing rewards system in scholarly publishing in South Africa hinders progress. Participants agree that academics struggle to understand their role in making their research output available in IRs. Many academics feel that there is a conflict between publishing in accredited journals and IRs. Institution D's Participant D3 has an opinion as to why academics are caught in this system of research rewards:

D3: "I don't think it's a matter of people fighting against the system as much as people being in the system that does them good because it earns them prestige and it earns money for the university and they get brownie points and they get promoted" (Institution D, Participant 3).

A common concern for all four libraries is the need for additional library staff to assist in the different areas of setting up a repository, as shortage of staff impact on how rapidly the repository can be expanded to impact the entire academic community. This is why Institution D insists on waiting for financial support from management before moving forward.

At the time of the interviews, all four libraries had not hired staff to specifically establish a repository. The existing staff had to deal with the learning curve of establishing a repository, as well as getting buy-in from the academic community. Retaining existing staff also continues to be a challenge as there is a demand for their technical skills.

D1: "We didn't have the staffing to do that much, it was really two people going full time for quite a long time" (Institution D, Participant 1).

A1: "It wasn't a project that we worked on full time. We could only implement the speed at which we had the resources available so it took us 18 months". (Institution A, Participant 1).

C2: "... we're doing everything with our existing staff" (Institution C, Participant 2).

B1: "The programmer left … about six or seven months ago, which is a great unfortunate – well, it's really regrettable, that she left, not handing the project over to somebody specific. So, we lost a lot of time" (Institution B, Participant 1).

Extra funding for the library would also allow for the purchasing of better equipment for digitisation, which is crucial to have as certain items needs to be digitised for the IR.

Institutions A and B were the only two institutions that spoke about the workflow process of submitting theses and dissertations in their interview. At the time of the establishment of Institution B's ETD repository, the process of submission was not uniform across all the faculties, which became one of the biggest stumbling blocks in getting the faculties' to play a role in adding files to the ETD repository. As a result of this, the roles and responsibilities that the supervisors and faculty staff had to have in this process of establishing an ETD repository, was not resolved by the time Participant B1, a librarian, left the institution:

> B1: "What we discovered was that a lot of the faculties differ, how they approach things, how they do things … There were differences, in terms of, what standards they were working with. Literally, some had more information on things in the front cover then the next one would have. Some would have made mention of the supervisor, some would not have made mention of the degree" (Institution B, Participant 1).

Institution A, on the other hand, had a single workflow system for the submission of theses and dissertations, which aided in their staff and students knowing what the specific roles and responsibilities are for a repository to work.

Institutions B and C remarked on problems with Internet connectivity and the latter specifically highlighted the lack of IT support that hampered their progress in setting up a repository. Institution B had serious connectivity problems off-campus and Institution C had general internet connection problems:

> B2: "We have major issues, for example now we are looking at redesigning our website. Our resources that we are paying for, that we are subscribing to, are not properly seen on the website. We have to do so many internal issues … our priority in this time is the management of our resources. Issues around connectivity for the system, the internet platform. We cannot take on e-resources when we cannot guarantee accessibility" (Institution B, Participant 2).

> C2: "The only thing our IT department had to do for us was put the URL into the DNS server…you've got partial access, which is very frustrating and that is the type of thing that one must now try to sort out. So that's a big negative, that everybody is not able to access it. It's up and running, it's just the access is not there. Even from the library web page, they can't access it because the server has not been set up .. So the main problem is speed of access. You can do a search and you get the results immediately, but when you want to download the document, it takes a while… you know the most frustrating thing is trying to upload something now because it's terribly slow" (Institution C, Participant 2).

4.9. Conclusion

In this case study, the data summarised and analysed provide a picture of "what's going on here" with regards to the establishing of IRs in the Western Cape HEIs.

The investigation into the establishment of IRs in these institutions has shown that none of the four HEIs has established a fully-fledged IR. By August 2009, three of the four libraries have an ETD repository and would like to expand this repository to include other institutional research, thus working towards an IR. There are also a number of departmental and disciplinary repositories.

The role of the library has been pivotal in initiating its institution's repository, despite the belief by some of the academics that librarians should not drive this process. Strong personalities have been a major factor within each HEI, whether it is the university management, librarians or academics. These personalities have either inhibited or promoted the establishment of an IR.

Another contributing factor has been communication. Do the various sectors of the institution communicate with one another about what is required for a successful IR? If not, how can they do it better? Getting academics interested in being part of the institution's repository will depend on communicating effectively and convincingly. This is surely a role for the university leadership. Another responsibility of the university leadership is to provide additional resources to the library or whoever is managing the IR - specifically skilled repository staff for the advancement and progress of IRs. Ultimately, the human element has been the swaying factor to the progress of IRs at the Western Cape HEIs.

In the light of the analysis of this exploratory case study of "what is going on here?", one can now focus on answering Wolcott's other questions: "How do things work?", "What is not working?" and "How might things work better?" (Wolcott, 1994: 12).

