CHAPTER 4

INFORMATION NEEDS OF ACADEMICS AND RESEARCHERS IN INSTITUTIONS OF HIGHER LEARNING

4.1   INTRODUCTION

In chapter 3, the academic's role in their working environment and in the world of scholarly communication was discussed, with particular reference to his interaction with information. An academic has multiple functions at his institution of higher learning. Firstly, he must be involved with teaching students and other researchers. As this means that the academic must have a high level of insight into his subject field, many academics are also learners who are working towards higher qualifications. Secondly, the academic is a scholar involved with creating, manipulating and using information. He is a central figure in the whole process of scholarly communication. The third main function of the academic is to conduct research. It was found that academics at technikons and subsequently at the new universities of technology are currently less involved with scholarly communication and research than are those at established South African universities. As universities of technology become more settled in their new role in the higher education infrastructure of South Africa, this situation is likely to change.

The various roles and functions of the academic give rise to various information needs, which will be carefully examined in this chapter. In recent years, a great deal of research has been carried out about the needs of academics, researchers and scholars in institutions of higher learning. For this reason, the findings of this chapter are based on an extensive literature study.

It is important to have a clear conceptualisation of such information needs because this prevents researchers and librarians from ascribing needs to users based on guesswork, professional hunches and the way things were done in the past (Green 1990:76). Joswick and Stierman (1997:48) add that it is essential to understand the

research behaviour of all the users at a particular institution, not just of academics and researchers in general, in order to build collections that correspond to the unique needs of the users at each institution. Then, on the basis of the real needs of users, librarians can strive to develop and manage collections in the university or college within the constraints of budgets, time and available human resources (Llull 1991:86).

The focus of this study is collection development and management. Therefore, only the information needs of academics and researchers that relate specifically to collection building and management will be included in this chapter. It is conceded that these information users have further needs relating to library and other information services, but these fall beyond the scope of this thesis and will not be dealt with.

Researchers and academics constitute the most scholarly of information users who have sophisticated information needs. This must lead to careful building of collections (De Stefano 2001:64). Kircz (1998:223-224) identifies four categories of scientific readers, giving the level of information need for each category:

- "Informed readers" who know what they are looking for and find their way in the literature easily and quickly. These readers need quick, direct access to descriptions of experiments or theory. They might just want to know if a piece of research is already in print to obtain proper referencing to the work.
- "Partially informed readers" who need to know how a particular paper fits into the broader spectrum of their own research.
- "Uninformed readers" in the exploratory phase of research. They need information about a new topic.
- "Non-readers" who are mainly science administrators who want to know if a researcher is active in his field. They need mainly bibliographic information and a general statement of the goal of the research.

All four categories fall within the parameters of this study and must be examined.

Bearing in mind that this thesis deals with collection development in institutions of higher learning that have recently evolved from colleges, polytechnics or South African technikons into fully-fledged universities offering under- and post-graduate degrees, the rapidly-changing needs of researchers and academics at such institutions have to be borne in mind. It is crucial to remember that as research needs change, so the library's infrastructure should be able to change and be reorganised so that the library reflects the new perspectives and interests of academics and researchers (Herman 2001a:391).

4.2   REASONS FOR SEEKING INFORMATION

There are various reasons why academics and scholars seek information. As discussed in chapter 3, their work is centred on creating, using, manipulating and disseminating information to others who in turn will use and manipulate the information to create more information and knowledge. The predominant reasons for needing information are the following.

4.2.1   Information for research

One of the most frequently cited reasons why academics seek information relates to their research projects. Several researchers (Belefant-Miller & King 2001:100; Berger & Hines 1994:307; Forward-looking library use survey … 1998:217; Hiller 2001:613; Jirojwong & Wallin 2001:70; Lakshmi & Kanakachary 1994:39; Maughan 1999:356) found that getting literature for their research needs is the most important reason why academics in their institutions seek information. In Belefant-Miller and King's (2001) study, 80% of the respondents said that the last document they had read was for research purposes. This information is required mainly for gaining background information for the projects. Abels *et al.* (1996:153) found this to be true concerning electronic databases as well, as the majority of their academics stated that they use these mainly for research and teaching.

Many academics and researchers find their greatest need is more specifically to acquire background information to start research (Belefant-Miller & King 2001:104).

