ANALYSIS OF THE APPROACHES OF SENIOR MANAGEMENT TEAMS TOWARDS ADOPTION OF NEXT GENERATION LIBRARY MANAGEMENT SYSTEMS: CASE STUDY OF CAPE LIBRARY CONSORTIUM INSTITUTIONS

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Plagiarism Declaration

I understand the meaning of plagiarism and declare that all of the work in the document, save for that which is properly acknowledged, is my own.

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Acknowledgements

Abstract

Sophistication of technology has resulted in libraries having to manage print, digital and electronic resources. Managing all resource types and formats with traditional integrated library systems is ineffective as the systems were designed for physical resources. Next generation library management systems are expected to change this by integrating all library resources and providing access through a single platform, reducing the number of transaction the user has to perform. Additionally libraries will save large proportions of their budgets on hardware and software, as the systems are accessed through a web browser this will be an added benefit for libraries as the cost of acquiring electronic resources is continuously increasing.

Next generation library management systems are not yet implemented in academic libraries in the Western Cape Province. To investigate the reasons for this, the author employed a qualitative case study approach in which a minimum of two members of the Executive Management of each of the four Cape Library Consortium institutions were interviewed. Data collected was analysed using NVivo analysis software, responses being analysed within the institution and compared across the other institutions.

The results show that Cape Library Consortium institutions are eager to adopt next generation library management systems in the next five years in order to respond better to user needs because users want "Google-like" systems; single access point for all collections and not silos of information. Adoption will streamline operations and staff will need to adapt to new business processes. Cape Library Consortium institutions are in a process of preparing staff and infrastructure for this move by re-skilling and repositioning of staff since next generation systems move the locus of system administration and maintenance away from the management of institutions and introduce liaison and application programming tasks. Secondly, management will have to ensure that there is reliable internet access. Lastly the support that Cape Library Consortium Board and Executive offered to the institutions will largely become redundant: therefore there will be a need to redefine their roles because the systems back-end will be managed by the vendor.

Generally the results of the four institutions fall into two categories defined by differences in institutional culture and perception which will require education of staff about next generation library management systems. Recommendations made include finding examples

for institutions to replicate conditions to prepare for implementation. Lastly academic libraries need to develop stronger partnerships with library schools to embed relevant skills to produce graduates with skills suitable for this changing environment.

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Abbreviations and Acronyms

API	Application Programming Interface
CALICO	Cape Library Consortium
CHEC	Cape Higher Education Consortium
CPUT	Cape Peninsula University of Technology
HE	Higher Education
IaaS	Infrastructure as a Service
ICT	Information Communication Technologies
ILS	Integrated Library Systems
LIASA	Library and Information Association of South Africa
LMS	Library Management Systems
OA	Open Access
OCLC	Online Computer Library Centre
OLE	Open Library Environment

OPAC	Online Public Access Catalogue
OSS	Open Source Systems
RDA	Resource Description and Access
RDM	Research Data Management
RFID	Radio Frequency Identification
PaaS	Platform as a Service
SA	South Africa
SaaS	Software as a Service
SOA	Service-Oriented Architecture
SU	Stellenbosch University
TAM	Technology Acceptance Model
UCT	University of Cape Town
UKZN	University of KwaZulu-Natal
UTAUT	Unified Theory of Acceptance and Use of Technology
UWC	University of the Western Cape
WC	Western Cape
XML	Extensible Mark-up Language

Introduction

This dissertation explores next generation Library Management Systems (LMS). The study investigates decision-making related to the adoption of next generation LMS by members of the Cape Library Consortium (CALICO) in the Western Cape (WC) region of South Africa (SA). The study employs a qualitative case study research technique. The data is collected through personal interviews with senior library staff. The study aims to advance understanding of decisions about new technology use among CALICO institutions.

1.1 <u>Background</u>

Next generation LMS, also referred to as Library Service Platforms (LSP) or Unified Resource Management (URM), is the next generation of Integrated Library Systems (ILS) which promises to better use technology to seamlessly handle both print and digital content by using unified resource management approach: clustering of a wide variety of geographically distributed resources to a single platform (Young, 2013:310). Next generation LMS were developed to solve the many challenges that libraries are facing with current traditional ILS as they did not evolve while library automation products evolved. Like the significant increase in the quantity of electronic and digital collections as well as the number of library systems which have left libraries in a tough situation: managing and maintaining numerous systems (Young, 2013:307).These new systems will replace traditional ILS, Electronic Resource Management (ERM), link resolvers, and other add-ons with a fully integrated system that is cloud deployed so libraries do not need to install or purchase anything locally but subscribe to the system (Fu, 2014:31).

The architecture of next generation LMS have distinctive features and designs but all aim to provide a comprehensive approach to managing content resources and support major library and non-library standards (Breeding, 2012:11). Maintaining traditional ILS (hardware and software) and numerous add-ons is quite costly for the libraries and next generation LMS aims to change this by streamlining resources, prevent duplication of processes and escalate productivity. This reorganization of library resources to a single interface will significantly minimize transaction cost for users, deliver flexibility to extend the systems, and increase efficiency in management of library resources (Barton & Mak, 2012:103).

The next generation LMS has caused quite a stir in library automation market, with the promise to transform library management and operations with new modern processes. The new generation of systems will support and promote the development of completely new services and initiatives to accommodate new needs and expectations permitted or driven by changes in technology. However development of proprietary next generation LMS has to compete with Open Source Systems (OSS) which is as innovative and regarded more affordable approach, compared to proprietary systems. Furthermore with OSS the code is freely available, in contrast to proprietary systems, allowing users to improve the systems.

Having systems that support the entire suite of library operations ─ all library materials regardless of format or location (Ex Libris, 2014) was the "desire" for most Library and Information Services (LIS). This is because information about library collections, necessary for their efficient and effective management, tends to be split across numerous places (Yang, 2013:1), thus making operations time consuming to accomplish. Therefore, it might be expected that the management of most libraries would contemplate adopting these innovative systems: unfortunately this is not necessarily so. The four academic libraries in the WC are still observing the development of these systems because of uncertainties surrounding security, cost of the systems and the immaturity of the systems. Traditional ILS have made use of well-understood technologies that have sustained development; in contrast, next generation LMSs must be regarded as new and relatively untried and their adoption and development may, consequently, result in some disruption to existing workflows as they introduce a completely new way of doing things.

1.2 Cape Library Consortium (CALICO)

CALICO[1] is situated in the Western Cape region of South Africa (Appendix A, Figure 1): it was established in 1992 with the view of developing a cooperative model after a generous donation from Ford Foundation (CALICO, 2003). It is a project of the Cape Higher Education Consortium (CHEC). CHEC functions to facilitate the development of a knowledge economy within its constituent institutions, to promote equity across them and to promote cost effective and high-quality levels of collaboration. It consists of four tertiary institutions: University of Cape Town (UCT), Stellenbosch University (SU), University of the Western Cape (UWC), and Cape Peninsula University of Technology (CPUT); the latter

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[1] "CALICO" refers to the CApe LIbrary COnsortuim initially founded as the CApe LIbrary Co-operative

came into being as the result of a merger between the Cape and Peninsula Technikons. CALICO's role is to facilitate the exploration of efficiencies and economies of scale as well as encouraging regional development.

Adopting new systems can provide libraries with significant savings but will also raise challenges, as the systems require new knowledge and skills, requiring re-training of staff. This study explores adoption of the next generation systems amongst its senior management teams. Senior management or executive management is the individuals at a high level of organizational management who have the day-to-day responsibilities of managing the institution. In this study senior management is used for library directorate and heads or managers of departments or sections. Senior management was chosen because these individuals have precedence in making certain decisions.

1.3 <u>Library automation</u>

The ILSs were developed in the 1990s due to an increasing need for a system to manage print and audio visual resources (Grant, 2012:5; Wang & Dawes, 2012:76; Yang, 2013:1). This was the appropriate answer at that time; twenty years later there is a different need, one for a system that can manage all resources irrespective of type because collection management has embraced a change from an ownership focus to an access model and workflows are more complex. Increasing dominance of electronic resources (e-resources) and digital content in academic libraries which the current automation systems are not capable of supporting has been a hindrance to progress (Breeding, 2012:9). Libraries have come up with strategies to manage with traditional ILS despite gaps in functionality; however, this approach tends to create more silos of isolated applications. Eventually, these gaps became a stimulus for vendor's and user communities to consider low-cost investment in OSS as alternative strategy to address the need for more innovative and affordable systems, thus helping libraries deal with constant budget cuts. Breeding implies over the past years it has been observed that the lifecycle of an automation system is about twenty years and after that period it becomes irrelevant due to changes in expectations about what a particular platform can offer (2007:39). The technology life cycle is decreasing due to the rapid developments in technology which directly influence the adoption of modern processes.

1.4 <u>Research problem</u>

Libraries are confronted with increasing demands and limited budgets, thus necessitating the best use of resources. "The traditional ILS does not have sufficient capacity to support changing needs and challenges of today's libraries, such as managing a wide variety of licensed electronic resources…" (Fu & Fitzgerald, 2013:47). Traditional ILS are limited in functionality and next generation LMS have the potential solve these limitations and stretch the budget by extending access to all information resources and facilitating seamless access to wider resources regardless of format. In the same way, new technologies have the potential to improve organisational productivity this can only happen if staff accept and use the adopted technology (Venkatesh & others, 2003:426).

This study focused on the attitudes of the Senior Management teams of the CALICO institutions towards adoption of next generation LMS.

1.5 <u>Objectives of the study</u>

The literature review (Chapter 2) identified challenges that the LIS sector is facing in SA, which have a direct impact on LMS adoption in its academic libraries. Accordingly it is important to understand these challenges and then look for ways to engage with them.

This study:

- Explored LMS adoption amongst CALICO institutions and assessed the climate for change to newer systems.

- Sought explanations about attitudes towards the adoption of new LMS by referring to Technology Acceptance models.

- Explored the role of CALICO, as a regional consortium, in facilitating adoption of modern processes.

1.6 <u>Rationale for the study</u>

Technology innovations and initiatives, such as Google, have changed user behaviour and expectation: users want seamless searching. If systems do not work effortlessly, users view them as unfriendly and the likelihood of using the system again diminishes, so library systems need to behave more like or, preferably, better than search engines: however

traditional ILS are limited in the capacity to offer this flexibility. New systems are important in meeting the needs of users to access the relevant information faster and easier, as well as meeting institutional demand for the increasing of operational efficiency (Enache, 2012:27).

In addition, academic libraries all over the world are experiencing significant growth in the provision and use of e-resources and so require systems that can better manage all resources, not just print and audio-visual resources. Libraries are faced with limited budgets and thus need systems that can provide value for money. Moreover traditional ILS is associated with high cost of ownership while new systems aim to save resources in the long term by reducing the burden of hardware and software costs on libraries as everything will be accessed through the internet. The Online Computer Library Centre (OCLC) stated that libraries spend 60% of their budget on e-resources (as reported by Burke, 2012). If libraries spend a huge proportion of their budget on e-resources there is great need to better manage these resources. As a result libraries need to move towards the adoption of more efficient and effective systems rather than remaining locked-in to traditional ILS.

1.7 <u>Research design and methods</u>

The research study is based on a qualitative case study approach because case studies provide a rich picture, by analysing people, events and decisions that can be studied holistically by one or more methods and allow multiple exploration of perspectives (Thomas, 2011:512). Case studies focus on exploration, description and explanation of events (Becker and others, 2014). The success of the approach depends on basing the study on the responses of those individuals with rich, comprehensive and local knowledge of the processes and systems being studied.

The researcher seeks to provide an accurate reflection of reality. Data has been collected through personal interviews. Information-oriented sampling has been adopted to select the research population. The interviews have been analysed using NVivo data analysis software.

1.8 <u>Limitations</u>

It is acknowledged that the study is limited in context to the WC academic libraries as these are the institutions to which the researcher could gain access. The time schedule for the research was also short, which limits the concepts the researcher could include in the study

and the range of institutions covered. Lastly there is a lack of prior research, or data on the topic, focusing on SA.

1.9 <u>Summary</u>

The users expect seamless access to resources and the traditional ILS do not offer this, which is why adoption of new systems would improve user experience and staff efficiency as they can offer a unified platform to access all resources regardless of format. Though the systems are still new, and libraries are waiting for them to mature. Staffs prefer sustaining technologies while next generation LMS tends to disrupt the norms and management has to manage this transition. Therefore management ought to find a balance between user and staff needs since technology seems to be disruptive in the early stages: this increases the need for libraries to have a good leader to facilitate staff development and transition through this point of disruption. The literature review discusses the obstacles and reasons for the current state in academic libraries in the WC. Libraries must be sure of the value that next generation LMS bring to their libraries: until then they may be hesitant to invest heavily in them.

1.10 <u>Definitions of related terms</u>

Cloud computing is the sharing and use of applications and resources of a network environment to get work done without concern about ownership and management of the network's resources and applications (Scale, 2009:10).

Culture is "the values, customs, rituals, attitudes, and norms shared by members of an organization, which have to be learnt and accepted by new members of the organization…" ("Culture", 2006).

Disruptive technology: is a kind of technology that allows new users to do new things but tends to interrupt existing practices.

Integrated Library System (ILS) is an integrated set of applications designed to perform the business and technical function of a library such as acquisitions, cataloguing, circulation, serials maintenance and Online Public Access Catalogue (OPAC). (Stilwell & Hoskins, 2013:154).

Next generation Library Management Systems (LMS) is the new management system which makes use of developing technologies to manage current workflows and extend access to collections.

Open Source Systems describes computer software with a source code that is freely available to develop and redistribute.

Sustaining technology: is a kind of technology that enhances traditional activities.

Technology Acceptance Models: identify factors which determine user's intention and behaviour towards Information Systems.

Literature Review

2.1 <u>Introduction</u>

The purpose of a literature review is to establish the theoretical framework for the study, provide justification for undertaking the research and for identifying similar studies that have been undertaken. The latter can indicate useful points of comparison with the results of the present study. It establishes the links between this study and current knowledge as well as showing how its findings can contribute to the existing body of knowledge by filling gaps and extending prior studies (Kumar, 2011:32; Creswell, 2009:25). This chapter presents an analysis of concepts and issues with decision-making related to the adoption of next generation LMS in academic libraries in the WC.

The literature review was conducted using three core databases: Library, Information Science and Technology Abstracts (LISTA), Library and Information Science Abstracts (LISA) for e-resources and the CALICO institutional system, ALEPH ─ OPAC, for other resources. Additionally web searches were conducted for other relevant media such as blogs and websites. For searching, the researcher employed the terms that various authors used in the literature to refer to next generation LMS. Search terms included: library management systems, web scale, unified resource management, library services platform, library management platforms, library management service and next generation integrated library system.