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CHAPTER FIVE: INTERPRETATION OF FINDINGS

In order to interpret the previous chapter's findings on the process of setting up IRs in the Western Cape, it is important to acknowledge the research journey up to this point. The qualitative research began with assumptions about how IRs are set up, the researcher then interviewed key informants in the Western HEIs and then analysed the data to identify themes or units of meaning. Using the contribution that the researcher brings to the study of what she sees, hears and understands, the research journey is now at the point of interpreting the findings by going underneath the surface of the data (Creswell, 2007: 39, 179). In essence it addresses questions of meaning and context by asking "What does it all mean?" and "What is to be made of it all?" (Wolcott, 1994: 12).

The interpretation in this chapter has two sections. The first section attempts to answer the research questions which were identified in Chapter Three and which guided the data-gathering. However, as the qualitative research process is emergent, all the research questions decided on in Chapter Three will not be answered in the same detail, as the initial plan shifted and the process changed after the researcher entered the study and began to collect data (Creswell, 2007: 39). The power of qualitative research is its inductive openness to new theory and angles. The second section reflects on the key findings to make four assertions – the result of the researcher's sense of certain underlying themes, like undercurrents running under and through the data analysis.

5.1.   Returning to the research questions

This section returns to the research questions that guided the study. The following research questions were formulated in Chapter Three:

- How far advanced are the IRs at the four higher education institutions?
- Who is driving the IR project at each Institution?
- What role has the library played in the IR projects?
- What partnerships exist within the institutions?
- What IR policies exist in the Western Cape?
- How are academic staff encouraged to contribute to this storage of scholarly output?
- How flexible and sustainable is the institutional repository project?
- Who are the IR software developers and how involved were they in the choice

of software used?

- Are there signs of joint collaborative initiatives across the four institutions that might lead to a regional IR?
- What factors inhibit and encourage the establishment of IRs and do these factors apply to each Western Cape's HEIs?

The data analysis in Chapter Four provides some answers to these questions which might be labelled "what" questions. This section will refer back to the analysis but will try to avoid too much repetition. Rather than just provide the obvious answers, the interpretation in this chapter tries to look for reasons and, in Wolcott's word, "meaning" (1994: 12). As mentioned in this chapter's introduction, the questions also shifted in the course of the study – as is common in inductive open-ended exploratory research. As Creswell points out, "The key idea behind qualitative research is to learn about the problem or issue from participants"(2007: 39).

How far advanced are the IRs at the four HEIs?

As found in Chapter Four, IRs in the case study site can only be described as "fledgling". The situation differs from campus to campus. Thomas's comment on the "spotty" and "messy" (2007a) nature of IR development can be applied to the Western Cape. ETD repositories are well established on two campuses and there are several repositories. These might well develop into mature IRs.

As suggested in the previous chapter's data analysis, the answer to this question cannot ignore the following:

- The setting up of IRs is personality driven, with dominant personalities persuading the course of action. The risk is that their enthusiasm and expertise are not communicated to others and their work might stall when they resign. Clearly the sustainability of the IRs they establish are at risk.
- The historical disparities among the HEIs have influenced the IR process.
- Lack of leadership and drive from university management impedes the progress of IRs.

The first two issues are so important that they make up two of the assertions that will be discussed in the following section.

Institution D's library's strategy is to wait for the approval of its university management through the provision of extra staff and more money, before it embarks on even an ETD repository. This institution also has over 50 research institutes

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whose output is at present scattered and inaccessible. The reason for the reluctance of university leadership is not made explicitly clear by key informants. However Participant D3, a scholarly publisher, alludes to the leadership possibly being bound by the Department of Education's peer-reviewing system and the university wanting to keep their status as one of the best universities in Africa. This could indicate that the library has not promoted the concept of an IR and its benefits for research status satisfactorily to its management. This specific library role is suggested in the literature (Correia & Teixeira, 2005: 360; Westell, 2006) and it is reflected in the strategising of Institutions A and B.

In answering the question of IR progress, each institution has its individual history, culture and traditions that make up their public faces. Each institution is establishing its IR at its own pace and within the boundaries and restrictions of its institution. Of the four HEIs, Institution A has made the most progress. There has been constant consultation between the library, faculty, administrative staff and university management to set up a process that would work for their institution and yet meet the requirements to make their theses or dissertations electronically available. This collaborative process was the formula that Lynch speaks about in his discussion of establishing a successful IR and will be returned to later (2003).

Institution A is also the only university that has made it compulsory for students to self-archive their theses or dissertations in the ETD repository. Self-archiving of scholarly communication also takes place at one of Institution A's research centres and at one of Institution D's departmental repositories. Mandatory self-archiving is the practice that some of the literature recommends (Anuradha, 2005; Sale, 2005; Davis & Connolly, 2007 and Ferreira et al., 2008).

