THE IMPACT OF INFORMATION AND COMMUNICATIONS TECHNOLOGY CHANGE ON THE MANAGEMENT AND OPERATIONS OF ACADEMIC LIBRARIES

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DEDICATION

I dedicate this research project to my wife Edwina for her unwavering love, support and encouragement.

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1. Introduction

Information and Communications Technology (ICT) have transformed Library and Information services globally. The Internet has provided universal access to information. Technological innovation has dramatically increased the rate of conversion of knowledge, information and data into electronic format. Developments in the software arena has generated powerful knowledge management software which has transformed the way knowledge is organized, stored, accessed and retrieved (Tam & Robertson, 2002:2).

The digital revolution driven by ICT innovation has transformed academic libraries fundamentally. It has impacted on every sphere of academic library activity e.g. the form of the library, collection development strategies, library buildings and consortia (Wood & Walther 2000:173). Information and communications technology have changed the academic library in a profound way. Computers and networked electronic resources had become an integral part of the academic library the past decade. This has been underscored by the phenomenon of knowledge or information commons in academic libraries, which refer to a specific environment in the library where a designated number of PC workstations, networked to databases and other e-resources, are made available to students (Bailin & Grafstein, 2005:2).

Every sphere of the academic library is being affected by ICT quite radically. No longer is the library the untouchable custodian of information. It is being shaken to its very foundation, in fact its existence is being threatened. The academic libraries' traditional role of information custodian had been reduced to that of being one of many information providers (Cheng, 2001:32). Of all the information and communication technologies the Internet and particularly the World Wide Web with its graphical user interface, has had the greatest impact on the information revolution (Duff, 2003:6). The number of electronic resources available on the Internet is growing at a phenomenal rate. One of the major search engines Alta Vista has reported in 1996 that it has indexed 30 million Web pages. By 1998 the number of Web pages indexed by this search engine has leaped to 90 million (Waldhart, Miller & Chan, 2000:2).

According to Farrow (1997:320) wide spread publicity has lead to assumptions that the Internet will meet all user information needs and that there will be no need for professional librarian intervention in future between user and information resources. Moyo (2002:2) states that student expectations that all their research needs will be met online are on the increase. Not only do students expect to find the information they need online, they also expect it to be available in full text. According to Tam & Robertson (2002:3) these assumptions have lead to a reluctance to use

the physical library materials and to a decrease of visits to the library. This phenomenon has fuelled fears of potential future job losses amongst librarians (Farrow, 1997:320).

Cheng explores the impact of information technology from an information ecological perspective. In information ecology the focus is not on information technology but on the human activities that are served. Cheng cites Nardi and O'day who draw a parallel between the explosive growth of information technology and the consequential Information explosion and a volcanic eruption. This eruption is impacting on everyone existing with the information ecosystem. Cheng emphasize the importance that we as academic librarians are clear about the challenges posed by this situation and also the opportunities offered. Cheng highlights some of the changes that took place within the information ecology:

- The way we gather information, organize it, disseminate and use information has changed.
- The evolution of the Web has lead to availability of masses of information, electronic journals and databases.
- The way information is being published is evolving rapidly e.g. it is threatening current practices.
- New problems have come to the fore e.g. the issue of intellectual property rights of e-resources.
- User expectations have changed. Users expect full text delivery to the desktop (Cheng, 2001:26–27).

Pugh (2000:2) is of the opinion that the changes that library and information services face are of an unknown and unpredictable nature. He states that it is impossible for library managers to predict future trends accurately. He feels traditional change management techniques are inadequate to deal with the changing environment that libraries are facing. For him it is a scenario where one has to brace oneself for whatever occurs. Under these conditions it is crucial that libraries make optimal use of the entire workforce. It is of fundamental importance that customer service be given top priority. It is also essential that flexible organizational structures be created where workloads and responsibilities are shared and trust and responsibility are the norm rather than control. For library and information services in academic libraries to prevail under these conditions real leadership and real changes in management styles and organizational structures are necessary.

2. Purpose of the study

The purpose of this study is to investigate the impact of Information and Communications Technology (ICT) change on the management and operations of academic libraries, how academic libraries deal with this phenomenon and strategies that could be considered to help deal with an environment where technology constantly change. In this study the researcher will focus holistically on the impact of ICT driven change on the academic library e.g. staff, clients, physical resources and information resources.

3. Concepts defined

Change

Robbins & Coulter (1999:380) defines change as any alterations in people, structure or technology.
Change involves moving from the current state of things, the status quo, to a new state of things. It is therefore a process of moving from what is known to the unknown (Smith, 2005:1).

Information technology

The McGraw-Hill Encyclopedia of Science and Technology (2002:169) defines information technology as "the field of engineering involving computer-based hardware and software systems, and communication systems to enable the acquisition, representation, storage, transmission, and use of information."

Information and Communications Technology (ICT)

Adeyoyin (2005:2) cites Bayode who defines ICT as "the acquisition, processing, storage, and dissemination of information by means of computers and other telecommunication equipment."

The Wikipedia free Internet encyclopedia defines "information technology (IT) or information and communication(s) technology (ICT)" as the "technology required for information processing. In particular the use of electronic computers and computer software to convert, store, protect, process, transmit, and retrieve information".

From the definitions it is clear that the terms IT and ICT are used interchangeably and has the same meaning. According to Jimba (1999:3), information technology is rooted in three sectors

namely information technology, telecommunications and the media and these sectors are converging on one another.

4. Types of change

4.1 Introduction

Del Val and Fuentes (2003:2) define change along a continuum ranging from low-scope (evolutionary) to high-scope (revolutionary) change.

4.2   Evolutionary change

Evolutionary change is incremental by nature (Del Val & Fuentes, 2003:2).
Incremental change is smooth and happens gradually in an organized and predictable way (Senior, 2002:38). Incremental change tends to be small changes that lead to improvement but does not alter the operational structure of the academic library (Del Val & Fuentes, 2003:2).

4.3   Strategic change

Strategic, revolutionary or transformational change leads to radical transformation and often changes the general organizational structure (Del Val & Fuentes, 2003:2). Transformational change tends to be very traumatic by nature. It can be generated as a response to a major crisis or a complete change in organizational strategy or purpose. The outcome of this type of change can lead to organizational transformation to the effect that the organization might look completely different from what it used to be (Molaudi, 2002:39).

4.4   Discontinuous change

The academic library is confronted with change that is unlike anything it has been exposed to before. Management theorists use the term discontinuous change. Pugh (2000:3) notes that discontinuous change is different from revolutionary change that is change undertaken to generate rapid results. Discontinuous change is unique in the sense that established management practices are inadequate to deal with it, in fact there is no model, paradigm or pool of experience that managers can fall back onto. Graetz et al. (2002:17) describes discontinuous change as turbulent, complex, traumatic, uncertain and of a revolutionary nature which requires different management skills to survive, supported by highly trained, motivated, flexible and multi-skilled staff that can be redeployed quickly and effectively if necessary.