The search was limited by time (2010 till current) because the systems are new and only the latest studies are relevant; however, the study has included also older publications to provide an understanding of library automation and the research methodology used in other studies (further discussed in chapter 3). Moreover the study was limited in scope ─ ERM, digital rights management, digital divide are not discussed in this study; nonetheless, the researcher acknowledges their relevance but the study is limited because it is a minor dissertation.

The chapter is broken down into five subsections. Section one covers the theoretical framework; history of library automation, technology acceptance models and issues with academic libraries. The second section covers next generation LMS, what is entailed, benefits

and challenges. The next sections cover the library automation vendors, regional library consortia and lastly a summary of the main points in the chapter, respectively.

2.2 Theoretical framework

The theoretical framework introduces and describes the theory which underpins the research problem. The framework describes concepts and elements that relate to library automation.

2.2.1 Early automation age

Library automation is the application of Information Communication Technologies (ICTs) to library operation and services. Libraries have been very good, throughout their history, in remodelling operations to be more efficient and effective. In the early years of the twentieth century, libraries managed their operations manually and each operation was independent of another. This was often done using card catalogues - a cabinet with index cards that identify books and other materials. During the late 1960s, computer technologies grew which fostered the library automation industry (Wang & Dawes, 2012:76). Additionally the increase in publications caused significant backlogs which resulted in a need to explore more efficient ways of processing, including automation of local operations, such as acquisition, circulation, serials management and cataloguing, because staffing was insufficient to acquire and process materials timeously with manual traditional systems (Borgman, 1997:219).

When early ILS was introduced in the 1980s these systems came at a time when libraries were struggling to effectively manage their operations and functions. Automating the workflows made many operations more manageable and it saved libraries money. Borgman (1997:218) states that British and American libraries had three goals with automation: efficiency, to provide access to local resources and to resources outside the library. Automating library functions came about to enhance internal workflows. This early automation resulted in many small companies developing a market with narrowly-focused systems, custom software and hardware: this strategy proved difficult for them because, as the market and the technology developed, many could not fund the necessary research and development to allow their systems to adapt, or had to consider alternative strategies to survive. There were many collaborations and amalgamations, resulting in the market becoming dominated by a few, larger, companies (Lynch, 2000:62). This is the idea that the library automation "Infographic" (Appendix A, Figure 2) portrays: many small companies then merging to form few big companies developing new systems, we see the cycle re-

starting again as there are more small companies entering library automation market. Library automation went hand-in-hand with the establishment of standards as this was the only way that sharing of bibliographic records could be made feasible, by encouraging systems interoperability. Thus standards, such as Machine Readable Cataloguing (MARC) and International Standard Book Number (ISBN) and the international searching and retrieval information standard (Z39.50), were developed (Borgman, 1997:220-221).

The emergence of the internet in the 1990s and 2000s encouraged the idea that information about library resources should be more easily available. ICTs have revolutionised academic library activities, with the World Wide Web having the greatest impact on the information revolution (Smith, 2005:1). This has led to the adoption of electronic catalogue (OPACs) and web portals, which allow users to search the holdings of a library from any location through the internet: this encouraged libraries to integrate systems (Borgman, 1997:222). This was a huge step forward as it facilitated the growth of the marketplace for library automation, as many libraries were going online and retrospectively cataloguing their records.

The potential for library development offered by the increasing availability of electronic information resources was radical but the existing ILS tended not to keep pace with these innovations, leading to increasing staff and user frustration (Breeding, 2007:40). This was a result of the application of traditional management techniques, which were frequently insufficient to address the current changes (Smith, 2005:2). The earlier ILS vendors tended to have a narrower view of the market or were locked-in to a development path based on technology that was becoming outdated. As technology changed the ILS did not change with it, which resulted in the users having to perform complicated tasks as they had to navigate across decentralized information silos that lacked standardised search procedures (Barton & Mak, 2012:84). This lack of change created a gap in the services provided and encouraged users to completely diverge away from library platforms to easy-to-use information platforms such as search engines and social networks.

Lynch (2000:62) declares that there are three factors that drive Information Technology (IT) in organizations: modernization, innovation and transformation. However, the innovation and transformation factors tended to be lacking in the previous systems, vendors started to re-integrate their ILS to provide a unified resource management for libraries (Fu, 2014:31). Therefore next generation LMS were developed in a way to catch up with technology by introducing modernity and innovation to library automation.

2.2.2   Next generation automation

The arrival of the next generation automation phase was signalled by the emergence of electronic formats as a potential replacement for print-on-paper and other traditional formats, exponential growth of e-resources and the development of OSS. As a standard procedure, OSS makes the source code freely available, which encourages development and experimentation by users (Lochhaas & Moore, 2010:4). The next generation development has been focused on innovation and transformation, which was lacking with the earlier systems: in particular, the development of search interfaces to more closely-resemble search engines. Technologies are changing the landscape of Higher Education (HE) and, consequently, teaching, learning, research is also changing: libraries need to also change their strategy to better serve their users (Lynch, 2000:68). The automation marketplace has responded to the limitations of legacy systems with next generation systems which offer a richer user experience through social media, and single point entry for the user to all content in the library, among other things (Cornish, Jost & Arch, 2013:16-17).

2.2.3   Issues with academic libraries

Academic libraries today face ample challenges that one could not imagine two decades ago. This calls for libraries to be more open: thinking not only of current needs but also trying to perceive future needs, because resources are evolving at a faster rate than before (Young, 2013:317). The cost of access to a resource in electronic form may be more expensive than its equivalent print form because many vendors offer aggregations of resources rather than access to a single item; therefore, managers need better information about usage in order to optimise the use of funds. Libraries are experiencing a drive to be more productive and to provide unrestricted access (Young, 2013:307). Academic libraries need to place more emphasis on quality of user experience rather than quantity of information (Andrews, 2007:563; Chad, 2012) to ensure that users come back to the library as source for relevant information rather than alternatives like search engines and social networks. This is because traditional ILS tends to have undergone minimal changes over its lifecycle to meet user needs, which is why change is needed (Young, 2013:309). Therefore libraries were confronted by the need to make considerable changes in the second decade after ILS was adopted in terms of the services provided and resources used (Wang & Dawes, 2012:76). The providers of library services have been aware of, and keen to adopt, new methods of

providing information resources, but were also frustrated in their attempts by the relative inflexibility of existing ILS.

Secondly libraries have been aggressive in implementing automation technologies since the early days, during the modernization age (Lynch, 2000:67), because they perceive the benefit of shared cataloguing, amongst other collaborative services. The development of new standards, such as the Resource Description and Access (RDA) system, has increased the perception that collaboration has considerable benefits. However, the acceleration of the rate of change, and the manifest uncertainties associated with it, has made library managers reluctant to adopt new technologies (Lynch, 2000:67). This is because managers do not only have to deal with challenges with ICTs but also they need to manage the impact of change on staff. The 21st century did not only bring innovative systems but also challenges for library managers.

For every library service using ILS, managers need to ascertain the point at which investment in traditional ILS should cease: this requires frequent scanning of the technology environment to identify new ideas and possibilities. Moreover managers need to prepare and encourage staff to adapt to change rather than impose it. Lastly, the greatest challenge in libraries is breaking away from traditional approaches and structures as they belong in the library of the past and not the future (Breeding, 2009). As part of their commitment to community development, libraries need to be able to help users to develop effective and efficient searches and to make the best use of technology available; this objective cannot be achieved if the ILS in use does not reflect recent developments in IT. Nevertheless there seems to be a constant struggle to satisfy both user expectations and staff capabilities as the users want change.

2.2.4   Technology Acceptance Models (TAM)

Technology advancement not only changes the way people do things but also their attitudes; which is why it is important to understand the experience of, and attitude of staff, towards new technologies. Developments in technology have resulted in many libraries taking a more positive approach towards managing change due to benefits perceived, because change should be facilitated by motivating staff to participate in order to reduce the resistance when encountering significant change (Smith, 2005:9). The use of new technology is growing thus making it hard to forecast the future; nonetheless, organisations are better advised to manage

how staff intermingle with new technologies rather than to leave it to chance (Garofalo, 2013:193). Therefore libraries need to stop waiting for new technologies to appear perfect for certain individuals but, rather, should be using the experience of those individuals to address the problems. To understand explanations about attitudes towards the adoption of next generation LMS among CALICO the researcher used the Unified Theory of Acceptance model and Use of Technology (UTAUT) model, Gartner's Hype Cycle and other relevant theories as a framework.

2.2.4.1 <u>Unified Theory of Acceptance and Use of Technology (UTAUT)</u>

IT acceptance research has yielded many competing models, each with different sets of acceptance determinants (Venkatesh & others, 2003:425). The various models allow for different views of technology acceptance but, for the practical purposes of research, one model has to be chosen. As represented in Figure 3 (Appendix A), the basic concept that underlies technology acceptance models is that it is a process and managers need to develop strategies to ensure positive output at any stage to maximise the probability of use of the technology in the end this is because individuals reaction towards a new technology will influence intention to use and actually use. There are eight key theoretical models which were developed to explain individual acceptance of technologies: Theory Reasoned Action (TRA), Technology Acceptance model (TAM), Motivational Model (MM), Theory of Planned Behavior (TPB), Combined TAM and TPB, Model of Personal Computer Utilisation (MPCU), Innovation Diffusion Theory (IDT) and Social Cognitive Theory (SCT) (Venkatesh & others, 2003:428-432). These earlier theories were not considered comprehensive enough, which resulted in the conception of the Unified Theory of Acceptance and Use of Technology (UTAUT) model to extend earlier models as they lacked unity even though the ideas were similar. UTAUT identified factors that determine the intention and behaviour of users towards Information System (IS) (Venkatesh & others, 2003:447). Organisations need to prepare staff through education and training to inform their attitudes towards systems so they are more willing to accept changes. This is critical for organisations to ensure they reap the benefits of the new technologies.

In integrating the conceptual fragments of the other theories, UTAUT identified four constructs that are direct determinants of user acceptance and behaviour: performance expectancy, effort expectancy, social influence and facilitating conditions (Venkatesh & others, 2003:447). Performance expectancy is the degree to which an individual believes that

using the system will help him or her improve in job performance and it is the strongest predictor of intention (Venkatesh & others, 2003:447). Effort expectancy is the level of ease associated with the use of the system and social influence is the degree to which an individual believes the views of others regarding the use of the new system (Venkatesh & others, 2003:450). The fourth determinant, facilitating conditions, is defined as the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system (Venkatesh & others, 2003:453).

Furthermore, three non-direct determinants of intention were identified (attitude, self-efficacy and anxiety) and the existence of four integral factors (experience, age, voluntarism and gender) was also confirmed (Venkatesh & others, 2003:447). The integral factors moderate the four direct determinants: performance expectancy is significantly influenced by age and gender, the relationship being of more significance for men and younger workers (Venkatesh & others, 2003:467). Therefore managers need to ensure especially that men and younger workers fully understand the benefits of the product to motivate acceptance and use. Effort expectancy is influenced by age, gender and experience: the effect is more noteworthy for women and older workers but it diminishes with experience (Venkatesh & others, 2003:467). Therefore managers need to ensure continuous training especially of women and older people on the new IT to ensure they can easily use the system. Social influence is dependent on all four moderating factors, and facilitating conditions only showed a significant difference when observed in conjunction with age and experience, but they mostly matter for older staff in their late years of experience (Venkatesh & others, 2003:467). Library managers need to take a closer look at social conditions as they play an important role for older staff.

UTAUT covers factors that affect the use and behaviour of individuals when encountering new IT so as to equip managers to prepare and better address staff reaction towards new IT. "UTAUT focuses on the success of adopting a new technology to help managers to proactively design interventions . . ." (Venkatesh & others, 2003:426). The success of an organisation is not in adopting a new system but, rather, in the effective use of the system. Managers need to continuously support staff throughout the whole process to ensure successful implementation. Thus managers need to develop strategies to manage user acceptance and behaviour, keeping in mind that age and gender are the key moderating factors in technology acceptance (Venkatesh & others, 2003:467). However the UTAUT

approach should only be viewed as preliminary owing to limitations in scales used to measure the constructs (Venkatesh & others, 2003:468-471).

2.2.4.2 <u>Gartner's Hype Cycle</u>

Another model that has the ability to supply substantial information on adoption of emerging technologies is Gartner's Hype Cycle. The Gartner Group specialises in providing IT research and advice to other firms so they can make the right decisions. Gartner provides clients with information about systems and technology and how technologies are likely to influence their organisation (O'Leary, 2008:240). The Hype Cycle (Appendix A, Figure 4) shows the progression of a developing technology and its use; it helps organisations to understand when it is safe to invest in a technology in accordance with the risk acceptance profile of the organisation (O'Leary, 2008:242). Similarly the Hype Cycle shows the life cycle stages a technology goes through from formation to full development and widespread adoption. When a new innovation enters the market, there are five potential stages, as mentioned in the hype cycle; technology trigger, peak of excitement, trough of disillusionment, slope of enlightenment and plateau of productivity (O'Leary, 2008:242). These stages do not essentially occur for all technologies; however, they can aid managers to identify a point where it is considered less risky to invest in a system.

In the earlier stages of the cycle there tend to be several development issues evident with the product, often resulting in an initial high price and few early adopters: this is an unattractive risk profile for organisations other than early adopters. After the product is launched there is excitement and trendsetters adopt it but this tends to be followed by a period when unmet expectations become evident. After this stage more people consider adoption because the identified problems get consolidated and solved, resulting in a greater potential for increased productivity. This is the point where many libraries would adopt the service as the price and risk level has dropped to an acceptable level. Moreover the product is also regarded as established enough for investment.

The curve may also be used to benchmark one's institution with similar institutions to understand what they are doing with a technology (O'Leary, 2008:242). Although the hype cycle may not have substantial evidence to support the thinking behind the model, it still provides relevant insights regarding trends about technology acceptance and use. Similarly,

institutions can apply this insight with other models to be aware of the need to choose a satisfactory time when shopping around for a new technology.