If Institution A has advanced the furthest, then Institution D is the least advanced. It is not so much that it is the only Western Cape HEI that does not have an ETD repository, but, as mentioned above, its university leadership has, it seems, not recognised the advantages of a central research repository. This university currently has over 290 NRF rated researchers. Where is all their research stored so that the knowledge world can benefit from it?

Institution D does have at least one departmental repository that is self-sustainable and which is run by the department's academics. The expertise of the initiator and current administrator, an academic in the department, is sought after by the NRF, as

one of his research areas is digital libraries. Given his expertise, it is peculiar that this institution's library is not using Participant D2's knowledge for its digitisation project. As pointed out in Chapter Four, he is in charge of the national ETD repository project that the NRF is currently establishing.

Due to a merger of institutions, Institution C's university management has been focussing on other institutional issues around amalgamation, rather than making a decision about putting its research in an IR. The library's determination to take matters in their own hands is illustrated by the purchase of a hosted solution repository software package, as its IT department was unable to provide support to the freely available open source software, Dspace. Institution C is the only institution in the Western Cape that has purchased repository software.

In common with Institution A, Institution B has two repositories running on the same software platform; an ETD repository and a disciplinary repository. Chapter Four traces the impact of severe library staff shortages in 2007 and 2008. Establishing the ETD repository process was driven initially by the library as suggested by the literature (Crow, 2002a; Allard, Mack & Feltner-Reichert, 2005; Bell, Foster & Gibbons, 2005; Mark & Shearer, 2006; Westell, 2006 and Bailey, 2006). However when the project leader, the librarian, left the institution, the repository process was put on a back burner. Thereafter, the senior administrator took over the project. He wanted control mechanisms in place before research was put in the public domain. Putting these control mechanisms in place is contrary to what the library had initially envisaged in terms of quick and easy accessibility.

Who is driving the IR project at each institution?

It is difficult to identify "**the**" IR project on each campus. However, it does seem that the libraries wish to take the lead. As the library has control over the storage of its theses and dissertations, and copyright belongs to the institution, it is the easiest research output to showcase, and the ETD repository can be the first phase of a fully-fledged IR. However, even though the library has been instrumental in establishing ETD repositories at three of the four universities in the Western Cape, there is no guarantee that the library will continue to drive the process in the future.

The most obvious evidence of a library taking the lead is the possibly risky decision by Institution C's library to establish a repository on its own, in the hope that other

role-players will accept it later as a fait-accompli. Whether the decision to buy a commercial product and not wait for the university to "catch up" with them is the right one for the institution remains to be seen.

After the success of its ETD repository process, Institution A's library wants to grow it into an IR. The library hopes to "educate" academics on the benefits of putting their research in the IR, as the literature recommends (Jones, Andrew & MacColl, 2006: 26). Furthermore, it also wants to recommend to university management an incentive policy to encourage academics to add their research to the IR, again as recommended in the literature (Soong, 2006; Ferreira et al., 2008). How seriously the university management takes all these recommendations will become known in the future as the IR process unfolds.

As discussed in Chapter Four, not all role-players might agree that libraries should take responsibility for the IR. Institution B's ETD repository was initially driven by the library, which promoted the idea of having a repository to the university's administration, which is what the literature suggests (Westell, 2006). However, after the project manager, who was an experienced librarian, left the institution, the new senior administrator took over the reins, wanting stricter control mechanisms in place. The change in management, as well as in philosophical approach, has hampered the progress of setting up this institution's IR. In the long term, the validation provided by the senior administrator's activism might help progress on that campus.

Institutions A, B and D's departmental and disciplinary repositories were established by library staff, an academic and a post-graduate student, with no support needed from the university management as the funding either came from donor funding or from the department's budget. As mentioned in the preceding section, the case study confirms the comment in the literature that establishing IRs is a spotty and messy business (Thomas, 2007a). There is no "tried and tested" method that all HEIs can use.

What partnerships exist within the institutions to foster IRs?

The literature strongly recommends the need for partnerships within institutions for IRs to succeed (Crow, 2002a; Lynch, 2003; Westell, 2006). For partnerships to exist, effective communication across sectors needs to take place. In the Western Cape, partnerships exist in varying degrees within three universities, Institutions A, B and D.

Institutions A and B's ETD repositories were established through collaboration of library, administration and academics.

Evidence of inadequate partnering and poor communication could be linked to the lack of university management support for IRs. The lack of "buy-in" from university leadership could be linked to cool response from academic staff and the existing silos of activity. The solution to this problem is complex, yet the answer could be in finding a "champion" at these two institutions, as recommended by Participant D3. Once an institution has a "champion" who believes in the benefits of IRs, then partnerships might result.

What IR policies exist in the Western Cape?