There is a stark contrast between the clearly defined boundaries of businesses in the 1960's and 1970's and the postindustrial era that is characterized by volatility, complexity and uncertainty. "This type of random, discontinuous change - which, by definition, is fast, traumatic, and revolutionary – requires very different management and leadership skills if the challenges it presents are to be handled innovatively and opportunistically." What organizations need in order to survive is highly committed, skilled, informed and trained staff which is willing to give their all (Graetz, 2002:16).

Until 15 years ago change was incremental. One could build on lessons learned before. Since then change had become discontinuous. In this climate old management behaviours are inadequate. New ways of doing things are imperative which questions the practices that worked in the past. Information services in the academic library are driven by ICT with all its uncertainties and instability (Pugh, 2000:3).

Change is occurring at a greater dimension than ever before. The volume, pace and complexity of change is increasing at an unprecedented rate. A comparison between 1970 and to-day reveals that in 1970 only 5% of change within organizations was of a continuous nature. Currently 75% of all organizational change is of a continuous nature (Conner, 2003:44).

5. Impact of ICT developments on staff

5.1 Introduction

Managers often introduce drastic change without considering its impact on people. People respond to change in a myriad of ways. Any significant change will impact on people's self-esteem, their motivation to do well, their status or the stress they experience be it positive or negative (Conner, 2003: xi).

It is of vital importance that managers do not overlook people when dealing with an ever-changing environment. According to Morgan (2001: 58) research suggests that 90% of change initiatives fail because people are not taken into consideration.

Change is good for academic libraries but its adoption requires tremendous input of physical, mental and emotional energy. After having to make intense inputs to accomplish change people expect to reach a plateau, a period for review and restoration of energy. The problem is that in the academic library this plateau had become non-existent because one peak follows after the other (Farrow, 1997:322).

5.2 Phases people go through when exposed to radical change

Elizabeth Kubler-Ross has identified 5 stages that patients experience when confronted with personal loss or death. These stages are denial, anger, bargaining, depression and acceptance (Fossum, 1998:31). Conner (2003:132) has used Kubler-Ross's 5 stages as a basis and extended it to 8 stages.

5.2.1 Stability

This is the phase just prior to change where everything is still normal.

5.2.2 Immobilized

When confronted with radical change people initially experience shock, confusion and become disoriented. During this phase people are out of touch with reality (Conner, 2003:132).

5.2.3 Denial

Conner (2003:133) defines denial as a refusal to accept reality. According to Fossum (1998:48) denial is a psychological defense mechanism that kicks in when individuals are confronted with radical change. It is a refusal to accept reality while the person's internal resources are being mobilized to eventually face a situation. To help staff to deal with this phase managers should use techniques designed to promote awareness that change has occurred or is in the process of occurring. The denial phase is a critical stage in the change process and people experience it differently. While some people are still dazed and out of touch with reality others may be ready to move on. Spending time on an individual bases with people struggling with this phase can be very useful (Fossum, 1998:49).

5.2.4 Anger

During this phase people experience anger and outrage. They become emotional, irritated, frustrated and hurt and may often lash out at those supporting them (Conner, 2003:133).

5.2.5 Bargaining

This is a negotiation phase with a view to avoid the negative aspects of change. A typical example would be negotiating an extension of a deadline one is facing. This phase indicates the

person is reaching a position where he or she can no longer avoid reality. This phase also demarcates the beginning of acceptance (Conner, 2003:134).

5.2.6 Depression

It is normal for people to become depressed when confronted with major change that affects them negatively. This is a very unpleasant phase but is an indication that the individual has come to complete realization of the negative change being faced. It is an unpleasant phase but indicates another step towards acceptance (Conner, 2003:134).

5.2.7 Testing

At this point a sense of control is regained. A person might explore how to set new goals (Conner, 2003:135).

5.2.8 Acceptance

At this point people accept change. To go with an employee through the negative response model can be a costly exercise because people need support at every step of the way. However the cost of an employee failing to go through the process can be more costly to an organization (Conner, 2003:135).
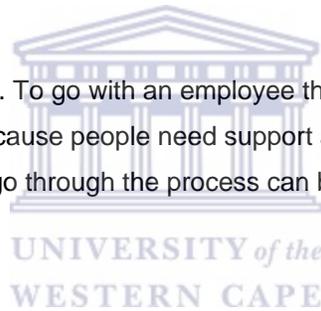
5.3 Resistance

5.3.1 Introduction

Managing change within the academic library is essentially about managing people since it is people that effect change. People who are such a critical factor in change implementation can also be a stumbling block to the change process by resisting change (Smith, 2005:1).

Change initiatives are often shipwrecked because of resistance. Resistance leading to escalation in costs often delays change processes. Resistance is such a central element in change management that it deserves serious attention in the change implementation process (Del Val & Fuentes, 2003:1).
Pugh (2000:170–171) states that one must neither fear resistance nor make efforts to avoid it. He states **" the inertia of systems which have relied on doing things as they have always been done and achieving objectives through well-tried methods is not to be underestimated. It**

is part of the organizational instinct for survival and as well as comfort and complacency and it breeds resistance.”

The successful implementation of change in the academic library is by and large dependent on the attitudes of people to the change process. People respond in different ways to change. Whereas some people will experience change as an exiting and stimulating event others may find it frightening and intimidating and consequently resist change. (Smith, 2005:2).

5.3.2 Causes of resistance

Pendlebury (1999: 199-200) identified the following causes of resistance:
- Lack of realization of a problem.
- Not grasping the implementation of a solution.
- Outright rejection of a solution as it is seen as the incorrect option.
- Fear of the outcome of change.
- Lack of interest.

This kind of behaviour is often the result of a vision not clearly communicated or staff's unwillingness to face up to the demands of change.

Kirkpatrick (2001:20) identifies the following additional reasons why people resist change:
- Security: Fear of potential job losses.
- Financial: Fear of loss of income.
- Pride and satisfaction: Technological innovation might make jobs and skills redundant.
- Freedom: Structural changes might impact on freedom of decision-making.
- Authority, responsibility and status: Restructuring might lead to a loss of authority and responsibilities (Kirkpatrick, 2001: 21).

Resistance tends to manifest itself in many different ways. Conner (2003:128) distinguishes between overt and covert resistance. Overt resistance is open and can be constructive. Covert resistance is submerged and can gain momentum unobtrusively and ruin a project.

Fossum (1998:57) describes covert resistance as a passive-aggressive form of resistance. It is difficult to manage because on the surface a person appears to do nothing but is often busy sabotaging a project through negative statements. In major change there will always be resistance. Creating an environment where people can openly express their fears will go a long way to minimize resistance (Conner, 2003:28).