4.2.2 Information for teaching and lecturing

The need for information to assist academics (also referred to as "faculty") with their teaching, curriculum development and lecturing was found to be almost as important to academics as the need for research material. This was found to be the case by Belefant-Miller and King (2001:100), Forward-looking library use survey … (1998:217), Hewitson (2002:46) and Hiller (2001:613). Some researchers found that although academics need information for teaching and lecturing, this need was less urgent than that for research material. These researchers are from smaller, less developed countries. In Nigeria, for example, only 25% of academics use information and libraries for teaching purposes (Oduwole 2001:45). A survey in India also revealed that only 35% of academics need information for teaching preparation (Lakshmi & Kanakachary 1994:39). Research was found to be a far greater need in the latter two studies.

4.2.3 Information for writing and publishing

Worldwide, academics and researchers are faced with constant pressure to publish their work in order to gain recognition for their scholarship and ultimately tenure in their faculties. This was found to be the case in several surveys amongst academics (Jirojwong & Wallin 2001:70; Lakshmi & Kanakachary 1994:39).

In South Africa, the new funding formula for public higher education institutions has placed a great deal of pressure on academics to carry out research and publish their findings in accredited journals for subsidy purposes. In terms of this new formula, the government is placing increasing emphasis on publication as the major part of an academic's research output. This means that the need for information to write and publish material is considerable.

4.2.4 Other reasons

Researchers and academics need to keep up to date with developments in their field of study. Their need for updating their knowledge through gathering information was identified by Belefant-Miller and King (2001:100), Forward-looking library use

survey … (1998:217), Hewitson (2002:46), Lakshmi and Kanakachary (1994:39) and Oduwole (2001:45).

Completing research grant applications was another important reason for academics to search for information (Jirojwong & Wallin 2001:70; Maughan 1999:356).

Researchers (Belefant-Miller & King 2001:100; Hiller 2001:613) have found that many academics and researchers are endeavouring to improve their qualifications. For this purpose, they require information. When the higher degrees involved are research-based master's or doctoral degrees, this need overlaps with section 4.2.1 of this thesis. In a survey, it was found that 86% of academics require information for their role as students (Reneker 1993:496).

Other reasons cited by academics for seeking information are for writing up research reports and collecting and analysing data (Jirojwong & Wallin 2001:70).

Based on these findings, one may conclude that information is an important requirement in the working life of academics and researchers.

4.3   NEED FOR QUICK, EASY ACCESS TO INFORMATION

A recurring theme in the literature about the information needs of academics and researchers is the lack of time they have to spend on searching for and accumulating information. It was found that a basic need of researchers is to have swift, easy access to all the material needed to complete the research (Green 1990:69). Jacobs *et al.* (2000:565) go so far as to state:

> What researchers tend to use is conditioned by what is most easily and quickly available to them at the time.

It is not only access to digital resources that is important to academics. They also need easy access to the traditional print media. Academics and researchers need to be within the proximity of the library. They also require prior experience in the use of resources and need access to workstations. In a survey carried out by Abels *et al.*

(1996:147), academics indicated that physical distance from a source or channel of information influences the use of that information. In their opinion, if a resource is difficult to use, it is inaccessible to them.

The lack of time is mentioned by Massey-Burzio (1998:212) who states that academics have to learn to be efficient in their use of resources because of the lack of time they have to spend in the library. Laribee and Lorber (1994:142) also discovered that their respondents complained of severe time constraints which limited them in their information-seeking activities. This leads them to pursue the most time-efficient methods of finding information, which do not necessarily always lead to the best information resources to meet their needs. Researchers at Bowling Green State University also stated that the shortage of time at their disposal means that they require easy access to library materials for research (Parrish 1989:645).

Hewitson (2002:46) found that academics at Leeds Metropolitan University prefer to search the Internet for their information because they believe it saves time, is easy to access and gives instant results. The Internet can also provide them with up to date information. Academics and researchers do, however, express some concern about using mainly information found on the Internet. In an Australian study (Applebee *et al.* 2000:204), more than 80% of the academics indicated that they do not have the time to use all the information they find on the Internet and 91% said that they do not have enough time to explore what might be available.

Because academics and researchers have now been exposed to information in electronic form, it has been found that user expectations have changed. They no longer wish to wait for their information and expect it to be delivered to them within hours, not days (Herman 2004b:125; Jackson 2004:88).

This lack of time mentioned in several studies has real consequences and affects many aspects of the information world of academics.

4.3.1   Information overload

The concept of "information overload" has been a cause for concern to both librarians and users of information for several years. As subject areas become more specialised, so new journals are developing to convey the new information to interested scholars and researchers. Academics are urged to publish extensively as well, which means that more and more information is being forwarded to publishers for peer review. Subsequently an increasing amount is accepted for publication and information relating to most subject fields continues to increase exponentially. The whole concept of scientists using information to create more information is part of the overload problem (Belefant-Miller & King 2001:91). There is so much scientific and technical information that the communication system is under strain. It is impossible for individual scientists to read and remember all relevant information, there is an economic impossibility in acquiring all the relevant information and there is a mechanical impossibility of information-seeking tools to locate all the relevant information (Belefant-Miller & King 2001:92-93).