Just as the case study could find no well-developed IRs, it could find no evidence of IR policy. A policy is typically described as a deliberate plan of action to guide decisions and achieve rational outcome. Policy is needed to lend weight to and guide projects. It establishes rules and procedures. Effective policy comes from consultation among role-players. Policy initiatives perhaps come best from those who have initiated the IR processes at the institutions.

The ETD repositories might be the start of IR policy-making. A good example is Institution A library's ETD. Some of the policies drafted and incorporated into the university calendar include the compulsory electronic submission of theses or dissertations to make it easier to import the files into the repository. In addition, Institutions A and B have rules in place for the embargoing of theses/dissertations to be implemented so that, if the research will be published into a book or will be patented, then it will not be added to the ETD repository before the process is completed.

How are academic staff encouraged to contribute to IRs?

A major finding from Chapter Four is the importance of belief and philosophy. Getting participation from the academic staff requires a mind set change that should come from other academics, and not librarians, according to the academic participants. These belief systems were founded on the conviction that research should be handled by its creators (academics). Despite this, academics are not willingly contributing to IRs. Thus, there is a need to strategise for academic support, as

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highlighted in Chapter Four. If librarians are going to lead the process they must communicate more effectively with academics and not use library jargon in their approach (Bell, Fried Foster & Gibbons, 2005; Jenkins, Breakstone & Hixson, 2005). Yet, this strategy will only be effective if academics view them as peers in the disseminating of research.

Specifically organising workshops to educate academics on the open access philosophy (Institution A) sounds like an effective strategy, but academics must know about this philosophy already, as they benefit from it by daily access to research.

The snowballing strategy will be quite effective, as Participant B2, a librarian, proposed. This entails identifying younger academics who are not as reticent to change and use their participation as bait to get the older academics' involvement. Another one will be targeting enthusiastic faculties first. Early adopters will have the same positive effect as focussing on young academics. Participant D2, an academic, proved that this strategy works. As reported in Chapter Four, he used evidence of the increased citing of his work to persuade his colleagues to support his department's repository. The literature also encourages this strategy (Jones, Andrew & MacColl, 2006: 228).
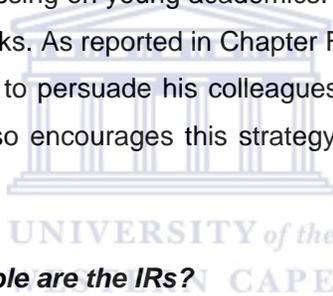
How flexible and sustainable are the IRs?

As establishing an IR is a very expensive and time-consuming venture, it is vital that it is sustainable. According to a survey taken of IR articles, only 20% of these articles mention costs (Bailey, 2006). These costs are not only for hardware and software, but very importantly, for human resources with expertise (Jones, Andrew & MacColl, 2006: 37). Part of the cost of human resources is being able to retain specialised staff. Two librarians left Institution A and B after their ETD repository had been established. Losing them impacted on IR development. It has taken Institution B almost two years to fill the specialised position. The question then needs to be asked: How viable is it for an institution to run its own IR?

Even though the NRF has a strategy in place to assist South African HEIs to establish an ETD repository, the researcher is unaware whether this body has a contingency plan in place to offer financial assistance to institutions if the need arises. Collaboration amongst HEIs could be the answer to sustainability.

Furthermore, flexibility has to be considered in terms of possible future collaboration with other repositories within the institution, as well as outside of it. This implies that certain international standards have to be adhered to for this to take place. This flexibility will have to be considered for all the CHEC HEIs. The joining of repositories will be fairly easy at Institutions A and B, because the same software platform is used. However, for the other institutions, the infrastructure of the repositories might have to be adapted if a decision is reached to amalgamate the repositories within the institution. Another important consideration for facilitating collaboration is the use of open formats for data representation. In the absence of these, records would need a, possibly extensive and expensive, data conversion process to ensure readability.

Who are the IR software developers and how involved were they in the choice of software used?

Before interviewing key informants and reading the literature (Correia & Teixeira, 2005: 360; Jones, Andrew, & MacColl, 2006: 37), the choice of software seemed to be a big factor in the establishment process. However, after the interviews, the researcher is not convinced of its significance. The reason for this is that prior to the interviews, the researcher thought that the software developers could influence what software package was chosen. Interviewing the technical librarians specifically, the researcher discovered that this was unfounded. In the Western Cape, besides Institution B, the librarians decided on the software. They did the software research and knew what guidelines should be followed for the repositories. Even at Institution B, where the senior IT manager made the software decision, the programmer could not contribute to his decision. She just had to follow his decision and program the software for the library.

Are there signs of joint collaborative initiatives across the four institutions that might lead to a regional IR?