Managers need to be aware that resistance often manifests itself in an increase in absenteeism, reductions in quality, decreased productivity, strikes or slowdowns and increase in grievances (Fossum, 1998:38).

6. Strategies to facilitate change within the academic library

6.1 Introduction

The prevailing organizational culture will determine how easy or complex it will be to communicate the need for change, share the vision and get people's opinions and participation. In an open culture communication is easiest. The leadership style, the trust people have in top management and the extent to which people are able to openly express themselves is of cardinal importance (Conner, 2003:xi).

Managers who have successfully implemented change understand that resistance is a natural reaction and would encourage it rather than suppress it. They would even reward people for open resistance in a constructive manner (Conner, 2003:129).

Fossum (1998:60) states that clear and open communication about pending change is crucial. Managers must not allow people to hear via rumours or the grapevine or the media about pending change. They should be open and upfront about pending change. Hearing from a third party will undermine trust and credibility. When communicating change it is important to send out positive and optimistic messages. Conner (2003:9) is of the opinion that effective leaders can change people's mindsets to a realization that meaningful change is not only essential but also possible.

Morgan (2001:59) argues that buy-in is crucial in change management. If staff can take ownership of change, it will bolster commitment and assist in overcoming any obstacles. It is also crucial to involve staff in the decision making process. Participation will break the management versus staff syndrome. Instead of letting management do the problem solving it is useful to involve staff at all levels in this process. Managers must be careful not to make assumptions about the acceptance of change. It is better to get accurate feedback through interviews or surveys. (Conner, 2003:xiii).

6.2 Techniques to make change positive

6.2.1 Introduction

Change creates conflict but the negative energy generated can be turned in constructive energy. Managers should realize that conflict in itself is not necessarily negative. It creates an opportunity to do creative problem solving with the staff. Conflict must never be taken personally. If people disagree managers should see it as an opportunity to find a more elegant solution that more staff

members will find acceptable. People should be encouraged to be honest about how they feel and support one another. Managers should maintain their sense of humor. It is essential to cultivate an atmosphere that will transform negative issues of conflict into positive constructive energy (Hudson, 1999:37).

6.2.2 Celebrate success.

It is important to sign-off change to ensure closure and enable people to move on. It need not be a celebration in the real sense. It could be a scenario where the team is thanked for their contribution. It helps to let people see the big picture. In that way they will see smaller change events as temporary unpleasant things to deal with and move on. If change events are seen as individual unrelated events it can lead to resistance (Conner, 2003:xiv – xv).

7. Academic library structures

7.1 Introduction

Organizational structure can be defined as "one of the interrelated components that define any organization referring to the definition of individual jobs and their relationship to each other as depicted in organizational charts and job descriptions." It clarifies how information is distributed, and jobs are organized (Moran, 2001:103).

For decades the hierarchical structure of management was regarded as the most efficient way of managing an organization. This system worked well in and environment where the future was predictable and librarians were in the driving seat (Pugh, 2000:9).

Hierarchies were not designed to foster creativity and lead workers to self-fulfillment. It is therefore very difficult to introduce fundamental change within hierarchical structures which are naturally resistant to change. In an effort to bring about reorganization within organizations institutions try to either modify the existing hierarchical structure or replace it with something else (Moran, 2001:107).

Deming as cited by Mullins (2001:4) states that management systems still prevalent today have had a destructive impact on people. According to Deming "people are born with intrinsic motivation, self-esteem, dignity, curiosity to learn ... " Qualities such as these are undermined by a management style that reward top achievers and punish those that do worse. Managers that exhibit such management styles use disapproval as a negative control measure. This approach

leads to a climate where staff performance is primarily directed at pleasing their superiors and that inevitably lead to average performance.

According to Pugh (2000:5) managers have a natural tendency to maintain the status quo. They would instinctively fall back on models and practices that worked in the past. The volatile nature and unpredictability of information services is forcing managers to adopt new management styles. It is beginning to dawn on people that the bureaucratic way of management is becoming outdated and that change will be more effectively achieved through education, sharing, motivation, teamwork and coaching.

Moran (2001:100) states that unprecedented change has forced managers to re-evaluate structures. Customary practices designed to maintain organizational stability are being questioned. To cope with change, organizations have started flattening structures to induce more flexibility within those organizations. These new structures being adopted have decreased levels of hierarchy, increased flexibility and resulted in diminishing boundaries between departments.

7.2 Issues to consider when introducing new structures

Management theorists are very reluctant to prescribe to a particular structural model but advise that structure should rather be designed to meet organizational needs and goals. Organizations should try and learn as much as possible from others who have implemented organizational change. They should never introduce a structure simply because it is being used elsewhere but always to meet specific organizational needs. Of cardinal importance is to determine how people within the organization will adopt the new structure (Moran, 2001:110).

Al-Ansari (1999:138) share the following points learnt from a process of restructuring at Kuwait University library. Before implementing a process of restructuring it is important to have clear vision, goals and objectives with the focus on service delivery. It is useful to establish a core team to lead the restructuring process. It is vitally important that senior management support the process e.g. a deputy vice-chancellor. It is important to involve the entire staff component, listen to their inputs and concerns since ownership by the staff is vital for successful change implementation. Staff development programs should be part of the process to prepare staff for new functions or roles they may be involved in. After implementation it is important to critically analise the performance of the academic library within the new structure (Al-Ansari, 1999:138).

Managers often do not adapt easily to the flatter less bureaucratic structures that are generally being adopted. Even staff members at lower levels experience this problem. Generally it is very

difficult to introduce change that goes against prevailing organizational culture. Proper planning is needed to take the organization from the existing structure to the new one. Employee input in developing such a strategy is crucial. Research indicates that organizational transformation had been most successful in scenarios where employees had maximum input. Finally evaluation is necessary after change implementation to determine its success (Moran, 2001:110).

In reorganized libraries structures are always flatter resulting in manager's roles reverting from directing to coordinating. The prime purpose of reorganization is to create a more effective organization. Reorganization results in academic libraries becoming learning organizations. The learning organization is characterized by staff empowerment, is team based, decentralized, practices participative management and information sharing. In the learning organization the person closest to a problem has the responsibility and authority to deal with it (Moran, 2001:107-108).

Tom Wilson as cited by Moran (2001:100) states that the academic library is in bad need of reconstruction. To Wilson academic libraries were essentially designed to manage physical artifacts. The rise of the Internet has completely transformed the way information is created, distributed and accessed. The e-journal is a typical example.

Johansen and Swigart as cited by Moran (2001:109) states "we had outlived the usefulness of models from the Industrial era but don't yet have robust organizational models for the information era". It is therefore of paramount importance that academic librarians continuously re-evaluate current structures and through an experimental process adopt new models. Moran (2001:109) states that for people who advocate restructuring there is good and bad news. The good news is that people understand that technological change will compel fundamental organizational change. The bad news is that there is a lack of urgency. Generally organizational change appears to be incremental rather than radical.