Although the focus groups in a study carried out at Penn State University indicated that they were concerned about information overload (MacEwan 1999:318), not all academics and researchers lament the abundance of information available today. Herman's (2004b:122) interviewees applaud the glut of information. They claim that they quickly skim new documents, look at the title, skim the abstract and see if the subject matter fits in with their work. They also check the author, journal and in the case of a book, the publisher for credentials. Relevant documents are examined more carefully before deciding whether to actually read or skip an item. Her respondents find that easy access to information, mainly via the World Wide Web (WWW) meets their need for time- and labour-saving information seeking processes.

From the latter study, it would appear that some scholars see the ready access to vast quantities of information as a way to save their limited time. This leads this researcher to question the quality of the research conducted using mainly the quick and easily available information without making sure if there is more relevant and more meaningful documentation available through the formal information channels, like subscription journals, monographs or databases.

4.3.2   Need for desktop access to information and library resources

There is an increasing tendency for academics to use their office PCs as their primary source of information. This means that many academics visit the library only when this is unavoidable. E-journals, for example, are a convenient means of providing access to journals as these can be accessed online. This is usually even possible from a remote location if the site licence allows it, which makes electronic media convenient for distance education and for researchers and academics seeking information from a location other than their academic institution.

One of the most frequently cited needs of academics and researchers is that for desktop access to remote information and library resources. Instead of physically going to the library, many academics and researchers of today prefer to remain in their offices and get their information through the Internet or through networked online information resources (Ericson-Roos 1997:217; Zhang 1999:756). Because academics indicated that it was the content of the WWW that actually attracts them, what they need is a user-friendly interface to facilitate access (Joint 2001:151). In Hiller's (2001:613) longitudinal study of the information needs and information-seeking behaviour of academics, he found that there is a definite shift towards remote use of library resources.

Some studies reveal more specific needs for different categories of information resources used from users' desktops. Researchers at the University of Washington felt that their library's highest priority should be to deliver full-text articles to their computers (Hiller 2001:617). Nelson (2001:208) and Pullinger (1999:164) found that academics use electronic journals (e-journals) because it was convenient to access these from one's desktop, thus saving them time and also providing access to a wider range of journals than the library could otherwise afford to purchase or store. The ability to search the whole text of e-journals was also found to be very useful to researchers. According to Morrow (1999:8) quick and easy access to a critical mass of e-journals which one can browse, search and from which one can print easily, is the core requirement of academics and researchers of today. Morrow (1999:6) also found that the current awareness function of remote access to information was valuable.

Users need to move research activities from a remote service to their desktops. Usually the current awareness service used by researchers and academics takes the form of table of contents (TOC) alerts which are automatically delivered via email to interested researchers. Another resource that is accessed remotely from the desktops of academics is the catalogues of their own libraries and of other libraries. Massey-Burzio (1998:208) found that there is a trend towards less face-to-face contact with library patrons as academics are increasingly accessing the library catalogue from remote locations. This, however, creates new needs for users in the form of help with downloading software to desktops to access library databases. A training need is also created because there are now so many databases and interfaces to work with. Online access to bibliographic services and databases was also found very useful to researchers because through these they can identify more comprehensively what has been published. Researchers need this service to be linked to an efficient document delivery service (Llull 1991:86).

In a recent OCLC survey (OCLC 2004:13), it was found that end users see the most important role of libraries to be making information available in their own digital workspace. This is in keeping with the finding of other researchers. Westbrook and Tucker (2002:147) concur that academics require desktop access to information. They found that services must be instituted whereby material can be delivered to them as efficiently as possible.

4.3.3   Need for gateways and gatekeepers

Because academics and researchers lack time to waste on searching through irrelevant information, they need some means of directing them more quickly to the information that could be valuable and authoritative for them.

A need was expressed for "gatekeepers" whose activities would allow academics to remain informed without having to spend their own time searching for this information. These gatekeepers are people who funnel information to interested parties and are often knowledgeable faculty members or librarians (Liebscher *et al.* 1997:505).

Librarians or other knowledgeable gatekeepers could then design gateways that are portals from which electronic information can be accessed relating to a certain subject. Morrow (1999:8) says that gateways linked to important electronic journals are one of the core requirements of academics and researchers. These should support one-stop shopping for specific information needs. Even humanists have expressed a need for all the good electronic material in their field to be selected and chosen and gathered into one database in much the same way as print media are selected and collected (Massey-Burzio 1999:636).