The literature suggests little about regional collaboration in setting up IRs. Given the existence of the Western Cape library consortium, CALICO, it was a natural question for the researcher to ask some of the key informants about possible regional collaboration. All the participants seemed a bit surprised when this question was asked. It seems that currently the CHEC institutions are at different stages of the IR process which has been bound by their own institution's history and culture. So to think that the CALICO initiative will extend to a regional IR does not

seem possible at this stage. A reason could also be that setting up an IR is "messy" (Thomas, 2007a). However, Participant D2's response to the idea of collaboration might be more exact, "What are we going to get out with collaborating with somebody else? Nothing".

What factors inhibit and encourage the establishment of IRs and do these factors apply to each Western Cape HEI?

The preceding discussion has already provided some answers to this question. For example, the lack of university leadership, buy-in and policy means that the existing silos of activity will continue in isolation. It is clear that a general lack of leadership from senior management is impeding the progress of IRs. Leadership needs to validate and give credibility to the fledgling IRs. The literature strongly recommends the support of the university administration (Lynch, 2003; Correia & Teixeira, 2005). As Crow indicates, "The perceptions and attitudes of university administrators are critical to gaining the support necessary to validate a repository's standing within an institution" (2002a: 7). It is only through interviewing the key informants that one realises the immense impact the role the university's leadership plays in this area, both positively and negatively.
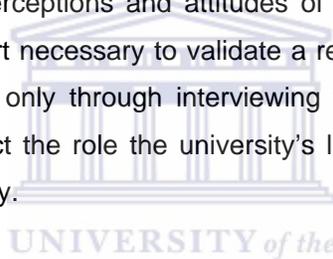
A gap in Chapter Four's analysis of data was acknowledgment of the importance of good project management. People were described as "project managers" but there was little evidence of knowledge of project management techniques. For example, those described as project managers are not able to point to their teams, the lines of communications, planning, costing, timeframes, risk factors, and, so on. The absence of project management thinking might contribute to the present messiness.

According to the literature (Crow, 2002a: 25), a successful IR is one that contains a significant amount and variety of scholarly content. As stated in Chapter One, a good IR thus should contain conference presentations, monographs, working papers, peer-reviewed research papers (published or pre-published), course material and audio and video clips. This implies the support of academics. The CHEC repositories cannot be said to meet these criteria. The ETD repositories have a fair amount of scholarly content. As there are plans to expand the repositories into IRs, one can only assess their success at a later stage. By their very nature, the other repositories are limited in content – by discipline or department. The project manager of Institution B's disciplinary repository admits that her repository is not yet a "success" in terms of

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having a significant amount of research papers. However, she warns that its research focus is so narrow that alone it is unlikely to expand considerably in the future.

Even though it is premature to list success factors, there are some success stories, such as the systems in place for self-archiving to occur amongst the students and staff at Institution A and the departmental repository of Institution D. The literature mentions the time-consuming nature of self-archiving (van Westrienen & Lynch, 2005), yet the participants who are involved in this, do not mention this as an inhibiting factor. The literature has authors who support self-archiving (Sale, 2005; Ferreira et al., 2008) and those who encourage having a mediator, such as librarians, to archive academics research (Allard, Mack, Feltner-Reichert, 2005; Joint, 2006). Institution B's disciplinary archive has a policy of self-archiving, but in practice, the librarian is the mediator to archive the research output.

The lack of resources can become an inhibiting factor. IRs require human resources and the money to purchase equipment to grow and keep up to date with the expansion of technology. Budgeting for IRs is often neglected as initiators often start small (Jones, Andrew & MacColl, 2006: 37). Participants in Institutions A and C mention the importance of extra resources for equipment for the success to an IR, but admit that so far their IR equipment has been purchased with the existing library budget. If the leadership does not allocate additional resources to the IR team, it cannot be sustainable.

5.2.   Key findings

The preceding section has attempted to answer the study's research questions. But running underneath and across the questions are certain key findings, which are like undercurrents. They are identified in the form of four assertions:

- "It is all about people"
- Philosophical differences are significant
- Context and history cannot be ignored
- The role of the university library is ambiguous.

"It is all about people"

As concluded in the previous chapter, the most powerful impression left by the case study IRs is the human element. This assertion comes from such findings as the

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importance of communication across campus sectors, the influence of dominant personalities, of personal preferences and of personal ideologies, as well as the deciding leadership role (or lack of it) played by the university administrators.

The impact of weak communication, the effect of strong personalities and the importance of support from the university administration were not part of the initial research questions for this investigation; but the data have shown that these factors have greatly impacted the IR setup process in the Western Cape.

The literature does not mention the effects that strong personalities have in the establishment of IRs. However, interpreting the data gathered reveals that this has been a strong influencing factor in the Western Cape. The example of two participants at Institution B might support this assertion. Whilst Participant B1, a librarian, was the project manager of setting up an ETD repository, the process of putting the structures in place was influenced by his goal-orientated personality. He admits to disliking too many formal meetings and bureaucracy. He says he would only call a meeting for the interested parties when necessary, such as reporting significant progress on the ETD repository or asking for a "rubber stamp" approval from the committee. The librarian was determined that Institution B join the international community of showcasing its research output, even though there were outstanding issues that could negatively impact the expansion of its repository.