8. Impact of ICT change on academic libraries

8.1   Introduction

Anita Lowring as cited by Herrington (1998:382) is of the opinion that the Internet has made information access and retrieval both simplistic and complex. Information retrieval systems are being designed to suit the needs of end users and therefore try to simplify the process. Simultaneously however the user is overwhelmed with so much information resources and choices that the process becomes complex. This creates a situation where the users need skills and knowledge in terms of search strategies and conceptualisation. Herrington (1998:383) is of

the opinion that information literacy instruction at the point of need can be very effective. Wood & Walther (2000:173) is of the opinion that unlike popular believe the Internet will not completely replace the skills of professional librarians but rather make them indispensable.

## 8.2	Changes in the job description of academic librarians

An overview of the core competencies required by academic library and information workers gives one an idea of how dramatically information and communications technology has changed the library profession. Cheng (2001:31) identifies the following core competencies needed by the future librarian:

- Good communication skills.
- Should be more than just computer literate and should have a good understanding of ICT and its relation to information resources.
- Should have an in-depth understanding of organizational and user needs that is research based and should organize library resources to satisfy those needs.
- Competent in Web publishing techniques.
- Skilled in manipulating metadata to organize digital information.
- Skilled in training users in the use of e-resources.
- Skilled in filtering, evaluating and appraising Internet information.

Wood & Walther (2000:173) identifies another quality required, an in-depth understanding of what information resources are available on the Internet, as well as insight in terms of its reliability and scope.

## 8.3	The changing nature of the academic library

ICT is busy transforming the nature of academic libraries. A variety of terms such as hybrid, digital and virtual library are used to refer to the academic library. A digital library can be defined as "a managed collection of information, with associated services, where the information is stored in digital formats and accessible over a network". The virtual library has been defined as "remote access to the contents and services of libraries and other information resources, combining an on-site collection of current and heavily used materials in both print and electronic form, with an electronic network which provides access to, and delivery from, external worldwide library and commercial information and knowledge sources". Hybrid libraries are libraries that provide access to both electronic resources and paper-based resources (Ferran, Mor & Minguillon, 2005:2-3).

From the definitions it is clear that most of today's academic libraries fall in either the hybrid or virtual category.

The library of the future is unlikely to be a physical entity as we know it but would probably be a Web portal providing access to information. The emphasis will be on access to information rather than physical ownership (Wood & Walther, 2000:173). Akeroyd (2001:71) supports this view and states that as a physical space entity the library, as we know it is unlikely to prevail in a digital environment. One reason for this is that because of Web access the digital library is accessible from anywhere.

8.4 Changes in the information seeking behaviour of users

Academic librarians have a good understanding of the tremendous value of printed and electronic resources available to students at academic libraries. Academic library users do not necessarily share this insight. New generation academic library users have a preference for Web resources rather than visiting the library. (Marcum, 2003:2). Hiller as cited by Callinan observed in 2002 that University of Washington students would visit the library to study rather than using books and periodicals. Seiden et al. as cited by Callinan reported that students from Skidmore College in New York had a definite preference for digital resources. Research done on undergraduate engineering students in 2004 revealed that they would turn to the Internet as the primary resource for information for their projects (Callinan, 2005:1).

Moyo refers to a scenario where users were asked what they expect from an academic library service. They responded as follows:

- All resources should be available in full text and be printable.
- The library service should be fast and easily accessible.
- 24/7 availability of a virtual reference service.
- Wish to do all library transactions online.
- Web resources that is easy to use and Web search engines that meet information needs (Moyo, 2004:2).

What is clear is that new generation academic library users prefer the convenience of digital access above reliance on assistance from librarians. This preference for the Internet poses a serious challenge to the academic library which has to move from a paradigm of the library as a physical entity to a library where the users do not have to come to physically to make use of it's services (Marcum, 2003:1).

Electronic access to information resources does have many advantages e.g.

- Multiple access which implies more that one user can access a resource simultaneously.
- Lots of resources are available in full text.

- 24/7 access which means users can access resources remotely e.g. from off campus or from dormitories.

One of the disadvantages of remote access from an academic library point of view is that users are not always aware of the fact that they are using library resources. One user stated: "No, I don't need to use the library, I use Internet resources" (Moyo, 2004:4).
Despite the apparent preference for digital content the need for access to high quality digital content remains constant. Greater cooperation between library and faculty is necessary to develop ways to connect users and high quality digital materials (Marcum, 2003:1).

9. Impact of ICT on collection management

9.1 Introduction

Collection development can be defined as the selection and acquisition of library materials based on current and potential user needs. Collection management goes beyond this. It is concerned with managing the utilization, storage and accessibility of a collection. Collection development can thus be seen as a subdivision of collection management (Singh, 2004:1).

Academic librarians find themselves in an era of unparalleled access to information. The latest edition of Uhlrich's has indicated the availability of more than 172 000 journal titles. Although this appears to be a most ideal situation it is not because the financial resources available in acquisitions departments have not necessarily increased. The sheer volume of information available also makes selection of the most suitable information a complex task (Fisher, 2003:463).

The impact of electronic resources has made collection management a very complex and challenging task. There are budgetary constraints, numerous formats, ever changing user needs. Collection management implies involvement in tasks such as analysis of needs, negotiation of contracts and evaluation of resources (Singh, 2004:4).

There was a time when the size of an academic library collection determined its stature. At that time the library's resources were generally adequate to meet most of its users needs. Since then the academic library has exchanged the ownership model for an access model where physical location becomes completely irrelevant (Singh, 2004:1).

9.2 Access versus ownership

Information and communications technology has had a fundamental impact on library collection development policies. Academic libraries had traditionally applied an ownership or just-in-case approach to collection development. The premise was that users would need the material and make use of it (Moahi, 2002:1). Having the material available in the library would also provide immediate access to it than having to borrow it from a third party. The cost of maintaining collections and increased demands for more information had forced academic libraries to reconsider the ownership model and adopt another model (Al-Ansari, 1999:133). Unparalleled price increases and shrinking budgets had ushered in a new model called access or just in time where the focus is to give the user the information that they need when they want it (Moahi, 2002:1).

9.2.1 Advantages of the access model

9.2.2 Cost

Technically it is more cost effective to produce an e-resource, for example an electronic journal, because the first copy costs are reduced. There is also savings in terms of packaging, delivery and storage. In practice these savings have not lead to reductions in the cost of e-journals.
It has been suggested that the academic library adopts a pay-as-you-use approach. This make sense according to research done in 1997 that indicated that 22% of science articles published in 1984 were never cited for the next 10 years. In the social sciences this figure goes up to 48% (Moahi, 2002:2).

9.2.3 Storage space

With the access model there is no need for storage space e.g. back copies. Moahi (2002: 2) cites Cooper who states that the storage cost per single copy is between $25 and $40. Calculations to determine JStor pricing lead to the conclusion that the cost per single volume was between $24 and $41. When costs for re-shelving and maintenance were included, the estimated cost rose to $45 per title per year for a core journal and $180 per title per year for a large research library (Moahi, 2002:3).