2.2.4.3 <u>User technology interaction in mainstream</u>

Technology is widely used across all sectors, primarily to make life easy and for survival. Technological developments are populating the internet with web 2.0 applications, which represent next generation internet usage and marks a shift in the way users create, share, store and distribute digital information e.g. blogs, podcasts, wikis etc. Therefore many companies have engaged in different studies to measure the impact of using technology among various groups of people. Thus we can observe mainstream research to see if there are similar trends between them and libraries: for example, by looking at Pew Research Center studies. Pew Research Center is a non-partisan organisation that informs the public about issues, attitudes and trends shaping America and the world by conducting public opinions polls (Pew Research Center, 2014). It performed a study to look at the use of technology by older adults (defined as sixty-five years and older) in America. This study is relevant because senior citizens in America have always been observed to be late adopters compared to the younger generation and SA faces a similar situation with older staff members and users: thus libraries can apply the similar trends to encourage technology use among older generations.

The study discovered that there tend to be two groups among the senior adults: the first group consists of open, educated, and affluent individuals, while the second group consists of less affluent persons most of whom do not have home access to online services (Pew Research Center, 2014:2). The study shows that more adults (more than 50%) are connected now than previously and also adults with higher incomes adopt internet use more than their lower earning peers (Pew Research Center, 2014:1). Even though adoption is increasing, many seniors are still lagging behind and are isolated from digital life. It has been noted that older people are sometimes more hesitant when it comes to adopting new technologies thus this is where management comes in to encourage staff to be effective.

A similar study, the Web Index Report, measures the impact of the World Wide Web globally. The study showed that, up to 2013, in Africa, a developing continent, only Morocco has achieved the World Summit on the Information Society (WSIS) target of connecting at least 50% of the population (Web Index, 2013:5). Even though SA is regarded as an emerging market it is still lagging when it comes to universal access, freedom and access,

relevant content and empowerment, which were the determinants in the research (Web Index, 2013:10). The study revealed that there are a number of challenges that discourage adults from adopting technologies, besides affordability, such as physical challenges, being unable to read, and difficulty learning to use the new technology (Pew Research Center, 2014:3). Similarly in Africa, 50% to 70% mention cost as the main reason they are not online, which suggest that the current digital divide is matter of affordability rather than lack of infrastructure (Web Index, 2013:5). This is true also for SA as lack of infrastructure is still a problem in many rural areas. Lack of infrastructure is the main hindrance for development of good libraries and information centres in SA (Stilwell & Hoskins, 2013:154).

On the other side, if a person is willing to use the technology ─ and not be sceptical about the benefits ─ she or he can be trained to operate the new technology (Pew Research Center, 2014:12). Adults that use internet daily view it in a positive light and this helps them to socialize more with friends and family (Pew Research Center, 2014:12-13). The study shows that similar trends were observed in libraries, suggesting that senior individuals do not necessarily want to use the new technologies by choice and are sometimes deterred because they are faced with obstacles. This means that, if an individual has been doing something in a certain way for years that is the "correct" way as far as they are concerned, and therefore it will be hard to expect the person to quickly change their stance. However with constant training and encouragement they can better be encouraged to adapt to the changes.

2.3 Adoption of ICTs in developing countries

ICTs have the potential to promote socioeconomic development because they have the ability to enhance livelihood and provide access to resources (Park & others, 2009:196). For libraries to take advantage of ICTs they require adequate infrastructure, facilities and policies. Currently libraries in developing countries are faced with inadequate ICT resources, lack of ICT policies and lack of skilled staff, which slows down development (Chisenga, 2004:2). This is due to lack of viable funding and lack of commitment of the parent body (Chisenga, 2004:2). Additionally, the region of sub-Saharan Africa has always been regarded as a late adopter of new technologies, compared to Europe and North America, due to the hostile economic conditions which result in limited budgets, shortage of staff skills and lack of adequate ICT infrastructure (Mutula, 2012:295). The harsh economic conditions in developing countries have been the greatest hindrance to implementation and sustainability of ICTs. Similarly, inadequate skills result in technologies being under-utilized in developing

countries (Mutula, 2012:295). This has resulted in libraries not using some modules in the ILS but developing custom-built systems instead. However, the availability of skilled staff is not necessarily a problem for university libraries as they usually have more resources than those in public libraries so they can outsource the skills if not available in-house.

2.4 Next generation Library Management Systems

ICTs have changed the way information is created and disseminated which in turn has affected the way libraries select, acquire, organise and deliver information: this has introduced new roles and responsibilities for staff. Breeding (2007:39-40) says that "next generation systems need to be designed to match the workflows of today's libraries, which manage both digital and electronic resources" to be able to provide efficient and effective support to organizational goals.

Exponential growth of electronic collections encouraged libraries to purchase and manage multiple systems to cope with multiple collections (Fu, 2014:31). Traditional systems have multiple platforms, for which users need to make use of search procedures that are not uniform to be able to access all collections: moreover add-ons to the traditional ILS tends to complicate the process with all the added steps to achieve a certain function, thus potentially reducing staff efficiency if training does not keep pace with such developments. This is not user friendly or an effective use of resources, so change is required. User expectations have changed, highlighting the need for libraries to be transformed and for search systems to operate like the search engines users have encountered on the World Wide Web. In particular, there is a need to provide a single platform to access all library collections and many libraries have not done enough to meet these needs.

Libraries in developed countries spend almost 60% of their budget on e-resources and this change in resource configuration has pressed ILS beyond capacity (Burke, 2012; Breeding, 2013a:13). The increasing dominance of e-resources and digital content in academic libraries, which the current automation systems are not capable of supporting, has been a hindrance to progress (Breeding, 2012:9). Emerging technologies continue to offer LIS an opportunity to extend their services beyond the library walls as well as breaking down division within the sector (Department of Arts & Culture and National Council for Library & Information Services, 2014:34) and encouraging collaboration through the internet.

Breeding (2007:39) outlines the three main aspects that the new systems should focus on: the prevalence of increased electronic collections, changed expectations regarding interfaces and shifting attitudes towards more openness of data and software. Libraries are now in the third, or next, generation of library automation, which has been largely inspired by innovation to create a unified resource management system. The next generation LMS focuses on innovation and transformation: making the new systems interoperable with IS (Borgman, 1997:218) as well as improving user experience. This means new systems need to be flexible, to create new services and to accommodate future changes (Breeding, 2007:41). The systems are designed anew, rather than being an extension of previous systems, to ensure better and smoother management of collections (Wilson, 2012:110). Next generation systems have changed the way libraries function from providing access to a collection of books or e-resources to a "single window" knowledge bank (Kumar & Reddy, 2013:439).

The new systems aim to benefit users with a discovery interface, improving end user experience and web service access, and to afford vendors the opportunity to introduce a modern Service-Oriented Architecture (SOA). SOA refers to the "policies, practices, frameworks that enable application functionality to be provided and consumed as sets of services…" (Sprott & Wilkes, 2004). Likewise the new systems take advantage of open source and Application Programming Interface (API) that allows infrastructure to be consumed as services and through cloud computing (Forsman, 2012:499). API is a set of routines, protocols, and tools for building software applications. The API specifies how software components should interact and allows for the extension of services. Cloud computing technology gives access to the vast majority of resources regardless of where they are geographically located (Mavodza, 2013:140). These are the principles on which next generation systems are built: for accessibility and discoverability. This is what Worldshare aims to do; streamline workflows to save money and time to improve service delivery (OCLC, 2014). Simply enhancing the earlier ILS is not feasible as the whole system needs to be novel to take advantage of modern technologies to provide effective and affordable systems.

Next generation LMS come with threats as well as opportunities. Berard (2013:55-56) says that the new LMS come with five threats that managers need to consider carefully: security, data quality, privacy, licensing data and pricing. The vendor needs to be reliable and have a high level of commitment to the subscribed institutions and must protect and respect the

personal information held by the institution (Berard, 2013:55). The price of the new systems is expensive for developing countries because the development tends to be done in the first world countries. However a decision not to purchase and use new software or hardware does not mean libraries will save in total costs: ageing equipment and software will continue to need maintenance and this may become prohibitively expensive.

Despite the challenges, the new systems have the potential to revitalise the academic environment, but this will require institutions to "view challenges as opportunities to utilise rather than overcome" (Garofalo, 2013:198). Companies may need to be revolutionary rather than evolutionary in their strategic approach: this is because improving an existing ILS is unlikely to be sufficient for future developments: it is better to develop a completely new product that can take advantage of current and foreseen technologies. In order for libraries to manage all kinds of resources they need high-quality integrated systems but the cost of these systems has prevented many libraries from using them; to address this matter libraries are looking into open source and other alternative options (Kumar & Reddy, 2013:439). Next generation systems present a conceptual divergence from traditional ILS model by engaging the community (Collins, 2010:93).

2.4.1   Open and community source

Next generation systems go hand in hand with open source and cloud computing models: thus it is worth discussing as they have become an integral part of academic library management (Collins, 2010:93). OSS is an attractive approach for many libraries because it is cost effective. Proprietary software is depicted as software that costs money and the source code is restricted: users cannot modify, fix or change the code in any form while, with open source, the source code is completely free of such restrictions (Lochhaas & Moore, 2010:4). OSS can be modified and redistributed as the licence grants the user rights to do so. Open source is collaborative thus making it more innovative as the community does the work, meaning that there is a symbiotic relationship and capacity to share development costs. The idea behind OSS is to keep the scientific advances created by software developers openly available for everyone to use, modify and improve: this is done by a pool of skilled and willing contributors, thus making developing and improving systems a quick and iterative process in contrast to proprietary software developments (Donnelly, 2010:132).

Open source is designed to encompass "open standards" technologies, such as web browsers; making it easy to connect to other systems or networks but, for any one system, the range of choice has to be limited in order that the installation and training costs may be manageable (Poulter, 2010:657). People argue that closed source software is inherently more secure since hackers do not have the internal workings of the software easily available to them; regardless of whether access to source code is open or closed this does not make programmers write more secure programs (Howlett, 2004:15-16). Security is not only a concern with OSS but also with proprietary systems.

OSS next generation systems like Kuali Open Library Environment (OLE) have attracted great interest from academic libraries and they have the potential to be a "game changer" for academic libraries and consortia. However, Kuali OLE has changed approach as now it is community source. Open source projects have struggled with sustainability, especially those aimed at the HE sector, because they require more programming and development, which has prompted the alternative development of community source (Feldstein, 2014). Community source is a type of open source that is governed by institutions and it borrows innovation from open source (Feldstein, 2014). Partners contribute financially and with human resources to help to sustain the project because the project can rarely be sustained by an individual or a sole funder. The institutions develop contracts together to build software for common need ─ which provides the best of both worlds because an institution or group of institutions is committed only to borrowing the software source code, which can then be adapted or used exactly as needed (Hanganu, 2014). This kind of innovation has been mostly applied in the United States (US) because the variations in economic and education environments there predicate the need to coordinate investments: community source approaches facilitate this in a proper manner (Hanganu, 2014) this is similar to CALICO institutions as resource allocation is unbalanced.

2.4.2   Cloud computing

Cloud computing was developed from the proprietary model: it evolved as a result of high performance computing facilities being multi-tenanted, consisting of single software applications serving multiple users or organizations at the same time. The need for clustering of multiple users from different organizations has led to increased utilization and thus the concept of cloud computing (Chorafas, 2011:4). Next generation systems are "cloud deployed", being offered as public clouds, managed by third parties. Cloud computing shifts

many of the IT responsibilities away from the library staff to third parties: this has the potential to change completely the operations in the library and shifts the locus of control over systems.

"The Cloud" has two visible elements: access from anywhere and computing on demand. It also offers three layers: Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS) (Blowers, 2012:29; Romero, 2012:111). SaaS shifts the hardware purchase, installation and maintenance to the provider, which lessens the dependency on internal IT support and PaaS, extends the cloud services by providing users with applications through gateways that are hosted by the provider. IaaS refers to shared services such as storage, hardware, servers etc. (Blowers, 2012:29-30). Therefore, with cloud web services, institutions purchase a service rather than a software product.

Cloud computing has advantages. "The Cloud" works on a pay-as-you-use policy or subscription and it is scalable, thus reducing costs (Chorafas, 2011:30; Romero, 2012:111), which can help libraries to deal with budgets cuts and work within a constrained budget (Liu & Cai, 2012:24). It offers scalability and collaboration options allowing sharing of information between widely-varied applications, as well as geographic locations, with the cloud storage (Chorafas, 2011:7; Romero, 2012:111). Cloud computing requires a lower investment which then reduces the risk involved in adopting it as there is immediate access to software and hardware (Romero, 2012:111), shifting the burden of concern about hardware and software from library staff. The librarians can use this time for improving library services but this comes at an expense of ceding of control as the libraries will rely completely on the vendor with cloud hosted systems. Despite all these benefits, cloud computing has some conceivable risks and limitations too, such as loss of control and security. With the shift to cloud computing, security and privacy are critical issues, since the services are offered through the internet and quality of network connectivity also becomes a vital consideration (Liu & Cai, 2012:25). However Romero (2012:111) says that the risks that are faced by using cloud computing software are the same as those faced by organizations that have data hosted outside the entity. Cloud computing is referred to as a "disruptive technology", allowing new users to do new things and interrupting normal practices, while "sustaining technology" enhances traditional activities (Garofalo, 2013:183). Libraries have been more focused on "sustaining technologies" in the past. Libraries need to develop expertise with the new systems to judge for themselves, as the perceptions of cloud computing are mixed.

2.4.3 Service-Oriented Architecture (SOA)

Service-Oriented Architecture is one of the new technologies that aim to offer libraries added value in the new systems. It is the underlying structure supporting communications between services; it is a loosely-coupled architecture designed to meet the business needs of the organization (Sprott & Wilkes, 2004). SOA defines how two computing entities, such as programs, interact in such a way as to enable one entity to perform a unit of work on behalf of another entity. Each interaction is self-contained and loosely-coupled, so that each interaction is independent of any other interaction. SOA may be implemented through web services. Web services are the set of rules by which services can be published, discovered and used in a technology-neutral, standard form (Sprott & Wilkes, 2004). Web services are becoming the most common implementation of SOA because in the past many technology services were provided but few were used, thus wasting resources. An example of the problem overcome in SOA models is the acquisition process: searching for a potential book, making an order through one service which communicates with another to check availability and another service which will process the invoice payment. SOA will create an adaptable environment for the user and provides also options for integration by third-party systems (Collins, 2010:93). SOA is not a new style of providing and consuming services: it has always been available but tended not to be used in libraries. With the new systems it has become an essential feature. Implementing new systems not only changes the services provided but also the operations that need to be performed by staff.