Another strong personality at the same institution was the senior IT manager. He wanted all the digital projects at this institution, including the ETD and disciplinary repositories, to use the same software platform. As the librarians, who set up these repositories, needed the onsite IT support and maintenance for the software, they had no choice but to adhere to his wishes. Institution B was the only HEI in South Africa to use this software platform. When these two people resigned in 2007 and 2008, the IR process stalled. It only resumed late in 2009.

Philosophical differences are significant

Chapter Four uncovered two philosophical or ideological approaches to IRs – which at times might well conflict. The two participants, D3 and B5, illustrate this point best. Participant D3 sees an IR as mostly about research dissemination. She talks of research making an impact on society and of "engaged" research. To her the purpose of an IR is to make access easier for the greater good of human kind.

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Participant B5, on the other hand, sees an IR as a showcase for his university's research output. To him improving prestige and ranking are important as dictated by the criteria of the Department of Education – and he wishes understandably to control the quality of the IR content.

It is not clear which "camp" the librarian participants are in. Perhaps, they are not even aware of the underlying philosophical issues or perhaps the researcher assumed too much in her interviews with the librarians. It is clear that, if they want to take on a stronger leadership role, they will need to deepen their ideological awareness and to talk persuasively to both camps. Their role will be returned to below.

Context and history are significant

One of the hallmarks of qualitative case study is its interest in context and history (Creswell 2007: 241). The social world of the case study of IR development has to be interpreted and given meaning within a social and historical context. This context shapes participants' understanding of their world.
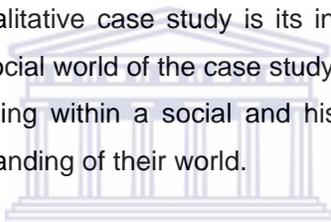
As pointed out in Chapter Three, two of the four CHEC members (case study Institutions A and D) may be described as historically advantaged, one as historically disadvantaged (Institution B) and one as a merger of an advantaged and disadvantaged (Institution C). South Africa's higher education landscape is still marked by the apartheid past. The so-called historically advantaged or white universities are better resourced, as evidenced in the information provided in their websites and other sources. Institution D is ranked as the top university in Africa and in the top 300 worldwide (Study South Africa, 2007: 21.) It has over 50 research units. Institution C has struggled with the merger undertaken a few years ago of an advantaged and a disadvantaged institution. More than five years after the merger, the institution is still going through teething problems of amalgamating its finance and IT departments, which, as shown in Chapter Four, clearly have impacted on the efforts of its library to establish an IR.

The uneven resources of the four university libraries support the above statement. They still reflect the disparities of the past, in terms of budgets, staffing, size and depth of collections (Hart, 2010). Institution D has the largest library collection of the four institutions. The case study interviews include discussion of the library's new

research portal, which was funded by an international donor in order to sustain the research "excellence" of the university. Institution B's library has the smallest collection in the Western Cape and the smallest library staff.

The case study has to acknowledge the impact of the historical disparities on IR development, such as the impact of losing critical staff at Institution B. Participant B1 mentioned the programmer had left whilst still busy developing the repository, which delayed the progress by more than half a year. When Participant B1 and B2 resigned, the entire ETD project stalled for two year. Institution A, on the other hand, was able to progress despite a critical person leaving. They managed to hire a senior librarian (Participant A2) to focus on policy issues during their set up process. Institution B has only been able to hire such a senior librarian in October 2008. The lack of IT support forced Institution C to purchase software. The major irony in the finding is that the institution with arguably the most resources, Institution D, has been found to be the most cautious. This issue will be returned to in the next section.
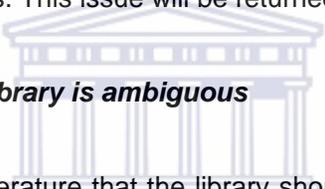
The role of the university library is ambiguous

There is agreement in the literature that the library should be driving the IR process at HEIs (Crow, 2002a; Allard, Mack & Feltner-Reichert, 2005; Bell, Foster & Gibbons, 2005; Bailey, 2006; Mark & Shearer, 2006; Westell, 2006). According to Crow, the academics are less sceptical about IRs if librarians are in charge of the process (2002a).

As discussed in Chapter Four, this viewpoint is not shared by all the case study participants. The three academics (Participants D2, B2 and B5) feel strongly that librarians should not drive the IR projects. Contrary to what Crow suggests, the academics reason that their fellow academics are more sceptical about librarians taking charge of their scholarly output. Perhaps the answer to the contradiction lies in perceptions of academic libraries that were uncovered in the case study. As acknowledged in Chapter Three, the small scale nature of the case study means that the academic participants cannot represent all CHEC universities. But some of their comments, as pointed out in Chapter Four, suggest that they tend to see librarians as caretakers rather than active role-players in the dissemination of research. This clearly is a question for a follow-up wider investigation.