9.3 Enhanced access to information

One of the benefits of ICT is enhanced access to library services and resources. The academic library can expose its users to a much larger collection than it can house physically because users can access information remotely. With online access it is possible to accurately measure utilization of e-resources and that is invaluable in determining which resources to purchase. It is easier to search e-resources and access speed is greatly enhanced. Other advantages are that users can simultaneously access the same resource, and there are no incidences of lost copies or mutilated issues (Moahi, 2002:2–3).

Singh (2004:4) is of the opinion that a paradigm shift is taking place within the academic library as more academic librarians are doing collection management rather that collection development. The focus is rather on interpretation of information rather than selection. Librarians are becoming knowledge managers rather than collection managers.

9.4 Digital preservation of data

One of the major costs facing the academic library is the cost related to the conversion and preservation of information in digital format. The cost of this process amounts to $1 per page. This does not include the cost relating to the annotation for indexing purposes and the cost of conversion of audio-visual material. One of the problems with converting records into digital image is the fact that the technology used to store these pages as a digital photograph results in large files which have storage implications and place demands on band-with (Wood & Walther, 2000:175).

Funding allocated to preservation of digital material is generally inadequate. This has to do with expectations that the costs of digital preservation over length of time might be very high. It is also difficult to forecast cost in terms of how long to retain digital material in an archive and computer architectures needed to access material (Lavoie & Dempsey, 2004:5). Preservation of digital materials poses many challenges. It is further complicated by the fact that computer technology changes at an unprecedented rate. There are concerns that changing interfaces, standards, formats and operating systems will render it impossible to read today's computer discs at some point in future. The implication of this is that one needs migration strategies to move data to new operating systems and structures or have scenarios where computers can simulate data structures and operating systems of previous eras. This scenario will make digital preservation prohibitively expensive (Cathro, 2001:337-338).

A great deal of current research into digital preservation is based on overcoming the technical issues to ensure long-term preservation of digital content. The issue of digital preservation initially came to the fore as an impending crisis. Fears were expressed that large portions of our cultural heritage were in danger of disappearing forever. Examples were cited of Web sites available today that might be gone to-morrow. Although digital materials are more fragile by nature than analog materials the risk varies within different categories of digital materials. Although it is true that a Web site currently available may disappear overnight, the same does not apply to electronic journals. This realization has transferred the focus from the immediate rescue notion to an approach that sees digital preservation as part of a carefully planned digital access management process (Lavoie & Dempsey, 2004:2).

One way academic libraries can deal with digital preservation is through cooperation. Through cooperation various institutions can share costs. Another advantage would be that it would reduce redundancy (Lavoie & Dempsey, 2004:6). Because of the fragile nature of digital materials libraries cannot put off decisions to preserve digital information *ad infinitum*. Time is of the essence. Unlike a book that can be repaired or rebound, once a digital file becomes corrupt it may be impossible or prohibitively expensive to restore the data (Lavoie & Dempsey, 2004:2). Another problem facing the academic library is the long-term preservation of digital information. There are questions concerning the long-term stability of digital information stored on disks and tapes. There is the potential of these media deteriorating over a period of time (Wood & Walther, 2000:175).

Another way digital preservation is approached is by letting the vendors do the preservation. These days there are also escrow repositories e.g. Elsevier has agreed to provide the National Library of Netherlands with a copy of Science Direct which the National Library will maintain and make available should Elsevier be unable to do so (Lavoie & Dempsey, 2004:6).

10. Electronic resources

10.1 Introduction

ICT has fundamentally changed academic library collections. Forever gone is the era when an academic library's physical collection determined its stature. In the modern networked technological era the emphasis has shifted from ownership of physical resources to access to electronic resources that are globally accessible (Singh, 2004:1).

10.2 Internet information

There are huge amounts of unedited information on the Internet. There are countless Web sites and no single listing of them all. There is also the phenomenon of Web sites disappearing overnight that create problems in terms of access (Singh, 2004:4).

10.2.1 The invisible Web

Academic library users make use of search engines such as Google and Altavista to find information on the Web. As a result they are only exposed to a small portion of the Web called the "Publicly Indexable Web" These students are only exposed to Web pages accessible via hyperlinks. Search engines do not index Web pages that requires authentication or Web pages behind search forms. The Web consists of two components namely the "Publicly Indexable Web" also referred to as the visible Web and the invisible Web. The invisible Web refers to all those information resources available yet not indexed by conventional search engines yet accessible via the Web (Ru & Horowitz, 2005:1). Masses of information available via the invisible Web are found in subject databases. Most of the databases that academic libraries make available to their users resort under the invisible Web e.g. EbscoHost and Eric (Devine & Egger-Sider: 265).

Conventional search engines can find databases such as EbscoHost but cannot access them. Search engines can only find content that was indexed by their software called spiders or crawlers. The problem is that they only index Web content available in formats such as HTML and PDF (Portable Data Format). Michael K. Bergman in year 2000 in a paper on the invisible Web for an Internet Search Company called Bright Planet suggests that the invisible Web is 500 times larger that the visible Web with approximately 550 billion documents (Devine & Egger-Sider: 265).

10.2.2 The issue of quality of resources available on the visible Web.

The Internet had become a very important research tool for academic endeauvour. Slaouti as cited by Stapleton (2003:1-2) notes that the relevance and importance of the Web as a research tool should not be underestimated. There is a stark contrast in the way resources are published on the Web versus traditional publishing. In the traditional print environment publishing generally was done by a publisher hence a controlled environment that impacted on quality as well as the scope of the audience being reached.

The open nature of the Web, the development of sophisticated search engines, browsers, Web creation and publishing software and easy access to networks via low cost connectivity has developed the Web into a tool that can be easily utilized by the masses for publishing purposes, people who were formally shut out of the publishing process. This has lead to a flood of Web publications of variable quality. During the 1990's library scholars recognized this dilemma and suggested criteria to evaluate Internet resources e.g. authority, purpose, coverage and objectivity and accessibility. These days a single search can yield hundreds of thousands of items. The unfiltered nature of Web resources has made evaluation of these resources essential. One often finds that unlike in traditional printed media, e-resources found on the Web often lack important criteria such as author or date. Web pages because of its non-linear textual nature has added new effects to the search process such as sound, videos and access to thousands of items by clicking a mouse. These new elements imply that new sets of skills are required on the part of the researcher (Stapleton, 2003: 1-2).

10.3 Reference works

According to Moyo (2002:1) reference statistics in academic libraries are plunging. At the same time electronic access of these resources are increasing. This tendency can be ascribed to the fact that users can access these resources remotely via the Internet (Moyo, 2002:2). Internet connectivity and e-resources had become absolutely essential for the new reference service paradigm. One of the key elements of e-reference service success is that the service is available at the point of need (Moyo, 2004:4).