In a survey in Germany amongst researchers, a need for an integrated access system or interface to all journals as well as to other information services was expressed (Rusch-Feja & Siebeky 1999:2). This concept of needing a single, seamless interface for all electronic media appears to be a common requirement of researchers and academics. Nelson's (2001:209) respondents also requested a seamless interface to electronic media.

4.3.4   Need for greater awareness of sources and services

Academics and researchers often lack awareness of the electronic information resources available to them, and if they do not know about these resources and cannot find them easily, they will not use them (Massey-Burzio 1999:635).

Researchers have found that the main reasons that academics and researchers do not use electronic media, including e-journals, are that they are not aware of the media and also do not know how to operate them (Adams & Bonk 1995:126; Nelson 2001:207; Starkweather & Wallin 1999:648). This was found to be the case even in institutions where the library had made a considerable effort to inform users about electronic media (Laribee & Lorber 1994:138; Van Zijl 2002:15).

Not surprisingly, it was found that in the disciplines where dissemination of research findings and information must be as quick as possible, there is more awareness of electronic media and e-journals. In a survey carried out at the Texas A&M University, the greatest awareness of e-journals was in the College of Science where 80% of faculty know of e-journals in their field. This was followed by the Faculty of

Medical and Veterinary Medicine where 75% of users know about their e-journals (Tenner & Yang 1999:5). Here clearly the degree of need drives the degree of awareness.

The recommendation of many researchers is that more effort be made to inform users about their electronic information sources, because they will not take the time to discover and explore these resources on their own (Majid & Mansor 1996:54; Massey-Burzio 1998:208; Nelson 2001:207; Pullinger 1999:166-167; Starkweather & Wallin 1999:648).

Libraries are the most likely agencies to direct users to valuable information media. They are historically entrusted with collecting and organising information resources to meet their clients' needs and electronic media need as much attention as traditional media do.

4.3.5   Training in the use of electronic resources

Tied in with the need to be directed to the existence of electronic media to increase access, is the need for training in the use of these media.

Pullinger (1999:167) maintains: "the degree to which university members are able confidently to use online services will affect usage." Laribee and Lorber (1994:141) concur that information technology can only provide maximum benefit when end-users are adequately trained in its use. Epp and Segal (1987:68) maintain that this training should come from the library.

There is a problem however with this, as some studies have shown that academics do not believe they require further training in the use of the library and of electronic resources (Schwartz 2002:254; Williams 1996:39). There is a possibility that the need for training is a perceived, rather than an actual, need of academics and researchers. Research has however shown that it is more of an unacknowledged need. In a survey it was found that although untrained users are indeed successful in using electronic media, trained academics are significantly more likely to use network services than those who have received no training (Abels *et al.* 1996:152).

The findings discussed in section 4.3 of this thesis are relevant to collection development and management because resources have to be selected and made available to academics and researchers in a format, place and environment that will be easily accessible and retrievable. Because ease and speed of access are very important to these information users, these criteria should be given a high priority amongst collection developers. These resources should then be made available to users through an easily accessible networked gateway if they are to be optimally used by information seekers. As extremely large amounts of the libraries' budgets are being spent on electronic resources, it is essential that they be used extensively if the library is to get value for this investment.

4.4   CONTENTS VERSUS FORMAT

As formats in which information is conveyed become more diverse, so collection developers are forced to move from old paradigms of focussing on which formats they should include into their collections to meet information needs. Miller (2000:664) contends that librarians must now focus more on content and less on format if they are going to meet user needs for specific information.

OCLC Marketing Staff (OCLC 2004:2) also found that modern content consumers are "format agnostic" in that they do not care whether the information is in a book, journal, blog (weblog in which individuals create their own websites relating to their lives and interests) or website. Content is no longer dependent on format and communication channels other than the traditional ones like libraries are used according to their survey. OCLC (2004:2) found:

> … the format of the content becomes less important than its ability to be delivered via a low-cost, convenient channel.

Historically, libraries have been collectors of content. They tended to use the just-in-case model of collection development.

What seems clear is that libraries should move beyond the role of collector and organizer of content, print and digital, to one that establishes the authenticity and provenance of content (OCLC 2004:13).

This new focus on the content rather than the format in information provision reinforces the need of information seekers for easy access to the information they require and is relevant to sections 4.5 and 4.6 which deal with the preferences academics and researchers have for various categories of traditional and electronic media.