2.5 Changing library staffing patterns

The evolution of next generation LMS and other technologies has resulted in changing staffing patterns. The management of staffing is changing in academic libraries with technical services being mostly affected by the restructuring that is vital to preserve the integrity of core academic library mission (Gremmels, 2013:233). This change is not new to libraries: it was experienced when libraries introduced ILS and when print was complemented by digital and electronic formats. Limited budgets have been a cause for changed staffing patterns as many academic libraries have shifted from providing front-line reference services to using library assistants and student workers as filters to deal with straight-forward enquiries; clerical work in technical services will be diminished or eliminated, automated and outsourced; work that is created by these other changes will be high-level work that requires greater educational expertise; and some libraries are increasingly hiring numbers of non-

librarian professionals (Gremmels, 2013:234-238). These changes will come with gains, the need for adjustments and concerns; Gremmels (2013:244-246) indicates that some staff are anxious as they might not have the appropriate skills for the transition. This might result in hiring of non-library professionals which will have a radical impact on the practise of librarianship and affect the relationship that librarians have developed with faculty.

Another staff section that might experience turbulence with the advent of next generation LMS is library IT as the responsibilities of systems librarians have been changing. With traditional ILS, the tasks of the systems librarian were limited to administration, support and enhancement of systems. The former role was more IT focused when managing the traditional ILS, being well-informed about IT developments was a prerequisite whereas, with the next generations LMS, job responsibilities are more human or organization oriented (Fu, 2014:30). Thus management would need to prioritize social skills amongst other things. This is the outcome of the next generation LMS being cloud hosted: the vendors manage all the hardware and software related responsibilities leaving the librarian with few technical responsibilities, with the number of core tasks being radically reduced because the vendor does the rest of the tasks (Fu, 2014:39). With the shifting of responsibilities of the systems librarian's role from being technology-focused to more humanistic roles, such as liaison with staff and vendors should, potentially, become easier (Fu, 2014:40). Fu (2014:30) reported that future systems librarians will focus on tasks that directly support critical issues of the library rather than IT. Three skills have been identified to be compulsory for systems librarians to support new systems: communication, management and training abilities (Liu & Cai, 2012:23). Communications or social skills, which are human focused, have been listed repeatedly in recent job adverts (Fu, 2014:33). This technological transition is not new but similar to what libraries went through when card catalogues were replaced by online catalogues (Liu & Cai, 2012:23).

That us to say that systems librarians need to retrain themselves to meet the new demands of emerging technology and changing IT management culture (Liu & Cai, 2012:26). The traditional strategies are proving inadequate to manage current needs: therefore real leadership and real changes in management style are necessary (Smith, 2005:2). Thus the roles will change with the next generation LMS in order to adapt to the new demands by fostering the acquisition of new knowledge, skills and refinement of job descriptions (Fu, 2014:32). With OSS, individual libraries have a choice to locally host the systems, meaning

the primary staff roles will remain the same since the institutions have complete control over their systems. Lastly the use of new technologies in HE has the potential to disrupt and transform the environment, thus calling for development of new insight amongst staff (Garofalo, 2013:180).

2.6 <u>Regional library consortia</u>

In the early 1990s, SA faced great changes, which encouraged libraries to unite to better serve the communities, resulting in the formation of regional consortia (Darch, Rapp & Underwood, 1999:27). Financial constraints made it impossible for every library to obtain all the materials required by its users, although Interlibrary Loan (ILL) agreements were in place both nationally and internationally, it became obvious that greater co-operation between tertiary education institutions was essential (UCT Libraries, 2014). Therefore, academic library consortium were formed to address issues, such as better resource sharing through the use of the same ILS, and the development of Information Literacy (IL) programmes.

Between 1992 and 1998, five regional library consortia were established in SA (Thomas & Fourie, 2006:432): namely, CALICO (CApe LIbrary COnsortium), esAL (Eastern Seaboard Association of Libraries), FRELICO (FREe State Libraries and Information Consortium), GAELIC (GAuteng and Environs Library Consortium) and SEALS (South Eastern Academic Libraries System). Over the years most of them achieved the purpose for which they were established and thus the idea of remaining in consortial groupings was not very convincing, because needs had changed. Even though other consortia eventually broke up, CALICO remained intact and strong and, due to lack of alternative capacity within its catchment area, one of the poorest areas of SA, the Eastern Cape, SEALS also did not break up (Darch, Rapp & Underwood, 1999:27).

2.6.1 <u>Cape Library Consortium (CALICO)</u>

CALICO is one of two remaining consortia in SA, its continuance being largely due to its foundation and the fact that it recognises the autonomy of each constituent institution. The concept of an academic library consortium was a long-dreamed for initiative but it became a reality when a grant was offered by the Andrew W. Mellon Foundation to purchase a common ILS for the academic libraries in the WC and centralise operations. CALICO has achieved a lot since the 1990s, such as the establishment of a common library system, improved resource sharing with the use of ARIEL (A Ruby Information Extraction Library)

system and coordinated IL courses (Thomas, 2007:83). These accomplishments resulted in a meaningful and coordinated consortium and CALICO has been one of the striving cooperatives and a key player nationally (Darch, Rapp & Underwood, 1999:28). Consortia, wherever developed, have to respond to social, political and economic challenges and academic libraries have to address increasing user expectations, technology innovations and national goals (Thomas, 2007:84).

By the 1990s democracy was still a social state that SA anticipated: thus, centralisation between the five[2] institutions was a huge step because of the different scales of financial support among institutions as well as the decline in the purchasing power of the SA currency (Darch, Rapp & Underwood, 1999:27-28). This was a legacy of the apartheid period, which also resulted in skewed resource provision (Darch, Rapp & Underwood, 1999:24). In particular, the historically-black institutions, University of the Western Cape and Cape and Peninsula Technikons, were dominated by inadequate infrastructure and lack of access to ICT (Thomas, 2007:77). The differences among the institutions made the 'richer' institutions to be cautious about what was to be centralised, therefore operations like cataloguing and acquisitions were not centralised but data was held on a single, centralised, server.

Moreover academic libraries in South Africa had to find a way around purchasing resources as most publishing is done in the first world countries which, at that time, further divided the academic institutions in two: those intended by the Apartheid Government to serve a white, well-financed, population and those serving a black community which was financially starved (Darch, Rapp & Underwood, 1999:26). Despite the division, consortia aimed to level the ground to ensure the same user experience in the libraries by improving staff skills and resource sharing. However transformation in the LIS sector has been challenged by the heritage of apartheid, the effects of which are still evident, even today, through such manifestations as uneven distribution of high quality library service and effective access to ICTs across HE institutions (Department of Arts & Culture and National Council for Library & Information Services, 2014:30), to keep a consortium strong and to keep motivated it must stay relevant and anticipate needs of the institutions.

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[2] Universities of Cape Town, Stellenbosch and the Western Cape, with the Cape and Peninsula Technikons. A subsequent merger between the two technikons, and their re-naming as Cape Peninsula University of Technology, reduced the membership of CALICO to four.

2.6.2 Consortia in the future

Consortia were formed to provide specialised and localised service to the collaborating institutions but they have to rethink their roles because resource sharing, synchronised staff training and networking is no longer sufficient justification for having a central office. Moreover, many other established bodies, such as the Library and Information Association of South Africa (LIASA), have replaced some key roles of consortia. LIASA provides staff training and networking nationally through conferences, workshops and seminars. Regional consortia have many similarities with the training function of LIASA, which has resulted in duplication of efforts between the professional association and the consortia.

Library consortia today need more than sharing of resources to survive: thus, they need to expand their scope, as the earlier goals are no longer sufficient justification for consortia (Thomas & Fourie, 2006:437). Some consortial goals are still relevant but do not justify a central administration as these services can be out sourced when needed: for example, synchronised staff education. Development of new systems is still necessary to equip staff to better assist the users. The role of consortia in relation to the next generation LMS will change. We can speculate that by implementing the next generation systems there should not be a need for a central office as everything would be in the Cloud, unlike with the ILS; hence institutions need to re-evaluate the necessity for consortia. Evaluating the role of a consortium is critical as traditional ILS were the main reason for keeping many consortia together. Consortia must better prepare for the future, continuously studying and analysing the needs to identify gaps in services and delivery (Thomas & Fourie, 2006:437). Open and community source systems are new and challenging for individual libraries and this is an area which consortia can populate to upskill and to help prepare library staff. OSS is driving interest in the systems by promoting collaboration and shared services, which stimulate better interoperability and consortia (Dalling & Rafferty, 2013:400).

2.7 Summary

The new systems not only come with opportunities ─ OSS aims to save cost and ensure sustainability of the services, cloud computing, SOA and API ─ but also challenges like maintenance of security and data (privacy, data quality and cost). Therefore leaders have to facilitate change by means of education and continuous training of staff to adapt to changing job requirements. The case studies developed in the following chapters show that using a

participative approach (ground-up approach) is more beneficial in studying new technologies: when staff participate in decision making this encourages collaboration rather than competition. When destructive energies are released by the new technologies, institutions need to embrace these and adapt to prevent being excluded.

Research Methodology

3.1 <u>Introduction</u>

This research study is based on a qualitative case study approach. Qualitative case studies analyse people, events and decisions that are studied holistically by one or more methods (Thomas, 2011:513). A case study is an exploratory, explanatory and descriptive analysis of a person, group or situation (Becker and others, 2014). It aims to explore cause in order to uncover underlying philosophies. Baxter and Jack (2008:548) go on to say that a case study explores the situations within the context in which an intervention is being sought for or developed. Exploratory case studies can be viewed as a preliminary investigation of a set of phenomena in order to better understand the domain and to identify factors that seem significant. The aim is to use this information for a more intensive investigation, should it be needed, at a later stage. Yin (2014:7) indicates that the case study approach is more appropriate for exploratory phase of investigation.

Participative theory has been used as the framework because people are intrinsically involved in the process. The assumption of participative theory is that people are more committed to a decision in which they were involved and, thus, more inclined to collaborate than compete. Participation is critical to the success of technological change: the success of a change such as the adoption of a new LMS will depend critically on the attitudes of people towards participation. Therefore, it is appropriate that the theory provides the framework for the case study.

Case studies have benefits. The case can be explored from more than one angle, using a variety of data sources which reveal the multiple facets of the phenomenon (Baxter & Jack, 2008:544). This promotes a comprehensive understanding of the situation. The case study approach has an ability to deal with variety of evidence: artefacts, interviews and observations (Yin, 2014:12). However it has disadvantages also. The case must be bounded: the researcher needs to identify the case well, not making it too narrow or broad too and recognising clear boundaries to avoid challenges (Creswell, 2013:102; Yin, 2014:101).

This approach will allow the researcher to explore the current situation in academic libraries with regards to adoption of next generation LMS because individual experiences and needs

will influence organizational strategies. Lastly, case studies help the researcher to answer "how" and "why" questions, taking into consideration that the occurrence is influenced by context of the case (Baxter & Jack, 2008:556).

3.2 <u>Research design</u>

The study is based on qualitative case study methodology. A qualitative case study gives the researcher an opportunity to explore or describe a specific phenomenon using a variety of data sources (Baxter & Jack, 2008:544). Creswell (2013:97) declares that case studies reconnoitre real life situations through in-depth data collection involving several sources of information. Human experience is valuable component of qualitative study as humans have the ability to construct reality. Neuman (2000:171) state further that qualitative research creates a tight fit between understanding, ideas and what is really occurring on the ground. This is because qualitative research is emergent rather configured around an existing model, which allows for exploration of new ideas (Marshall & Rossman, 1999:2). Moreover qualitative research is useful when a topic is new or has never been addressed with the specific sample of people before (Creswell, 2009:15), such as the existence and reasons for adoption or non-adoption of next generation LMS. Lastly qualitative design explores the participant's opinions or perceptions towards an issue, service or product (Kumar, 2011:127).

3.3 <u>Population and sampling</u>

A population is a small collection of units from a much larger collection – the parent population (Neuman, 2000:195). Babbie (2004:180) represents that sampling is an act of selecting units of observation from the rest of the group. It is easier to work with a fraction of the group because it is more manageable and helps to clarify and deepen understanding of the characteristics of parent population. The sample population can be fairly small, thus making the case study approach feasible. The parent population studied consists of senior management staff in the Cape Library Consortium (CALICO) institutions, which are situated in the Western Cape Province; the sample population consists of a sub-set of these members of staff. This is because senior management staffs actively participate in the daily supervision, planning and administrative processes required by a business to help meet its objectives, they translate policy into goals, objectives and strategy. Relevant managers of sections were identified for the exploration of the topic because they have the power to influence the decisions that the institution will take with adoption of next generation LMS.

The researcher used information-oriented sampling because this mode offers the ability to concentrate on those potential participants considered most likely to have key information regarding the object of the investigation. The sample has the ability to reveal more information as the individuals are chosen because of the rich knowledge they have of the system being investigated and library processes. Information-oriented selection maximizes the value of information from small samples as the cases are selected on the basis of expectations about their information content rather than representation (Flyvbjerg, 2006: 230). The population chosen has the potential to provide relevant information to advance the study. The user view was not sought out – because the topic is a little remote for end users to be able to provide an informed view.

3.4 <u>Research Instruments</u>

Research instruments are the tools that are used to collect data. A researcher needs to ensure that the tools used are reliable and valid and data collection procedures need to be critically evaluated so to give the expected results. In the case where an individual cannot be interviewed personally, telephone interviews can be used as alternative.

3.4.1 <u>Face-to-face interviews</u>

Interview methodology was used to collect data. Interviews have the ability to collect large data amounts quickly if more than one person is interviewed (Marshall & Rossman, 1999:108). Likewise, semi-structured interviews are flexible, allow the researcher to explore issues that arise spontaneously which may not have been considered initially and allow for collection of focused data (Doody & Noonan, 2013:30).

In an interview, the researcher can observe the environment of the participants, expressions and signals, which cannot be possible with other methods. Marshall and Rossman (1999:63) commented that interviews have the ability to capture the deep meaning of the experience of the participants in their own words, thus exploring individual experiences to understand a particular matter in their lives. Interviews are conversations with a purpose and have high response rate (Neuman, 2000:272). Besides, they allow for follow up and probing of responses. Interviews also have some disadvantages. Interviews are associated with high cost, might be biased and analysis is time consuming (Neuman, 2000:273). The researcher used face-to-face interviews to explore attitudes towards adoption of next generation LMS by

using open-ended questions and probing to get rich data from participants this was important as the topic is relatively new territory.

3.5 <u>Validity and reliability</u>

Case study validity is achieved by the use of multiple sources of evidence and replication of multiple cases (Riege, 2003:78; Baxter & Jack, 2008:550). The case study approach allows for analysis within a setting and across a setting, which helps the researcher to understand the similarities and differences between cases thus providing a rich analysis (Baxter & Jack, 2008:550; Creswell, 2013:101). Riege (2003:78) comments that case analysis within the case and across cases permits comparison and improves coherence of findings and concepts that are thoroughly related. Case study reliability can be achieved by having a full interpretation of concepts and assuring congruence between research issues and features of the study (Riege, 2003:79). Furthermore reliability can be attained through concrete recording of observations, actions and audio recording of the case study (Riege, 2003:79). To ensure internal validity the researcher has comprehensively defined the scope and boundaries for data analysis. Lastly to achieve reliability the researcher has confirmed that all relevant information or observations necessary for analysis are recorded correctly and the study design is congruent to the research issues.