The tremendous growth in the use of online reference works has created a need within the academic library to develop services to support this type of service. Academic libraries are turning to on-line real time reference tools also referred to as ORR to support students remotely. The Pen State University library has more than 300 databases that students may access. On-line real time reference support is used to assist students at the point of need (Moyo, 2002:2). E-reference works share all the benefits of e-resources e.g. 24/7 remote accessibility, concurrent access for multiple users and the potential for online updating to keep content up to date (Sowards, 2003:4).

Electronic communication had become the primary mode of communication in e-reference services. Online chat had become the method of choice. Some e-reference application providers have added Voice over IP (VOIP) to their products which enable voice dialogue with the library user. E-reference services have many advantages e.g.:
- Availability via the Internet.

- Service at the point of need.
- Easy for people who are unable to come to the academic library e.g. the physically disabled.
- 24/7 availability (Moyo, 2004:5).

Moyo (2002:5) cites Stormont who states that online real time reference support is very labour intensive. In order to cope academic libraries have adopted a distributed staffing model where the load of the service is shared among various libraries.

10.4 E-Journals

10.4.1 Introduction

The e-journal can be defined as "a version of the traditional print or paper-based journal which is disseminated electronically in some form or other directly to the end user." Although e-journals had been in existence since 1976 it became prominent during the 1990's (Rao, 2001:4).

Since it's inception in 1665 the printed journal remained the primary vehicle for communication among academics and researchers. The advent of the Internet transformed publishing radically as it made it possible to publish cheaply. Internet also made access universally available. Because of the Internet academics and researchers became more creative and productive (Rao, 2001:2).
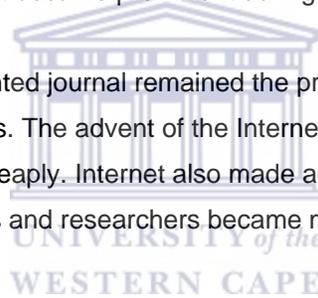
10.4.2 Cost factors

There had been major increases in the cost of journal subscriptions during the last two decades (Moahi, 2002:1). According to Rao (2001:3) between 1986 and 1996 the average increase per journal subscription had been a whopping 147%. This state of affairs had been laid at the door of the commercial publishers. Moahi (2002:1) states that simultaneously there had been a significant increase in the number of science and engineering journals published. Because of ever decreasing budgets academic libraries are unable to purchase the titles they deem necessary.

Falk (2004:1) cites McCabe of Georgia Institute of Technology stating that publishers offer libraries bundled packages of e-journals under the pretense that it is cheaper but these deals actually inflate prices. Moahi (2002:4) is of the opinion that a consequence of these bundled deals is that academic libraries end up with titles they do not want or need. Despite the fact that

publishers have substantial cost savings on first copy production of e-journals and also save on distribution costs, these savings are not passed onto their customers. Cost of e-journals tend to be similar or higher that their printed counterparts. What further complicate matters are the fact that provision has to be made for connectivity and desktops, which means additional costs. Aggregate publishers also tend to drop titles without prior consultation with academic librarians (Moahi, 2002:6).

10.4.3 Academic library's response to publishers

Despite general expectations that e-journals should be cheaper than printed versions publishers maintain the status quo by maximizing profits (Falk, 2004:2). Publisher's attitudes have forced academic institutions to take a tougher stance against them. Recently the Senate of the University of California instructed the library to sever all ties with Elsevier, e.g. cancel subscriptions and cease submission of research papers if negotiations with them fail to obtain a reduction in the price of subscriptions. Harvard University has cancelled their Elsevier subscriptions of bundled journals. The Senate of North Carolina State University urged that excessive prices from publishers be resisted. Four North Carolina universities had signed a deal for a bundle of 1300 journals in 2003 with the proviso that no titles are dropped. When these institutions wanted to renew subscription for 2004 the price was so exorbitant that they all cancelled the deal. Cornell University and the University of Missouri also cancelled subscription with Elsevier for the same reasons (Falk, 2004:2).

Three North Carolina universities have drafted policies to only forward research to publishers whose journals are reasonably priced and widely accessible. In the event of this not being possible they will include an "authorization to publish' clause in contracts that empower the author to retain copyright to reproduce research for academic and research purposes. Kansas University includes a clause in their contracts that give them permission to use their research for teaching and research purposes and retain the right to make it available on public accessible Web sites (Falk, 2004:3).

10.4.4 Open access journals

The open access initiative is aimed at making scholarly research freely available via the Internet (Correia & Teixeira, 2005:7). Open access journals are journals available on the Internet for academics, researchers and the general public. The open access journal philosophy received a tremendous stimulus with the birth of the Public Library of Science (PLoS). At its conception 30 000 scientists promised their support in terms of submitting research.

The first open access journal to emerge was PLoS Biology in the year 2003 which was received with great enthusiasm. In the publishing arena the Biomed Central publishing house embarked on free access to peer-reviewed journals. Recently the Directory of Open Access Journals (DOAJ) made open access journals available covering different languages and subjects (Falk, 2004:3).

10.4.5 Open access archives

Many leading universities are setting up electronic archives as depositories for their research output and are granting access to it. There are plans in progress to use theses archives as a platform to provide open access journals. The Massachusetts Institute of Technology (MIT) has made software (Dspace) freely available for managing electronic archives. Currently there are approximately 140 universities that have established open access archives. The number of journals held in these archives have increased from 20 000 in 2001 to 1.3 million in 2003. Although this is still fairly insignificant compared to the 2 million peer reviewed journals printed annually it nevertheless sends out a clear warning signal to commercial publishers of what is to come. In Europe the Open Archives Forum was established. The goal of this forum is to establish electronic archives and make it globally available (Falk, 2004:4).

10.5 E-Books

10.5.1 Introduction
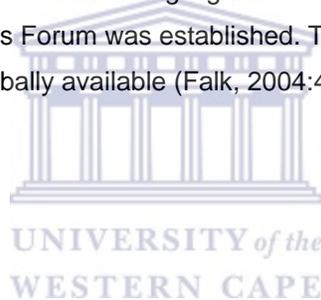
There are various definitions for e-books but e-books are essentially published books and reference materials that were digitized and are distributed electronically (Secker, 2004:17).

In the year 2000 e-books were heralded as the new publishing revolution. One market research company predicted that by 2005 there would be 1.9 million users. Forrester Research predicted that income generated from e-book sales would increase from $9 million in 2000 to $414 million in 2004. Unfortunately e-book popularity never rose to expected heights. Despite the negativity surrounding e-books it had not demised completely. There are still some companies dealing with e-books that are profitable and experiencing growth (Hawkins, 2002:1).