5.3. Conclusion

Using the research questions decided on before the data collection and following the trends within the literature could have meant that a theory was handed down to the researcher, rather than her building it inductively.

Her main finding, through the guidance of the research questions and the views of the participants, is that establishing an IR in the Western Cape is a 'messy affair'. IRs have been set up in an ad hoc and unstrategic manner. The qualitative nature of this study has added, it is hoped, new insights to the literature. The case study has highlighted:

- the impact of strong personalities
- controversy as to who should drive the IR process
- the impact of the lack of leadership support
- the need for effective communication across the campus sectors.

CHAPTER SIX: REFLECTIONS AND RECOMMENDATIONS

The study came out of a belief in the importance of research and knowledge sharing in knowledge societies and in IRs as a useful tool in this sharing. The concluding chapter reflects on the project and considers its implications for IR development and future research.

6.1.   Some reflections on the study

In reflecting on the study, the limitations caused by its smallness have to be acknowledged. It is a small-scale case study, with only 14 key informants, which could result in not picking up all the nuances that are related to the establishment of IRs in the Western Cape. It is also an exploratory study as the research topic is relatively new in South African institutions.   Thus gaining insight into what a successful IR looks like is premature at this stage. The literature refers to IRs as one institution-wide repository, but the Western Cape institutions do not have one IR, as they are in its infancy stages of this process. Thus, the findings might be different once IRs are established, as described in the literature.

The assertion that "it is all about people" is crucial to the study. Looking back at the proposal for the project, it is striking that it began as a study of "things". It evolved into a study of people and relationships and power.

A regret came after the interview with the senior administrator at Institution B, which highlighted the power of this position to influence institutional culture and policy. It is a pity that it came rather late in the study and that it was too late to approach other senior administrators. Their job is to nurture research at their institution and so ultimately the IR "buck" will stop with them.   However, the interview with the one senior administrator highlights the issue of power and influence rather than the individual person.

Having acknowledged the limitations, the researcher might give the qualitative perspective that size and evenness of researcher gaze do not matter. The very smallness and unevenness of the case study provide insights that might be of value to the IR literature. Klein and Myers's comment on so-called generalisable knowledge might be repeated. They say that it is "often neither relevant nor meaningful, in which case we are better off understanding specific contexts" (1999: 82).

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6.2. Some recommendations for IR development

The study found that none of the universities had undertaken a needs assessment. This would of necessity include a survey of academics.

Assessing her findings, the researcher is inclined to recommend a top-down management approach. So far the repositories have developed in ad hoc ways. For long-term sustainability of IRs, the university management must validate IRs as crucial to research dissemination. Management, at least for a time, must be seen to drive the process for academics to participate in fledgling IRs. The researcher feels that academics will be more open to listening to other academics than librarians.

Through this top-down approach, the university management must mandate self-archiving. The study has convinced the researcher that academics will not be involved in this kind of archiving if they are not forced to do so. If it is part of their job, then they will add their research to the IR. In other words, self-archiving must be as normal for academics as teaching students. Another persuasive incentive would be to issue research grants only after self-archiving. The benefits of self-archiving can be seen by adopting and adapting the workflow model of Institution D's departmental repository. This repository is a one-stop-shop for its department's research.

Another recommendation is project management. There has to be a plan in place to achieve the goal of establishing successful IRs. The focus should be on the project objectives, timeline, cost and roles and responsibilities of all the participants and stakeholders. Through project management, the process can be thought through more thoroughly. This also allows for evaluation and monitoring of progress. Through effective project management, IRs can be properly planned and managed.

The role of the library needs to be evaluated. The researcher recommends that librarians play the key role of assisting in putting the infrastructure in place, as well as training academics to self-archive and taking part in the marketing strategy. But perhaps they should not drive the process. The researcher believes that her study might show that, when librarians try to drive the process, IRs lose their impact and importance with academics. They have to be driven by academics for academics, with the critical validating support of university leadership. This comment might be a

reflection on the lack of academic standing of the CHEC libraries and their staff. Institution A's library might well prove the researcher wrong.

In order for the Western Cape IRs to make an impact and be sustainable, the researcher recommends creating a regional forum for establishing IRs. Through this collaboration, perhaps the disparities among the four universities that hamper IR development can be levelled out and expertise can be shared. Furthermore, the key participants can use other institutions as a sounding board for ideas in the process. The model of CALICO should be revisited, as it illustrates success through sharing resources and knowledge and it should be adapted to IRs.

6.3. Conclusion

Establishing an IR is not an easy process. Yet, one of the key reasons for doing so can be linked to living by the philosophy of "ubuntu".   This philosophy is best summarised by the phrase: 'umuntu ngumuntu ngabantu', which can be roughly translated as: "a person is a person through other people" or "I am what I am because of you". The "ubuntu" philosophy for IRs embraces the evolving creation of knowledge and recognises that their impact and value is distributed to the community for strengthening and making better future contributions.