3.6 <u>Data collection</u>

Data was collected using semi-structured interviews. Relevant questions were compiled into an interview script to help facilitate discussion, establish direction for conversations and pursue certain topics raised by respondent (Babbie, 2004:300). Appointments were made with library staff from the four institutions, administered by the researcher during the months of September and October 2014. Meetings with participants were audio recorded and transcribed.

3.7 <u>Data analysis and presentation</u>

The recorded interviews were analysed by the researcher using NVivo data analysis software. Marshall and Rossman (1999:62) say the greatest strength of content analysis is that it is unobstructed and nonreactive; it does not disturb the setting in any way. NVivo can be used to analyse the data by uncovering subtle connections, adding the insights of the researcher in order to justify findings (QSR International, 2013). Additionally, it allows for a

comprehensive comparison of data sets between and within data categories to avoid partiality in the results. Text data was represented visually using word clouds.

Data Analysis and Presentation

4.1 <u>Introduction</u>

This chapter presents data that was collected through interviews with senior management of CALICO institutions. Data analysis is a way of evaluating and interpreting observations for the purpose of discovering underlying factors and patterns (Babbie, 2004:370). One person was approached from each institution to help arrange interviews with relevant managers. A minimum of two members of senior management staff from each institution were interviewed: the managers included deputy directors and section managers of technical services, library services, IT or ICT and digital services. The interviews were held in the library of each institution.

The data was analysed using NVivo to identify similarities and differences between the responses of the senior managers interviewed. For the sake of anonymity, the institutions represented by the staff members will be referred to as institution A, B, C or D.

4.2 <u>Approach to analysis</u>

Case studies are aimed at exploring the cause of events in order to uncover underlying philosophies. Technology is the biggest driver of development in most sectors, including academic libraries, resulting in users developing new needs for which libraries have not made provision. The next generation LMS and new web 2.0 technologies aim to fulfil these new and emerging user needs. Academic libraries in the Western Cape have been lagging behind with adoption of next generation LMS, thus the study investigates the attitudes of the senior management staff towards adoption of next generation LMS as well as the role of CALICO.

For better understanding of the research population in this case study a brief background is provided. The four institutions studied are diverse; they consist of previously disadvantaged and "rich" institutions and because of this diversity the population can be representative of academic institutions in the country. The funding of the four institutions during the apartheid era resulted in gross imbalances in the distribution of resources: whilst the imbalances in the funding model have been addressed, some inheritance of the skewed distribution of resources in the region remains. Likewise the history and culture within each institution affects its administrative systems and methods. The culture of the institution tends to affect the

technology acceptance and use among staff, while the political and economic state of the country, such as the declining power of South African currency, affects its buying power. This is because everything prior influences everything after, but not consistently, and how things end up depends on how things start so, rather than looking for a global solution, institutions must acknowledge the past and present in planning for the future.

The case study analysis follows the interview guide (Appendix B) to measure the institutional readiness to adopt next generation LMS. The questions have been divided into six categories:

- Library response to user and staff needs.

- Staff behaviour with adoption of modern processes

- The impact of next generation LMS.

- Adoption of next generation LMS.

- The present and future role of CALICO.

- How the role of the IT service departments intersect with CALICO.

The analysis looks at underlying matters that are causing academic libraries in the Western Cape to lag behind with adoption of next generation LMS.

The following descriptions collate the information and opinions expressed by those being interviewed: they do not necessarily reflect opinions in the professional literature or the opinions of the researcher. When a comment refers specifically to the institution being surveyed, "Library" and its derivatives is used; "library" and its derivatives may be taken to be a reference to libraries and the library profession in general.

4.3 Case Studies
4.3.1   Institution A

Five members of the executive team were interviewed from institution A, which included the deputy director, head of cataloguing, systems librarian, e-resources librarian and information services manager.

4.3.1.1 <u>Library response to user and staff needs</u>

Technology has influenced and shaped libraries and the users, which has resulted in new and emerging user needs. Users expect easy-to-use systems and greater access to resources on mobile devices and off-campus. Institution A has adopted various ways to respond to user needs, such as adopting a user-oriented strategy and continuously being alert to the user needs through surveys (LibQual) and conferences. Surveys have helped the library to understand what the users might need and conferences help the institution to perceive future needs. By being aware, Institution A can investigate solutions to the identified needs and ultimately provide a solution which may entail shifting of resources (staff and money) to the point of need and training of staff and users.

4.3.1.2 <u>Staff behaviour with adoption of modern processes</u>

Institution A they have discovered that modern processes are developed with a different architecture and perspective compared to older technologies. They tend to emphasise user perspectives during the design stage, sometimes to the detriment of functionality that suits staff: although this is a balance that has to be established, the result has sometimes been that staff express resistance to the need to learn and understand new systems and staff training and familiarity may take longer. Evidence for this is the varied staff behaviour, with some expressing reluctance to use new systems and others willing to take the initiative to learn the systems. Additionally there are mixed feelings with respect to the uptake of new skills: some members of staff appear to have little difficulty in adopting modern processes with the use of online training while others are reluctant to approve of the new systems because of fear of change. The uptake of technical skills, such as metadata standards and repository standards (for example, Extensible Mark-up Language, XML), has been found to be a great challenge for many staff. However with non-technical skills the transition has been smoother and one approach has been the redeployment of staff to new positions to force them to learn the new skills. It has been found that members of staff learn better this way than if they remained in their former positions.

The Executive Management team agrees that modern processes require staff to embrace a change in mind-set, be more open-minded and ambitious to learn because the new skills that libraries need are more technical than ever before and it takes a very long time for staff to become acquainted with them. Institution A is considering hiring people outside the library

with the required skill set as the library is not necessarily in a position to train staff in this regard; however hiring non-library graduates comes with a challenge as the library will have to offer them market-related remuneration.

4.3.1.3 The impact of next generation LMS

The implementation of next generation LMS will offer both advantages and disadvantages for the institution. Guided by the report prepared by CALICO, Institution A believes that next generation LMS will maximise the scale of the web with new mobile services, linked data to OCLC, Wikipedia and similar services as well as allowing better aggregation of content with the WorldCat service. The current library systems offer some of this, but Institution A has not tried this function. This is to mean that the systems are underutilised because of combination of factors, such as lack of skills and the adverse response to change. Moreover the institution is convinced next generation LMS will streamline "back office" activities, which will allow staff to manage services rather than systems. Institution A is doing further research on next generation LMS which will unveil what these advantages would mean for the institution and how the advantages might better meet their needs. At present, workflows for managing print and electronic are separate: a next-generation LMS will integrate existing services and systems, so they can be managed in a coherent and optimal way. Lastly the systems will allow libraries to extend services by developing software applications using APIs.

The institution is aware like most technologies there are gains and losses that will come with next generation LMS. Implementation of systems will have an adverse impact on staff as workflows and practices are being modernised. Staff will have to be repurposed to areas of need and re-skilling of staff; there is a shortage of staff, so adoption of next generation LMS will not result in any job losses. Management is aware of the adverse situations associated with this change coming, which will entail significant time to manage, train the staff and users, as well as testing of the system. Hence staff acceptance is necessary to encourage successful implementation, acceptance and use of the new systems.

4.3.1.4 Adoption of next generation LMS

Institution A is aware of the challenges the systems will bring but the benefits will be greater in the long run. It will adopt next generation LMS, however no plan has yet been developed in detail because Institution A is still conducting research on possibilities. The system of choice will be dependent on the maturity, ability of the systems to fulfil desired functions and

coherence with institutional strategies. Coupled with next generation LMS advantages the institution plans to create services to be available on mobile devices (for example, a library website that is compliant with mobile devices), create open data services and provides more wikis to host content and services for students. There are also plans to develop a media library by digitising materials to facilitate searching and help services.

The institution understands the new systems will require preparation of staff but it is unclear what inculcation of skills will be necessary. Moreover, a change in perspective is required as the new systems focus on relations between objects, such as the World Wide Web, rather than describing the objects as was the case in the past. Technical services staff will be mostly affected by next generation LMS so the staff would need to be equipped for this. Institution A does not expect a next generation LMS to satisfy all the new needs but it is one component of a bigger strategy to respond to the needs of the contemporary researcher and student.

4.3.1.5 <u>The present and future role of CALICO</u>

The regional consortium, CALICO, hosts and manages the shared system (ALEPH). The CALICO central office relies on subscription fees from the institutions for day-to-day running. It liaises with vendors and provides support to the institutions in terms of training and investigating new opportunities like next generation LMS, Resource Description and Access (RDA) and Research Data Management (RDM). The institution takes pleasure in the support the consortium provides, such as training of staff with new and existing systems. The institution regards this as an added benefit with adoption of next generation systems; however, as the systems will be fully cloud-based, there will be no need for a central systems librarian or technical support from CALICO, as is currently needed. As this primary role of CALICO diminishes, this will affect the future aims and objectives of CALICO.

The institution suppose the future role of CALICO will be guided by management decisions of the CALICO institutions, depending on what they view as beneficial; managing the system at consortial or institutional level has both advantages and disadvantages. The Executive Management Team of Institution A appreciates the services that CALICO offers; they would like to see this continue because new systems will require upskilling of staff and CALICO helps facilitate such training. However, the researcher reckons institution-specific training needs to be provided by the institution, not by consortium; thus this is not evidence of the continuing need for a central office.

4.3.1.6 <u>How the role of IT service department intersect with CALICO</u>

Institution A's Executive Management does not see any intersection between the role that institutional IT service departments play compared with the role that CALICO plays. The two types of service work together to manage the systems and ensure staff and users can function as desired. The researcher thinks there might be some confusion with regards to intersection between IT service department and CALICO because, according to what the institutions describe as the role of each, it is the same: management of systems and liaison with vendors but at different levels, as CALICO inter-manages the systems while the IT service department intra-manages the systems.

4.3.2 <u>Institution B</u>

Two members of the Executive Management Team were interviewed from Institution B: the head of library IT and the deputy director.

4.3.2.1 <u>Library response to user and staff needs</u>

Institution B is responding to user needs through Information Literacy (IL) training; various IL courses are offered, and at completion of the course users receive certificates. Staff are working closely with academics better to understand user needs and embed training in academic programmes. In addition Institution B is looking for the best way to use the current resources and adopting modern processes to improve services offered to the users such as the implementation of a limited number of tablets in major campuses for users to use in the Library as well as providing services to smartphones as most of their users own smartphones. Additionally Institution B has developed an application to access the Library website through the smartphone so that the users can have the same experience with a smartphone as they would with a computer. In future Institution B plans to introduce other new trends such Radio Frequency Identification (RFID) – wireless sensor – for library resources and student cards to allow for easy circulation and effectively gather student data. These technologies are not new or inexpensive, but prices are decreasing and becoming affordable for libraries rather than just commercial institutions.

Institution B is always willing to adopt modern processes yet finance is still a challenge as well as having numerous geographically separated campuses. This has caused the library to lag behind but the adoption of next generation LMS will be a way to catch up with this, as well as other modern processes being adopted like Research Data Management (RDM).

Institution B is advancing with RDM trial phase; the infrastructure has been set up and plans prepared to start with pilot researchers in late 2014 to determine their specific needs. This makes Institution B one of the early adopters of this initiative in the Western Cape. RDM is driven by funders because in the past only the final thesis was made available but now making raw and processed data available will make the research process more transparent.

4.3.2.2 Staff behaviour with adoption of modern processes

Institution B is focused on in-house training as well as specialised outsourced training, consisting of "train the trainer" training performed by the vendor and student training by skilled staff. There is resistance towards adopted modern processes from technical services staff some of whom feel threatened by new systems because they fear their skills will no longer be in demand. Management recognises that change management will be required to minimise resistance from staff, while customers tend to accept anything that will make systems better.

Institution B accepts the need to be more focussed on staff training and skilling with new systems. The researcher noticed that less was mentioned about how staff behave with adoption of modern processes but more on what has been implemented. This might mean two things: one being that there is ignorance about staff needs or, alternatively, that the staff is highly motivated to self-educate and, thus, management does not have to invest heavily in staff training.

4.3.2.3 The impact of next generation LMS

Institution B, like Institution A, has mixed feelings about the impact the next generation LMS might have. Management believes automating operations would mean less technical staff being required while it will also provide an effective way to manage all resources. Moving away from backend architecture to a discovery mode will mean most operations will be automated with no duplication, as well as greater efficiencies in management of all resources: current systems have short-comings and meet less than half the needs of the Library. Current systems are limited and have resulted in Institution B using manual systems and various additional systems to supplement them: with the next generation LMS this will no longer be an issue and it is likely to be more easily integratable with other systems on campus. Therefore, a new system would provide more benefits but these would need to be coupled with staff training to effectively use the new system; for services supplied by technical staff

to continue to be in demand, upskilling would be critical. Institution B considers the new systems as a way for the institution to catch-up with technology as they are lagging behind.

The researcher thinks that some members of management are less informed about next generation LMS and would need to be educated in these matters because automating operations as it will be with next generation LMS does not necessarily mean that some staff will lose their jobs, certain functions might be less in demand even so the new systems will create new opportunities for those staff but it is up to staff if they want to make use of this chance for advancement or be redundant in their traditional processes. This suggests that staff will have to be redeployed to areas of need, such as user services, as there would be less need for staff in technical services as well as systems management.

The Executive Management Team of Institution B believe the staff is completely ready for new systems as web 2.0, discovery tools and other modern processes have introduced staff to the architecture behind new systems, so no training will be necessary. The researcher is on the view that management might be underestimating the technical skills the new systems will require from staff which will make adoption rather challenging if staff are unprepared and not familiarised with those necessary skills. There is no doubt that training is essential for staff to adapt to new business processes. The views coming from management in this institution about adoption of new systems are quite diverse, which suggests that management have a different understanding about new systems, thus education before implementation is obligatory to ensure management is on the same understanding.

4.3.2.4 <u>Adoption of next generation LMS</u>

The institution will certainly adopt next generation LMS. The institution is looking for a system that can best meet its specifications. At the moment the Executive Management Team is assessing institutional needs and how the available next generation systems can fulfil these needs. Institution B is looking for something new and modernised, not a hybrid system, because such systems are limited and cannot integrate fully. It has narrowed the systems of choice to three; Alma, Worldshare and Kuali. The institution is excited about open source since next generation systems are costly and open source can make it possible for a struggling institutions to acquire a good system and Institution B has adopted various OSS in the past.