One of the first commercial e-book services, NetLibrary, was established by OCLC in 1998. The NetLibrary collection has since grown to over 400 000 titles. The shortcoming in the NetLibrary system is the fact that an e-book can only be used by one user at a time. Questia, another commercial e-book service went live in 2001. Their target market was students and they

employed librarians to manage collection development. By 2003 Questia had more than 400 000 titles from more than 200 publishers (Secker, 2004:18).

10.5.2 Advantages of e-books

E-books have numerous advantages. There are no printing, storage, warehousing and shipping costs. Consequently e-books can be published at costs much lower than conventional books. Additional advantages are online availability, keyword-searching capability, cross-referencing, adjustable fonts, electronic bookmarks and imbedded audio. Updating e-books will be easier than re-editing conventional books. From an academic library point of view benefits would include cost savings in terms of shelving, binding, circulation, overdue notices and management of fines. All needed would be a person to maintain the collection and a person to manage user accounts (Grant, 2002:2).

Print collections in academic libraries are very expensive to acquire and maintain. E-books are also environmentally friendly in the sense that no tree pulping is necessary to for its production. The flaws in current e-book technology will be overcome. When that day dawns e-books being much cheaper to produce and publish than printed books as well as economies of scale will tip the balance in favour of e-books (Grant, 2002:4).

10.5.3 Disadvantages

The devices needed to read e-books are relatively expensive e.g. hand held devices, PC's and laptops. In order to minimize piracy publishers use proprietary hardware devices and software platforms. This lack of universal standards is a problem (Grant, 2002:1).

The question many ask is whether e-books pose a threat to libraries. Can it eventually put libraries out of business (Grant, 2002:4). Although e-books did not take off as well as expected within the public domain, the use of e-books at schools, colleges and universities are rapidly increasing (Falk, 2003:64-65).

10.5.4 Use of e-books

Falk (2003:65) refers to research done by Forrester that indicated that 4 million e-books were sold at campus stores in year 2000. Forrester forecasted that by year 2005 e-book sales should have increased to 140 million. Research indicates that students are developing a preference for e-books above printed books. At the University of Rochester Rush Rhees Library course reserve

section students were exposed to printed books and their e-book equivalents. Statistics compiled on a weekly base indicated a three to one preference in favour of the e-books (Falk, 2003:65).

11. Some of the problems relating to electronic resources

Online full text implies availability of articles rather that the entire content of a particular journal. The complete contents of a publication are seldom put into a full text database. This implies that an author one might have seen in a physical publication may not be traceable in electronic format. This predicament also applies to archiving where there is uncertainty about the percentage of a journals content that is archived in digital format (Fisher, 2003:465). Another concern is that the academic library in a sense has lost control over the resources it make available to its users. When academic libraries subscribe to aggregator databases e.g. EbscoHost or ProQuest they subscribe to a service, a list of titles bundled together of which many are useful and many not so useful. One of the problems is that aggregators sometimes drop titles. Typically this would happen when publishers withdraw all their titles. In such cases those publishers' titles get dropped as was the case with Sage Publications. The Chronicle of Higher Education has reported in 2003 that Elsevier has been removing articles from aggregator files because of various reasons e.g. scientific misconduct, plagiarism and errors (Fisher, 2003:466).

On the Web there are masses of information available. With search engines e.g. Google or Yahoo one may find useful information and record the URL or title. There is however no guarantee when one wants to revisit the site that it may still be available. Sites on the Web sometimes disappear overnight. An organization may have merged with another one or the host server might have become dysfunctional. The quality of information available on the Web is also sometimes questionable. Any individual with access to the Web and basic hardware and software can publish on the Web regardless of whether the person's views are factually correct. On the Web are more than an estimated billion Web pages and this create problems for users of the academic library to distinguish between what is useful or not. Another problem is that search engines cover only a small portion of what is what is available on the Web. There are lots of information behind firewalls and thus inaccessible. Many crawlers of search engines only focus on html and ignore graphics. Generally ASCII files will not be found. To assist users academic library services should try and inform users when sites have relocated or are no longer available (Fisher, 2003:469-470).

12. Changes in the educational environment

12.1 Introduction

ICT have changed every fiber of society including education. Lifelong learning has become essential. A very competitive working environment has influenced this. Even educational methodologies have changed. Greater interaction between learner, educator and material is becoming the norm. Learners have greater choices in terms of curricula. The 24 hour networked classroom became reality leading to the birth of the virtual library. Network technologies and new educational methodologies have empowered learners, given them a greater measure of control and participation in the learning process and enabled network interaction with both fellow students and lecturers (Tam & Robertson, 2002:2).

Change in institutions of higher education will compel academic libraries to change accordingly. The most dramatic change according to visionaries will take place in distance education. This was a direct influence of the Internet. When the day dawns when distance education becomes the norm, universities the way we know them may vanish and virtual libraries may become a reality. Recently an author warned that the railroad managers overlooked the fact that they were in the transport business. He noted that universities must remember they are in the education business and not the campus business. If campuses disappear libraries will disappear. There are already examples of cyberspace universities e.g. Phoenix (Moran, 2001:111). If academics should fail to restructure their institutions' external forces will do it. Of cardinal importance is to focus on what education wants to achieve and how one can fulfill it. Survival of the academic library will depend on its ability to continuously reshape and reorganize (Moran, 2001:112).

12.2 Distance education

New technologies driven by ICT innovation have enhanced the virtual delivery of academic programs and stimulated unparalleled growth of distance education at institutions of higher learning (Moyo & Cahoy, 2003:1). The phenomenal growth in distance education technologies has lead to an escalation in the availability of online academic programs and a tremendous increase in remote users (Moyo, 2002:3). In order to support these programs academic librarians have developed excellent portfolios and programs for remote students. One aspect that is neglected is evaluation of these programs. What is of critical importance is to establish how these programs are used, which ones are used more frequently than others and why (Moyo & Cahoy, 2003:2). Monash University library in Australia provides online curriculum content to their

students all over the world. The university library provides online access to more than 440 online databases, 140 000 e-books and 20 000 e-journal subscriptions. Apart from full text databases and e-books the university library also provides digital audio recordings of lectures that become available minutes after conclusion of lectures (Ho, 2004:168-170). According to Ho (2004:174) Monash University library has made a paradigm shift to a complete new service module that utilizes e-commerce technologies. Moyo (2002:3) is of the opinion that the transformation in distance education has created a need for distance librarianship.

12.3 Changes in scholarly communication

The rising of the Internet and subsequent Web during the 1990's has resulted in the decline of the printed journal as the principal medium of scholarly publication (Correia & Teixeira, 2005:3). The costs of journals have increased dramatically driven by commercial publishers trying to control research content. This resulted in depriving many researchers of access to needed resources. The Web has also made fast and easy electronic publication possible and has increased direct communication between researchers (Tam & Robertson, 2002:3).