Even though this research study is not in any way conclusive and the findings at the CHEC institutions cannot be generalised to the other parts of South Africa, the reader will gain insight into what other institutions have experienced whilst setting up their IR. Using the Western Cape as a case study also provides the reader with the contextual diversity that is a vital part of our rainbow nation, South Africa. Yet, just as part of "ubuntu" is sharing with people, so the vision of IRs will be realised when the Western Cape institutions create an environment of collaboration; partnering inside their own institution and outside of it.

APPENDIX 1: EXAMPLE OF INTRODUCTORY LETTER

Jill Claassen - Interview request

From: Jill Claassen
Subject: Interview request

>>> On 4/21/2009 at 3:18 pm, in message <49EDE26A.BA46.00C4.0@uwc.ac.za>, Jill Claassen wrote:

Dear [senior administrator]

I am the librarian at the Community Law Centre and am currently registered for a MBibl at UWC. My mini thesis is a qualitative study of looking at the establishment of institutional repositories (IRs) in the Western Cape Higher Education Institutions (HEIs). I'm now at the interview stage of my mini-thesis. I have interviewed a number of key people involved in IRs in the four Western Cape HEIs. According to [the senior librarian], you are driving the process of [Institution B's] research portal/ research repository. Will it be possible to interview you on your vision and role in this regard?

The interview will be open-ended and will be approximately 30 minutes. I am available to come to your office anytime that suits you.

Regards
Jill

Jill Claassen
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Website: www.communitylawcentre.org.za

APPENDIX 2: INTERVIEW PROTOCOL FOR LIBRARIAN KEY INFORMANT

1. Did your institution conduct a needs-assessment prior to implementing an IR?
2. What were the important needs-assessments to consider for your institution (for example, recruiting digital content; increasing faculty awareness; identifying preservation techniques; choosing an IR software package)?
3. Which institution's IR did you copy/ follow? Why?
4. What did the process entail of setting up your institution's IR?
5. What role did the library play in establishing the IR?
6. Which institution's infrastructure influenced your decision to use the chosen software?
7. Based on your experience with IR implementation, how would you rate your chosen system with regard to these capabilities?
    - Technical support
    - Adherence to open access standards
    - Supported file formats
    - Formulating metadata for digital documents
    - Browsing, searching and retrieving digital content
    - End-user interface generally
    - Digital preservation
8. Did you "pilot test" the IR software package? If so, what were the most important benefits of the pilot testing?
9. What interoperability standards does your IR support? *Elaborate.*
10. Estimate the total number of digital documents that are published (or in process) in your IR?
11. What type of documents is most uploaded?
12. How long do you think your institution will stick to this IR system before migrating to a new system?
13. How likely are you to modify your IR's software?
14. What do you think will be the most important reasons for migrating to a new IR system?
15. What IR policies are currently in place? How are these policies filtered down to the academics?
16. Where does funding come from for your institution's IR?
17. If you had to estimate, what percentage of your IR's annual budget is allocated to the following categories?
    - Staff
    - Hardware acquisition
    - Hardware maintenance
    - Software acquisition
    - Software maintenance and updates
    - System backup
18. What approaches have you used to date to assess your IR's success?
19. What are the current IR-related hindrances evident at your institution?
20. Is there any indication that IR collaboration will occur with other institutions in the province (or even nationally)?

APPENDIX 3: INTERVIEW PROTOCOL FOR UNIVERSITY ANAGEMENT

KEY INFORMANT

1. What is your view on the traditional way scholarly communication/ research output is disseminated currently?
2. How do you think the digital libraries have influenced scholarly communication? Do you think it has had a positive or negative effect on scholarly communication generally?
3. What is your view on making all scholarly communication available to the public?
4. Has an institution or group of academics influenced your thinking in this regard?
5. What is the current view of management towards institutional repositories?
6. What further plans are envisaged for the wider dissemination of [your] scholarly communication, using the internet, specifically through an institutional repository (IR)?
7. In your opinion, what kind of information should be part of an IR?
8. What factors, would you say, make up a successful IR?
9. What factors are currently hampering [your institution's] plans for an IR?
10. Where will the funding come from for an IR?
11. What role should the library play in establishing and maintaining an IR?
12. How do you envisage changing the traditional mindset of the way academics view the digital dissemination of scholarly communication?
13. Do you envisage establishing collaboration with another higher education institution for the setting up and/ or maintenance of the IR?
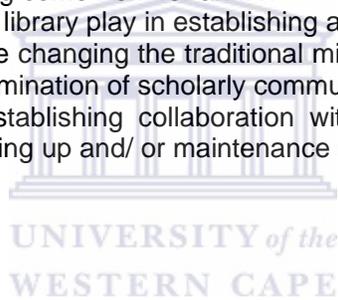
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