4.3.2.5 <u>The present and future role of CALICO</u>

CALICO provides technical support for current ILS as well as providing support with systems aspects like reporting, set-ups, data and user demands. If the institutions switch to next generation systems, CALICO involvement becomes minimal as everything will be in the cloud and not as software on a local server. CALICO plays as significant role with current systems because each institution does things differently: thus, there is a need for a central systems librarian to coordinate system demands but this will fall away with next generation LMS.

Technical support would diminish with new systems as the systems will be cloud-based but CALICO can still assist in other aspects. In future CALICO can look at supplementary ways of collaborating with adoption of modern processes that the library and users make use of. Therefore consortia will need to embrace a different approach because the sharing of the system is what kept the institutions together, so this raises some concerns for the future of CALICO. The institution is under the impression that the forthcoming role of CALICO will be less technical, such as sharing of best practices, expertise and information; though this is not a binding rationale for regional consortia as other avenues can be used for this.

4.3.2.6 <u>How the role of the IT service department intersects with CALICO</u>

There is no intersection between the functions of the institutional IT service department and CALICO. They work together to ensure the pipeline works well from the host to Institution B, but they have different functions. The only time the two intersect it is when there are problems in the network and then they try to resolve the issue collectively.

4.3.3 <u>Institution C</u>

Two members of the Executive Team were interviewed: the deputy director and head of library IT.

4.3.3.1 <u>Library response to user and staff needs</u>

Institution C is responding by anticipating user needs derived from looking at trends in literature and internationally and combining this with user experiences on campus. The Library is also aware of the 21st century multi-literacies; digital, information, academic, technology, multimedia and language as these cannot be separated so they have to account for these when addressing user needs. Institution C is focusing on key trends in technology to

provide better access and discovery as well as integrating library resources with online resources. The Library has introduced latest technologies like tablets as a way to transform its services.

The Library is currently involved with new projects to address user needs like RDM and Open Access (OA); this came about from its own interest in reforming scholarly communication and publishing. The funders have also shown interest in this area as public funded research must be easily accessible. The faculty librarians are having conversations with faculty to see how they can better serve them in support of learning and teaching.

4.3.3.2 <u>Staff behaviour with adoption of modern processes</u>

The level of interest differs amongst staff and there is some resistance to the idea of using modern processes. Institution C has recently adopted tablets and a limited number is available for staff to borrow, so as to familiarise themselves with this technology; the aim is for them to try it first and then pass the knowledge to users. Senior management are able to borrow a tablet for longer periods to use while the other staff can borrow one for at least one semester. In the beginning there was reluctance among staff to use the tablets but, gradually, the level of interest is increasing.

The Library is using in-house seminars to raise awareness, educate and train staff on social media and other modern processes. They are also utilising a reading club, which meets once a month to share knowledge. Besides this, they send delegates to attend external workshops and seminars which then report back to the rest of the team. However, the existence of a diverse student population has always remained a challenge, especially with limited funding. This has encouraged the use of web-based OSS to keep abreast with modern processes and expose staff to systems that the institution might never afford. Another way the institution equips staff is through team-work; break up a complicated task into smaller portions and delegate each task to a member of staff, thus creating a sense of ownership. In most cases it works well, because all the staff are in close proximity.

4.3.3.3 <u>The impact of next generation LMS</u>

Next generation LMS will have positive and negative impacts on Institution C. Firstly the systems will offer easy integration with other systems, including data aggregation, and will be offered as SaaS, thus reducing cost as there will be no need to invest in infrastructure.

Secondly, statistical data relating to library performance will be real time, thus allowing management to react timeously. This is facilitated by next generation LMS and is not available immediately with current systems. The institution is aware that data security will be critical since the systems are therefore it is essential to choose a reputable company with a practical data security strategy. The systems will also require the provision of consistent and reliable bandwidth from Institution C because everything will be web-based.

The new systems will bring changes in workflows, which will result in changes in skills to utilise the systems. Currently there is a lack of skills and, thus, new systems will call for re-skilling of staff as some operations will be redundant and new ones developed; therefore there will be a need to train the staff to fit into the new roles. Next generation LMS will entail processing skills, to manage repositories and other areas in the Library that will need more human capacity, such as data curation and digitization: staff will need to be equipped with relevant skills. The Library will be moving to a WorldCat Local platform soon: there are mixed feelings about this move but staff members are slowly getting used to the new way of doing things.

The researcher thinks Institution C might be underestimating the technical requirements that introduction of next generation LMS will bring and Executive Management seems to disagree about the reliability of their ICT infrastructure. Moreover the ICT service department in Institution C is small and it might have limited skills, compared to other consortium members.

4.3.3.4 <u>Adoption of next generation LMS</u>

Institution C will certainly adopt next generation LMS: choices have been narrowed to three systems: Alma, Worldshare and Kuali. The choices were based on looking at what the institution is doing and what the vendors are offering and which one would better serve them. Institution C still needs to assess the vendors with regards to support schemes: the characteristics of previous support for Ex Libris and OCLC are well-known but this does not apply to Kuali as it is a new entrant to the industry. Another factor will be cost analysis across the three vendors and matching the workflows with systems functionality. The above factors will guide the final choice of system to be adopted.

Institution C is not looking at adopting an open source LMS because the Library IT department is small and lacks the capabilities to support such systems. Moreover, there have

been unpleasant past experiences with OSS and staff members are more conscious of the care with which this option should be considered. Kuali is not free: institutions have to be members of Kuali foundation and they have to invest in the community code. In the past, lack of local knowledge to develop the system further resulted in OSS initiatives failing: thus it is a preference for the institution not to adopt an open source library system. The researcher thinks this might be a capability issue as most OSS initiatives are driven by an individual or team with the required skills and when they leave the initiative cannot be sustained thus making it hard for the institution as they have to start from scratch.

4.3.3.5 <u>The present and future role of CALICO</u>

The regional consortium facilitates collaboration and collegial support. CALICO also builds capacity and negotiates prices for the members. In future proximity will no longer be relevant: thus the role of CALICO will be different. There will be a need to re-evaluate role, build a new skill set and, perhaps, build a national consortium instead, as distance would be irrelevant with next generation LMS. The consortium can focus on building human relationships, organising shared workshops and capacity-building in future.

4.3.3.6 <u>How the role of IT service department intersects with CALICO</u>

CALICO sits in between campus IT and the Library IT. There is no intersection between the two service departments but they work together: CALICO communicates with Library IT when there is a problem and they collaborate to resolve it, joint systems management.

4.3.4 <u>Institution D</u>

Three members of the Executive Management Team were interviewed: deputy director, head of library IT and the systems librarian.

4.3.4.1 <u>Library response to user and staff needs</u>

In the past, staff used to focus on their needs but now the focus and mind-set has changed and the Library is more user-focused. This is because libraries do not manage systems but manage information that is inter-linked, which is why the Library IT strategy is to develop a user-oriented systems because the Library exists to serve the users. So it is necessary to address user needs first and then see how the systems can fit in. Change in mind-set is a key point in moving forward and staff seem to have understood this: nonetheless this is a new

way of doing things and staff are learning continuously. The institution has not mentioned any real strategies they will implement but theories.

4.3.4.2 Staff behaviour with adoption of modern processes

There is a growing interest and excitement from staff with the modern processes becoming available. The Library is in the forefront of applying modern processes but is still in the early stages of building its infrastructure. The Library is trying to catch up as it was lagging behind and is making great progress and has implemented the Aleph acquisition module, new Library website and WorldCat Local. WorldCat Local is not so new anymore but the Library used Primo before and is in a trial phase with this platform; staff members are not convinced it is the best platform and management is considering using Google Scholar as the users are already using it anyway. Institution D is learning to be flexible and not be guided by what staff would prefer but rather what would better serve the users. Staff requires as little change as possible, they did not like Primo and they do not like WorldCat Local as well, so it is very hard to please them but the Library is putting user needs at the forefront.

Vendor training is what the Library is using to get acquainted with modern processes, but staff members have voiced their desire for more training, which management does not think is necessary. Executive Management believes that staff must take the initiative to learn these technologies on their own, by using online materials on YouTube and other resources that might be useful. YouTube is the most used training support and staff members need to take advantage of this. The Library has recently introduced EndNote and staff has requested training: it is planned to use the vendor to train the staff but this becomes a vicious circle; if staff lack ambition to learn the systems then bringing external person to train them will not solve the issue.

4.3.4.3 The impact of next generation LMS

Institution D is in the early stages, at this point, and cannot foresee the full impact of the systems as they have not defined the full specifications for what they are seeking, but they know they are looking for something new and cloud-based. They are aware of the issues associated with the cloud but these are seen as being beyond consideration of the system functionality. The institution is involved in a two-year project to determine the specifications and will only then make a choice and, perhaps, implement a new LMS by then. Though they

will require greater functionality with managing of e-resources this might change in future as information resources evolve, but is a major criterion for now.

Other members of the Executive Management Team consider that there will be a huge impact in the way data and information is managed, as it is inter-linked. With the new systems, users will no longer need to search across databases, thus the systems must be interoperable, having several systems linked together by one search engine, which is not happening at the moment. Additionally this will have an impact on operations and processes as they will be integrated and will allow libraries to work more efficiently by breaking down the silos between technical and customer services. The new systems architecture is about structure of the systems, the services and processes, not focusing on the acquisition or circulation modules. Additional positive impacts arising from this system structure are better management with the use of reporting and analytics tools, making it easier for managers to see if the institution is getting an adequate return on investment, real time statistics. However adoption of next generation LMS will have an impact on outsourced systems administration such as CALICO and Business Connexion (BCX, IT consulting and outsourcing company), the facility manager; the institution will no longer need technical support with LMS or local hardware. However this will not free the Library's systems librarian as there will still be a need to maintain the other systems and liaise with the vendors.

New systems require new skills and with the exponential growth of modern processes there are more new skills to be learnt. The same applies with the adoption of next generation LMS: staff will need to be up-skilled, getting familiar with new operations and develop new or match existing business processes. Adoption will call for different skills from those that staff members currently hold: thus, staff have to be flexible. Next generation LMS is not about the systems but the services the academic library offers, as there will not be a back-end or a front-end, therefore a change in outlook is necessary. Besides, staff will need to be familiar with XML, and the use of data sets, and must be comfortable with social media as the new systems are offered through different channels. Data management and mining skills will be as critical to achieve interoperability, which involves understanding of the web as everything will be web-based. The Library can equip staff with these skill sets to a certain extent but, with the changes coming, it might be better to contract a training company that can provide these expertise.

4.3.4.4 Adoption of next generation LMS

Institution D will adopt next generation LMS nevertheless and is still investigating this, though a plan has not yet been developed. Adoption of these systems is, nevertheless, part of a five-year strategic plan. The Library is considering this move because the current vendors will only support Aleph for a few more years and institutions will have no choice but to eventually migrate to next generation LMS; this is also a way for the vendors to generate more revenue. The Library has been involved in a business process review, which is useful for this investigation because new systems require looking at existing workflows and operations to enable identification of where they can improve and where economies can be made. The outcome of the business process review will influence the decision Institution D takes but it plans to implement the next generation LMS by 2016, dependent on the size of budget available and the response to the Request for Information (RFI). The academic environment is changing so the Library has to also change to better meet these demands. Another factor is that the institution spends a large percentage of the budget on e-resources while the current system does not cater for this; staff have to maintain spreadsheets and different ways to manage this information and this is not effective, so this change is inevitable.

The institution is sceptical about open source LMS. Kuali has changed its approach, and has included a commercial component: this renders it no longer OSS, which has changed the institutional motivation towards adopting Kuali. Kuali is a community code so it is not free and is more complicated as institutions need to be members of the Kuali Foundation. The membership is calculated on the size of the institution and membership for Institution D is probably not feasible. The institution is monitoring the development of Kuali; however, it is still in the early stages, not fully developed; besides Kuali will require a lot of in-house skills to tweak and customise the system. If the central institution's IT was to adopt other Kuali products like student management, financial and human resources system, the Library would consider this move as OSS requires infrastructure and expertise on campus. Moreover, integration would not be a problem if the institution as a whole was going to adopt other Kuali systems.

At the moment central IT is looking at a research product for managing grants. In its view OSS is very demanding: as an example, it has recently adopted Geospatial systems and the process was labour intensive, with staff also needing to understand what is involved. Initially

the Library used its IT department to support the system but this was short-lived: the systems could not be sustained and the Library had to outsource support for this OSS. This might have been avoided if the IT people had documented the work that was done with the system. Managing OSS requires rare skills and there are not many people who can do this, therefore it is best to settle for proprietary software because of lack of sustainability for OSS.

4.3.4.5 <u>The present and future role of CALICO</u>

CALICO plays a key role in coordination, from the library systems side; liaison is necessary between vendor and library IT department as well as liaison between library and facility manager. Whenever there is a problem with Aleph this role escalates as they work hand-in hand to resolve the issue. The role will change completely in future as there will be no need for an intermediary: the institutional systems librarian will communicate directly with the vendor as is done with other systems used in the Library. The Library is not dependent on CALICO but it manages the current system. Next generation LMS architecture is so different and the cloud takes away geographical location as a factor thus facilitating collaboration with anyone, anywhere, in the world.

If Institution D chooses Kuali, there are two potential roles: CALICO can provide the infrastructure and programming skills to develop the system and any other relevant skills to utilise the features the system offers. CALICO can facilitate this nonetheless because there is no drive for institutions to choose the same system: the next generation LMS will not necessarily be shared.

4.3.4.6 <u>How the role of IT service department intersects with CALICO</u>

There is an intersection between IT and CALICO, consisting of regular collaboration between the two bodies. The intersection depends on the task at hand; for example, there is a present need to change the financial component of the acquisitions module and ensure it is interoperable with other systems. The entities would work together in this scenario as well as in procurement of hardware with the help of the Tertiary Education and Research Network of South Africa (TENET) also. TENET support institutions with IT services, as they have more experience, and it is easier to collaborate because of the close proximity with CALICO. Likewise CALICO and IT departments work together to modify or change certain processes within the system.

4.4 <u>Cross-case analysis</u>

4.4.1 <u>User and staff needs</u>

The needs of each institution are different due to the user population being diverse, thus the solution to the diversity of needs ought to be institution-specific and the institution is the most relevant body to best address these needs. Global problems require customised solutions because the policies, mission and culture of the institutions are different; some institutions are risk-averse, preferring to wait and see before implementing new systems, while others want to be the forerunners. In spite of differences do not have to be threat but should be seen as what makes the community and grasp them and similarities.