Publishers immediately started making electronic versions of printed journals available on the Web. This was however seen as perpetuating the status quo in a new medium. Scholars started seeing in the new technology the potential to develop a new model for publishing research and an opportunity to return ownership of scholarly output to the rightful owners of the research. These sentiments were driven by shortcomings in existing scholarly journal publishing which were:

- The time to publish an article was to too long.
- The existing model demanded transfer of copyright to the publishers.
- A too rigid peer review system that tends to favour publication of authors from the more prestigious institutions.
- Journal prices had become unaffordable.

One of the outcomes of this dissatisfaction was the birth of the e-print which is essentially an electronic version of a research paper. E-prints lead to the development of e-print repositories that are an archive of e-prints accessible to the public. Some of the advantages of e-print repositories are the reduction of publishing barriers, increased visibility of research and rapid dissemination of research results to a wide audience (Correia & Teixeira, 2005:3-5).

12.4   Consortia collaboration

Initially libraries got involved in consortia in order to reduce costs particularly with regard to the acquisition of e-resources (Bosseau, Martin & Hirshon, 1999:1). Consortia development is thus an attempt to maximize limited resources through co-operation and resource sharing. In the

consortia scenario the emphasis is on access to information rather than ownership (Darch, Rapp & Underwood, 1999: 3). Consortia collaboration provides more power when it comes to negotiating contracts. It also provides a platform for libraries to co-operate in terms of services (Hooper, 2001:76).

Nowadays libraries also turn to consortia to provide advice and guidance in complex decision-making. The input of consortia is also valuable in terms of evaluating e-resources in terms of quality, different options e.g. whether to subscribe to journals or pay article-by-article (Bosseau, 1999:1-2).

12.4.1 The South African scenario

In terms of network infrastructure South Africa is not on par with first world countries where consortia cooperation is very effective. For the establishment of an information society in South Africa proper connectivity infrastructure is an absolute prerequisite. There is an uneven distribution of telecommunications infrastructure across South Africa stemming from the political ideologies of the apartheid government (Darch & Underwood, 1999:2). This inequity is also prevalent in South African academic libraries. Institutions for the privileged white people were well financed and resourced under the apartheid regime. Institutions for blacks (Indian, Coloureds and Africans) were under funded and thus under resourced; hence the distinction between advantaged and historically disadvantaged institutions. Because of this there are great differences in wealth and the collections of academic libraries.

In South Africa there are 5 academic library consortia.
1 CALICO (Cape Library Cooperative) based in Cape Town
2 ESAL (Eastern Seaboard Association of Libraries based in Kwazulu-Natal.
3. FRELICO (Free State Libraries and Information Consortium) based in Free State
4. Gaelic (Gauteng and Environs Library Consortium) based in Gauteng.
5. SEALS (South Eastern Academic Libraries System in the Eastern Cape.

Essential for the development of successful consortia is low cost tariffs coupled with high bandwith connectivity. Academic institutions constantly engaged with government agencies to achieve this ideal (Darch, Rapp and Underwood, 1999:3 -5).
Library consortia can also be invaluable in assisting member libraries with change management because "An organization needs external coaches to catalyze, guide and facilitate a change process", the reason being that people within the academic library are sometimes to closely

involved with daily activities to see things objectively. An outside view often helps to see things in the right perspective (Bosseau, 1999:1-3).

13. ICT management issues

Libraries are caught midstream between print versus a digital setup. To navigate the transition from print to digital remains enormously challenging. Rapid ICT development had resulted in lots of incompatible systems being used within libraries. To manage ICT is a complex and daunting task. To select the right ICT technologies is a major management issue. It is very difficult in a world where hardware and software changes at a phenomenal rate (Hooper, 2001:74-75).

The shift in the academic library from printed resources to electronic resources that are accessible via campus networks or remotely and the fact that users can even request services via the network has lead to a decline in users visiting the library. The growing electronic nature of the academic library is resulting in it becoming less visible as a physical entity to its users (Borgman, 2003:653).

 What is also disturbing is the fact that users are often oblivious to the fact that they are using library resources because of the seamlessness of access. Users are not aware of the fact that to make those resources available are costly in terms of subscriptions, infrastructure and staff. Academic libraries need to find a way to reverse this scenario of the library loosing its visibility (Borgman, 2003:656).
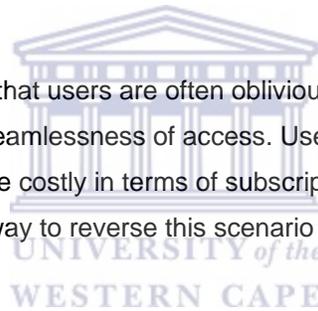
Hooper (2001:76) suggests that the academic library should use ICT to stimulate interaction between user and the library. It should be done in such a way that the user could identify with the academic library providing the service and experience a sense of ownership. As a starting point the academic library can interact with the user relating to loans, database searches and other services available. It is also important to create an environment where the user can provide feedback relating to service shortcomings and suggestions that could lead to improvement.

Stakeholder relationships are also very important. It is of vital importance for the academic library to ensure that their operations dovetail with the strategic goals of the university it supports. In these days where accountability is becoming the norm it is essential to run operations in such a way that the academic library at any point is in a position to provide proof of the value of its services as a return on investment made by the university authority (Hooper, 2001:75).

14. Conclusion

Information and communications technology (ICT) have brought unprecedented change and transformation to academic library and information services. It has created an environment where rapid continuous change had become the norm. Gone are the days when the library's collection was its pride and determined its value. ICT has reduced the library from its stature as custodian of our literary heritage to being a competitor among many others in the information society.

The concept of the academic library as a physical entity is being eroded by online access and the rise of virtual academic libraries. Access has replaced ownership and the Internet has made remote access to databases possible 24 hours 7 days per week. The academic library finds itself in a time of tremendous challenge but it is also a time of boundless opportunity to use ICT creatively to enhance service delivery to the user. Academic librarians should through research and consultation with their users find ways to add value to the user's information retrieval experience.

It is disturbing that there appear to be academic libraries that are still entrenched in outdated hierarchical management structures. Such structures are not suitable for coping with a fast changing ICT environment. It is crucial that the academic library reorganize itself with more flexible structures to be able to cope and respond to an ever-changing ICT environment. To persist in the traditional way of doing business is a sure recipe for disaster.

15. Recommendations

Based on findings in the literature I make the following recommendations:

- Academic libraries in the Western Cape should adopt more flexible management structures to ensure better capacity to cope with change.
- During change implementation managers should consider the impact of change on staff and take the necessary steps to minimize its negative aspects and help staff through the process.
- Research should be conducted on the information seeking habits of academic library users at tertiary institutions in the Western Cape. The results of such research can be used as input to develop strategies to enhance user services.
- Local tertiary institutions should address the issue of preservation of digital resources collectively at the CALICO consortia level. To deal with it individually might be too expensive.

- Local tertiary institutions should support the open access model by making research findings available through open access channels.

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