The institutions agree that skills upgrade will be necessary with next generation LMS so staff training will be a priority to prepare staff for the changes in workflows and processes. Moreover, a good ICT network will be critical and only one out of the four institutions will need to upgrade its network standard to prepare for next generation LMS. Adopting next generation LMS with the same ICT network might be a challenge for that institution if the inadequacy of the infrastructure or lack of IT skills issue causing instability in the network is not addressed timeously.

4.4.2 <u>Overall adoption of next generation systems</u>

Ex Libris will support Aleph for a limited time, till 2017: this gives each of the institutions three years to prepare for the next generation LMS of their choice as the new systems might not be shared. Therefore all academic libraries in the CALICO consortium in the Western Cape will be implementing next generation systems in the next five years. In response to this, CALICO and representatives from the universities engaged in a comprehensive study which was the ground-work for next generation LMS, which focused on three systems: Worldshare, Kuali and Alma. This is the research that institutions will be building on with the next phase, which will be conducted at an institution level. The system of choice differs for the institutions but all agree with Worldshare and Alma as one of the two that they might adopt. There is uncertainty with Kuali among the institutions - only half are considering it because of the complications involved - Institutions A and B are willing to try open source LMS. This is not the case for Institutions C and D because of skills required and their past experiences with open source initiatives, with the latter resulting in the greatest demoralisation. Studies show that libraries that are dissatisfied with current proprietary systems show more interest in

an OSS (Kirsch, 2014). Additionally if there was to be a strong motivation for OSS implementation of OSS among the institutions like a donor, the institutions might consider implementation of OSS as a consortium as is the case with current systems.

4.4.3   Word frequency

The collected data from the interviews was analysed using NVivo to identify similarities and differences amongst the institutions. A query was performed to identify word frequency in the interviews and was represented in a word cloud. Institution A's word cloud (Appendix A, Figure 5) shows words like "new services", "roles" and "skills" used frequently because the institution comprehends that it is at a crossroads and change is inevitable. Additionally, the adoption of modern processes and changing roles will require training of staff and users; this shows that management acknowledges that next generation systems are novel and calls for the inculcation of a new perception among staff. Institution B (Appendix A, Figure 6) agrees with Institution A in many areas, such as adoption of modern processes, changing needs or roles and training. The Institution admits services that academic library offers are changing and thus is exploring further ways to make better use of current systems and adopting new ones.

Institution C (Appendix A, Figure 7) has a different perception; it is following new trends and technologies as well as educating staff and users on these. Moreover the institution is making resources easily discoverable by using social media in order to address new needs. Like Institution C, Institution D (Appendix A, Figure 8) is dealing with new needs that require changes in roles and development of new skills. The two approaches of these institutions seem to be quite similar.

The word frequencies from the four institutions were in some respects similar but two pairs of institutions can be observed where the frequencies are almost identical: the first pair is Institution A and Institution B, and C and D for the other pair. The two pairs of institutions are more similar but the perceived urgency of development is the real cause of the differences observed: for example with RDM, all institutions are looking into it but some are more advanced than others in initiation of this. The views the institutions have are global and so are the differences: thus institutions do not have to make premature decisions about the future.

4.4.4   State of the regional consortium

The case studies revealed that there are similarities and differences among the four institutions but these might not be the same throughout all areas in each Library as the study only considered one section of each Library. With library systems it was noticed that in reality there are two institutional sets under CALICO, due to the prevalence of two views. The most evident difference between the institutions was the culture, but this does not mean the institutions cannot find common ground. Institutions can still work together even when the systems are no longer shared: staff have raised a strong need for collegiality and CALICO can still facilitate this. However academic libraries have to cut their budget and, if next generation systems do not deliver on their promises, this money would have to be cut elsewhere which would have an impact on CALICO's future. This leaves CALICO with some uncertainty because institutions have diverse views about the future direction and the need to manage LMS and the existence of a shared system was the main reason why the consortium thrived.

The institutions still appreciate some benefits of the consortial approach but still prefer to function individually: they want complete control over their systems so next generation LMS will provide some sense of control. A national consortium might be a worthwhile consideration for the future: however, national consortia have not proved sustainable in South Africa. Likewise the culture and the experiences the institutions have had in the past will be a major deciding factor with the direction the institutions will take in future. Lastly the institutions have points of agreement and points of disagreement which may play a critical role in the future role that CALICO might assume. Hence CALICO has to engage in a dialogue with staff from the institutions to understand their concerns and needs; hold workshops to establish a way forward with staff at different levels of the organisation, not just with library directors; this could help to shape a new role for CALICO. Open communication culture will not only assist CALICO to get an understanding of the overall needs but will also help each institution to ensure staff buy-in.

4.5 Conclusion

Next generation LMS are expected to change the way libraries operate, bringing changes in workflows, repositioning staff and saving on operational costs. Academic libraries must be able to adapt in an agile manner to a changing environment by equipping librarians with

relevant skills to ensure preparedness. The role of CALICO must change or it will face becoming redundant with next generation LMS, which will tend to de-centralize the systems.

Discussion and Conclusion

5.1 <u>Introduction</u>

This chapter contains a discussion of findings, issues that arose in the study, recommendations and limitations. It seeks to integrate the analysis of the findings to highlight the similarities and differences between the case studies.

Data collection was a challenging process as access to senior management was sometimes problematic due to their busy schedules and different policies; this was unforeseen which resulted in the size of the population being smaller than expected but the study still produced sufficient data for a rich analysis of the topic. Therefore, when working with executive management, it is advisable to allow ample time to seek permission and observe protocol.

This study probed attitudes of the senior management teams of the CALICO institutions towards adoption of next generation LMS. This is because traditional ILS is outdated and insufficient to meet the changing requirements of the library and user; adoption of next generation LMS would allow libraries to successfully manage a wide variety of licensed resources and better serve the users. The study revealed that adoption of next generation LMS is considered to be a key to addressing the needs of contemporary users and staff and it is what vendors are encouraging by discontinuing provision of traditional ILS in the near future. Hence institutions will be adopting next generation LMS as well as preparing staff for the move. This will necessitate management to become proactive in their response to the change, for a smooth transition process. Moreover, institutions and the CALICO Board will have to redefine their needs and ultimately the role that the consortium can play with respect to next generation LMS, since it will be different from management of a traditional ILS.

5.2 <u>Discussion</u>
5.2.1 <u>Trends in library automation systems</u>

Dealing with print, digital and electronic resources can be a daunting task with traditional ILS but next generation LMS aims to solve these challenges. Senior management teams in the four institutions are still examining options for next generation LMS which they plan to adopt in the next five years. We can expect significant increase in the implementation of discovery products by 2016 among academic libraries but this is not enough to fix generational changes

and this development will only reach full maturity by 2026 and the market approaches universal adoption (Breeding, 2012:12-13). Likewise libraries with limited resources have little choice when it comes to choosing the best LMS and in most cases they will keep with the same system: this adds more variation in the predicted cycle. This is mostly true for America and other developed countries and, for developing countries, this time frame may be extended. Therefore major academic libraries in the Western Cape are in harmony with the rest of the world as predicted by Breeding. Despite that there has been some early adopters, University of KwaZulu-Natal (UKZN) in the East Coast of SA has gone live with next generation LMS as of early 2015 and it is the first African institution to implement the cloud-based LMS (OCLC, 2015). CALICO institutions are in a process of adapting staff for the transition, by introducing other modern processes to get staff up-to-speed, and clarifying the prerequisites for management systems.

5.2.2 <u>Similarities and differences between the institutions</u>

The four institutions examined are referred to as Institution A, Institution B, Institution C and Institution D. Broadly, the results fall into two groups defined by differences in culture and past experiences: Institution A and Institution B tend to share similar views, as do Institution C and Institution D. Across all four institutions there is inconsistency in views.

There are considerable differences as to the degree to which the work of CALICO and the institutional IT service departments intersect; this inclines the researcher to suggest that the institutions are tending to operate as silos, separate from each other, and that an obstacle to development may be a lack of clarity about this role. Similarly the advantages and disadvantages of next generation LMS seem to be unclear for some of the CALICO institutions. Lastly the institutional views differ with regards to open source or community source next generation LMS, with two considering adopting Kuali whiles the other two are totally against it. This is an opportunity for the regional consortium, or a body like LIASA, to offer support to the institutions to close this gap.

5.2.3 <u>Academic library staff complement</u>

A move to a next generation LMS will result in readjusted responsibilities which will reduce the workload of systems librarians by 40%: this is due to staff not having to perform software upgrades, manage servers, client application upgrades and data backups (Fu & Fitzgerald, 2013:53-54). Next generation LMS reintegrates the workflows of traditional ILS functions

thus cutting down some activities and adding new ones which will require new skills from staff. These skills include, but are not limited to, the ability to use API to customise the discovery interfaces as well as being able to integrate the systems with other local systems like financial and student administration systems (Fu & Fitzgerald, 2013:54). The changes in business processes will require management to consider how to train staff, improve their technical skills and prepare for transition in the best way to avoid fatigue and apathy among staff. Likewise management will have to consider hiring new people with the required skills set where they cannot train staff: there is no doubt that training will be necessary. Such changes will have key impact on academic library staffing patterns as for many years staff were managing systems and not collections. Therefore management must try to address these concerns. Fu and Fitzgerald reason that directors must provide library staff with opportunities and provide training for staff to improve their skills and knowledge (2013:57).

5.2.4   Technology Acceptance attitude

Introduction of web 2.0 technologies has come with mixed feelings among staff with some being excited about the virtual interaction and collaboration it offered to the user but others saw it as distraction to established processes; which resulted in staff being divided into two groups; creating a challenge for management. Management has to manage how staff interact and use modern processes because this builds a lasting view to them and their colleagues. CALICO institutions are exposing and training staff on adopted modern processes: direct and/or indirect, vendor facilitated and by use of online resources. UTAUT mentions three major factors that affect the acceptance and use of technologies: performance expectancy, effort expectancy and facilitating conditions.

Libraries with next generation LMS have to ensure the benefits of the system are well understood by all staff. The institutions must market the new system or services to staff and students, make clear the benefits to encourage the acceptance and use of the adopted modern processes. With CALICO institutions this area still needs prominence as Executive Management Teams seem to be indistinct with specifications of the new systems. UTAUT shows that management ought to manage the perceived level of ease of the systems because staff can easily influence each other to use or refrain from using the systems. The perceived ease of use between Executive Management and staff among CALICO institutions vary: staffs always require training with new systems i.e. not easy to use but management do not think it is necessary to train staff on every system being introduced. Therefore the two parties

need to negotiate this as financially what staff require might not be feasible; develop an open communication to achieve a desired perceived level of ease. Ultimately Executive Management urge to offer support for staff to use the systems like training and correct infrastructure: CALICO institutions will be providing training and upgrading infrastructure for the new systems but the degree differs as Management see fits.

Lastly Management will have to treat older staff, age and in later years of experience, with caution as they tend to be closed to modern processes but rather prefer to use legacy systems. Executive Management Teams must be more attentive to older staff and be able to assist with any limitations they might be facing; research showed that physical challenges and difficulty in learning the new technology are the major hindrances among older people (Pew Research Center, 2014:12). Similarly providing more training and support throughout the process can change how the staff perceive the systems and make the environment conducive for learning. Change in focus from academic library, treating the library as a workplace rather than just a service provider because quality of a workplace for workers will no doubt yield a more productive organization (Blessinger & Hrycaj, 2013:1).

Hype Cycle determines when it is safe for an institution to adopt a new technology taking into consideration the institutions risk profile and culture. Hype Cycle shows that as the price and risk of a technology decrease, acceptance level increases as organizations view the product as mature for investment. Looking at CALICO institutions they want to adopt the next generation LMS when they have reached a plateau of productivity as the risk level are relatively low and many system problems have been fixed. This stage seems to be the next few years with next generation LMS as they are developing very fast which correlates to the time the institutions have planned to adopt them.

In general the technology acceptance ethos of Institution A and Institution B seems good with regards to next generation LMS and associated factors: exchange rate, maturity of the systems and priorities. However for Institution C and Institution D a lot still must be done to uproot staff from past experiences as they are still holding on to these which tends to hinder them from seeing the value and exploring new grounds.

5.2.5 Successful implementation

Once management has provided opportunities for staff to enrich their skills and knowledge the next focus is staff perception as this will influence whether staff members will accept

and/or use the implemented systems. Thus there is a need to facilitate the development of an ethos of technology acceptance, flexibility and a lifelong learning culture to ensure the adopted system is used effectively. It was witnessed in the past that institutions do not use the systems to maximum capacity but preferred purchasing additional systems for some tasks: with next generation LMS such behaviour would be expensive and continue to encourage staff to hold-on to legacy systems. Therefore institutions must invest in continuous training, having a person within to train the staff so they can be up-to-date with next generation LMS and effectively help users to configure the systems. Likewise the library needs support from stakeholders in terms of funding and buy-in in order to implement such costly systems. Collins implied that adoption of next generation systems will not be a smooth journey but will have trials and tribulations which will require librarians to alter their operations with ILS (2010:94). For that reason more preparation (education, training and open-mindedness) is critical for survival in such turbulent times as lie ahead.

5.3 <u>Concluding remarks</u>

Building a successful future for the academic library requires institutions to take risks and experiment and not play the "blame game" when systems and procedures fail to perform as expected because risks can be managed but not avoided thus the institutions need to develop a different perception from that exhibited at the present. Management must engage with all staff in the same way they do with students, through surveys and other means, because staff perceptions influence service quality. Thus management has to engage with staff and enhance staff social skills rather than manage through enforcement of specific skills, a process that has been largely ignored in the past. In this way libraries can actively participate in this change that has been brought upon by technology: users have more information options and, thus, library management needs to be bold and wise at the same time (Gremmels, 2013:248).

5.4 <u>Limitations and recommendations</u>

The study was limited to major academic libraries in the Western Cape, thus the same may not necessarily apply to other academic libraries in SA. To get a well-rounded understanding of the perception of executive management towards next generation LMS in the country more research needs to be done to include other academic institutions in SA. Moreover, the views expressed in this study are only those of executive management interviewed. To gain a

comprehensive understanding of the matter, further research is essential to better understand the perceptions of staff at all levels in the institutions.

Management is in a process of employing next generation LMS but it lacks appropriate case studies because most studies come from America or/and Europe where the situations are not the same, so these case studies are inapt and not useful to local institutions. Besides this, case studies that have been presented by vendors of next generation LMS tend to be from smaller institutions, like community colleges, which cannot equate to local universities in size and breadth of collections. Therefore it would be best to locate a case study from similar institutions, and an environment like a developing country, regarding training for next generation LMS. Additionally, a study to understand the requirements from IT service department and technical services sections is essential because implementation of next generation LMS would have considerable impact on these departments and sections.

Next generation LMS require new skills: libraries can train staff to acquire some of these but, for others, they must rely on external bodies, such as library schools. These, in turn, are faced with the need to equip new graduates with industry-relevant skills. Therefore academic libraries must partner with library schools in order to embed these skills in their curriculum to make new graduates more marketable. Finally the library will have to offer market related salaries to recruit staff with the relevant skill sets outside the library field.

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APPENDICES

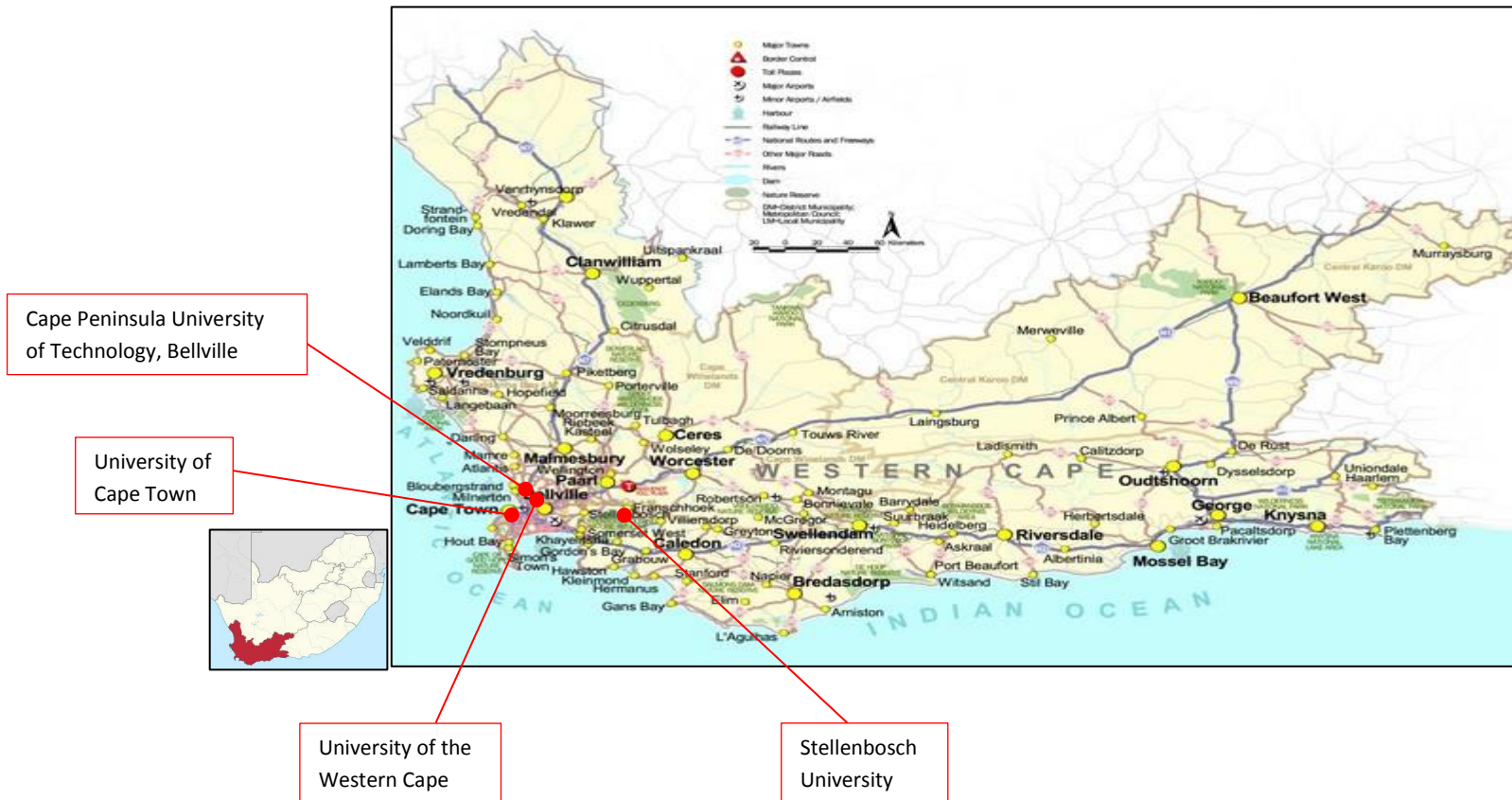## Appendix A: Figures

1. **Map of the Western Cape, South Africa**

Figure 1: Map of the Western Cape, South Africa (accessed from: http://www.mappery.com/map-of/Western-Cape-Tourist-Map)

2. **Library Automation Infographic**

Figure 2: Automation History (Breeding, 2013b)
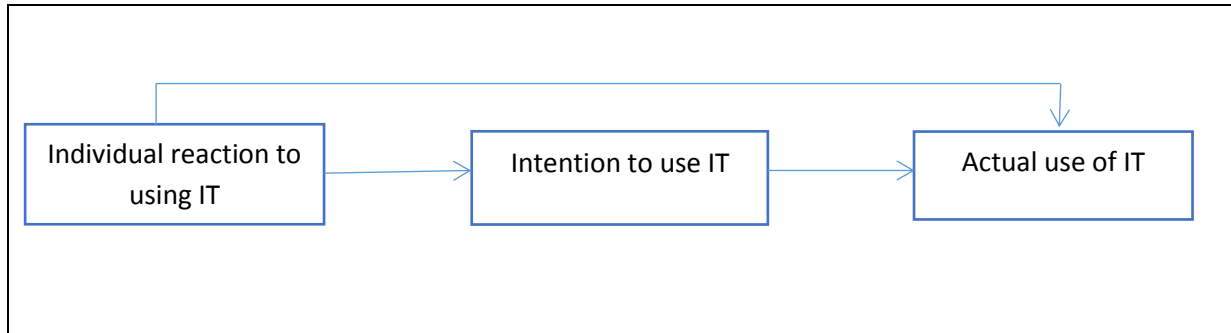
3. Technology Acceptance Model

Figure 3: Basic concept underlying Technology Acceptance Models (Venkatesh & others, 2003:427)
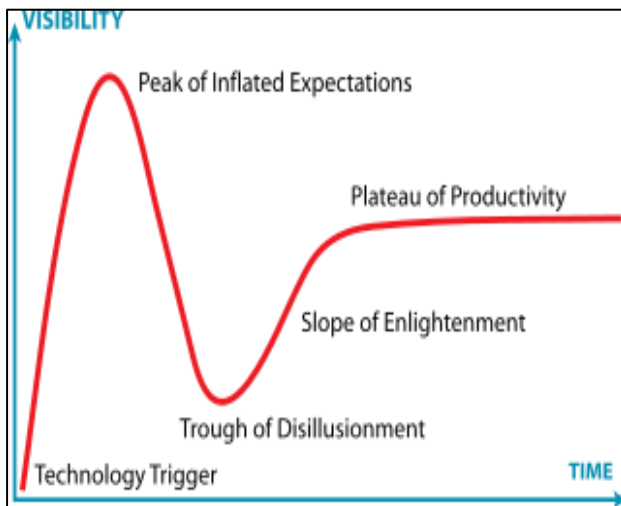
4. Gartner's Hype Cycle

Figure 4: Hype cycle (Gartner, 2014)

5. <u>Institution A Word Cloud</u>

Figure 5: Word Cloud for interviews with Institution A

6. Institution B Word Cloud

Figure 6: Word Cloud for interviews with Institution B
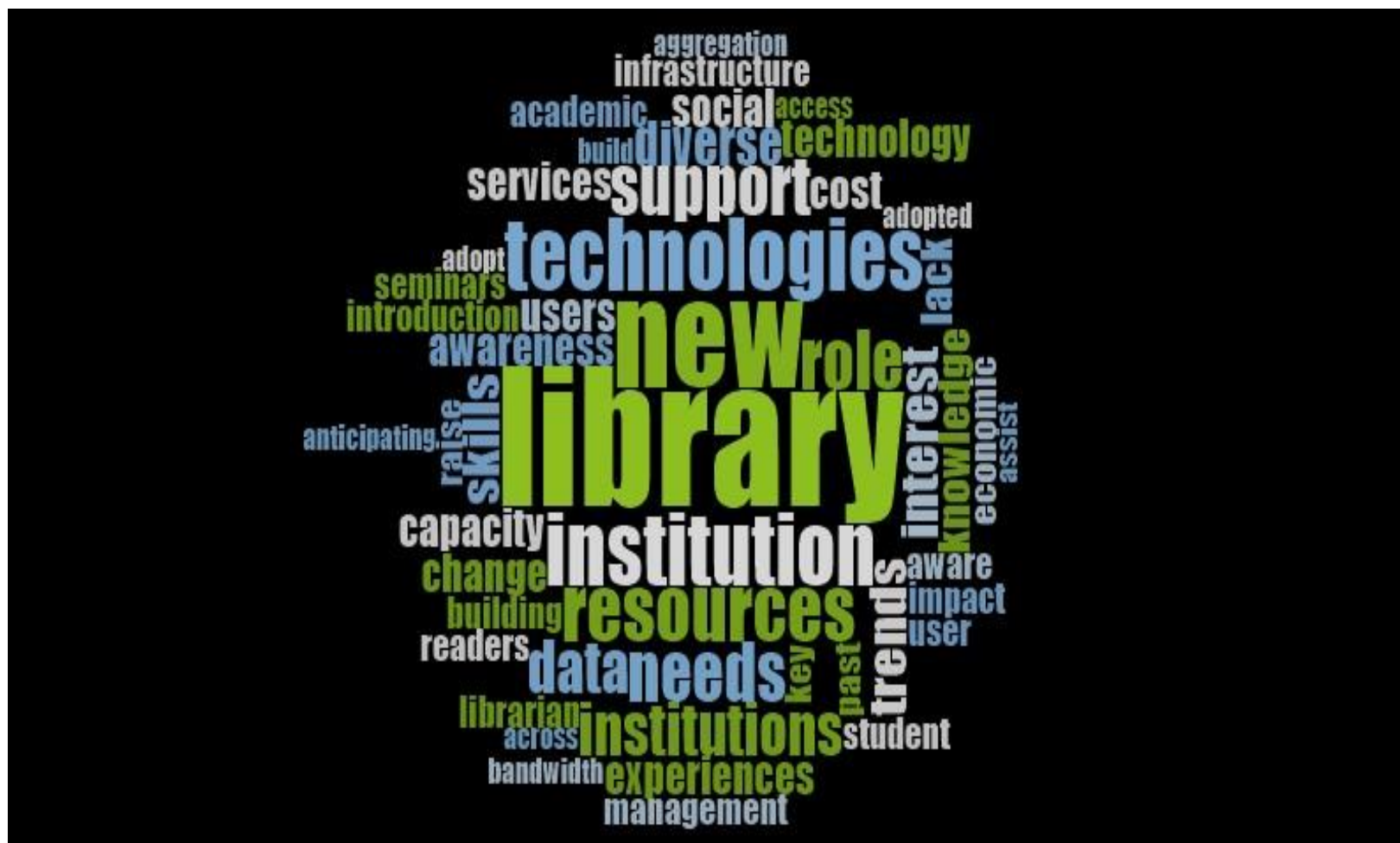
7. **Institution C Word Cloud**

Figure 7: Word Cloud for interviews with Institution C

Figure 8: Word Cloud for interviews with Institution D

Analysis of the approaches of senior management teams towards adoption of next generation Library Management Systems: case study of Cape Library Consortium institutions

I am currently undertaking research towards a Master's Degree in Library and Information Studies at the University of Cape Town. The research topic is, Analysis of next generation Library Management Systems (LMS): case study of Cape Library Consortium (CALICO) institutions.

Next generation LMS provide a new approach to library management and operations. The systems are offered as cloud service which allows easy access; from anywhere (using the internet) computing on demand and the ability to adapt to workloads. The cloud also combines functions that were previously separated, breaking down silos and extending accessibility of library services.

I am conducting research which explores attitudes of the Senior Management teams of the CALICO institutions (UCT, UWC, CPUT and SU) towards adoption of next generation LMS. This field of study is still new and this research will help advance understanding of decisions about new technology use among CALICO institutions.

I would hereby like to invite you to participate in semi-structured face-to-face interview which forms part of my research study. The interview will be 1 hour long. Participation in the study has no perceived risks. Your participation will help the researcher to contribute to the body of knowledge. The study has applied for ethics clearance from Ethics Review Committee of the Faculty of Humanities.

Research Questions

1. Academic libraries are dealing with new and emerging user needs, how are you responding to this change as a manager?
2. To what extent do you think that the introduction of modern processes or services changes the behaviour of staff using the systems? Please describe examples of how staff is responding to the introduction of modern processes or services.
3. What training is, or has been, necessary for effective use of these technologies or services?
4. What impact do you think "next generation Library Management Systems (LMS)" will have on academic libraries?
5. What in your view will be the skills that are necessary for librarians to prepare for "next generation LMS"?
6. Does your institution plan to adopt "next generation LMS"? If so, please summarise the plan.
7. What role does the regional consortium, CALICO, have to play in present circumstances? If so, how would you describe that role and in what ways might the role change?
8. In what way does the role of the IT service department at your institution intersect with that of CALICO?

9. What do you anticipate would be the role of CALICO with "next generation LMS"?

Consent

Subject to your permission, I should like to record this interview for further analysis. **Your participation is voluntary, and should you wish to withdraw from the study you may do so at any time**. Your responses and any information obtained from the interviews will be treated with the utmost confidentiality. It will not be possible to identify your responses from the information to be included in this study. The data will be used for the purpose of this research study only and the record of individual responses will be erased once the study is complete.

I agree to participate in this interview for the purposes of research.

Signed ……………………………

I hope that you will be willing to participate in this study. Please contact me by e-mail at MFNAND002@myuct.ac.za to arrange an interview time. If possible, I should like to arrange an interview with you for an hour in the afternoon in the period 14.30-17.00, during the months of July and August. I cannot, unfortunately, manage Thursdays but any other afternoon of the working week is possible. Should none of these periods be possible, please suggest what would suit you and I will adjust my schedule.

Thank you for consenting to this interview.

If you wish to ask further questions, please contact me directly:

Andiswa Mfengu

Master of Library and Information Studies student

Library and Information Studies Centre

University of Cape Town

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Mobile: 073 780 6112