4.5   NEED FOR TRADITIONAL MEDIA

It was found that researchers often use a mixture of hard copy, CD-ROM and online media to find their information (Barford 1997:56). As discussed in section 4.3, the choice of information source is largely governed by practical factors, like ease of access, location of the information and time factors.

In these times, where digital access to information is developing rapidly and new ways of accessing information proliferate, one might be forgiven for assuming that traditional, print media are losing their usefulness for academics and researchers. This does not appear to be the case, however, as surveys prove that print media are still very much in demand amongst academics in academic libraries. At the University of Zululand, for example, academics demonstrate a distinct preference for print, or traditional, media. Ocholla (1999:136) found that researchers and academics there prefer to use journals, dissertations and theses, conference literature, textbooks and research reports in descending order of preference. In Australia, it was found that journals, textbooks and tables of contents of journals (in descending order of importance) are the preferred media for academics (Jirojwong & Wallin 2001:70).

Other researchers (Ashoor & Kanamugire 1996:177; Berger & Hines 1994:308; Gorman 1990:155; Herring 2001:218; Hiller 2002:10) have found that academics at their institutions request that attention be given to building up and developing collections of monographs and print journals. These researchers believe that this demand will continue to exist for many years to come. At the University of Illinois in

Chicago, academics have had access to networked databases for many years. However, in a survey carried out in 1995 (Fiscella & Proctor 1995:457) they still preferred print resources to e-resources. It is possible, however, that their attitudes towards e-resources have become more favourable as these have become more ubiquitous. According to Nelson (2001:208) this preference for traditional media is because culturally academics are more familiar with print resources. Academics in this study indicated that they are not as comfortable with electronic media as with the print sources with which they had grown up. Print resources are especially important to scholars in the humanities and the social sciences (Hiller 2002:11) and for those embarking on research into an unfamiliar subject area.

An interesting trend was discovered by Hiller (2002:10) that the degree of support of print media over electronic media fell by 13% from 1998 to 2001. This finding would suggest that although print media are still important to academics and researchers, electronic media are gaining in user acceptance and use. As e-resources become more accepted and understood by library users, indications are that they will be used increasingly.

4.5.1 Dependence on journals

Of all the information resources available today, the printed journal is considered the most important to academics and researchers. This statement is borne out in the research findings. According to Bradley (1998:18): "The scholarly journal plays a central role in the community of scholars." Jirojwong and Wallin (2001:71) also found that academics use journals more than other formal sources of information. Academics at the University of Washington likewise rank journals as very important information sources (Hiller 2001:621). In Hiller's (2002:8) subsequent survey in 2002, it was found that journals are very important to academics and researchers. Academics at the Washington State University were asked to rank improvements they wanted to see in their library and again they overwhelmingly ranked increasing the journal collection first (Forward-looking library use survey … 1998:219). Academics at the Stockholm School of Economics consider journals to be more important than books (45%) or as important as books (41%) for their research requirements (Ericson-Roos 1997:214). Seventy-seven percent of scholars at this institution consult journals

at least once a week. Scholarly journals must be readily and quickly accessible and close at hand (Ericson-Roos 1997:219) because researchers and academics need them to get access to the latest information and research findings (Publicker & Stoklosa 1999:14). Hiller (2001:616) found that at the University of Washington, the primary concern of academics regarding collections is that the library should own complete runs of certain journals. In fact, this researcher could find no studies that did not indicate that journals were considered essential sources of information for academics and researchers.

They are so important that scholars continue to subscribe personally to important journals in their field, whether the library holds subscriptions to these or not. In the American Council of Learned Societies (ACLS) survey scholars revealed that they do not cancel their private subscriptions because their library subscribed to these journals (Epp & Segal 1987:64). The scholars in this study also indicated that they supplemented their private subscriptions by regularly monitoring other journals and also checking a few others occasionally. The journals they deem the most significant in their fields are those received as part of membership to their professional associations (Epp & Segal 1987:66). At Martin University it was found that journals are the second most popular media for academics to purchase privately (Williams 1996:35). They are however still the most popular medium accessed through the library.

Libraries have been forced to cancel subscriptions, due to exponential rising of costs, but this is also done with adequate concern for the needs of users. Joswick and Stierman (1997:48) state that selection and deselection of journals has always been based on the research habits of specialised groups.

The two major concerns when it comes to selection of journals are firstly, whether the journal is core in a specific discipline and secondly, how to give the scholar access to articles in journals to which the library does not subscribe. As the need for quick access to articles is of paramount importance to academics and researchers, one cannot deal with just titles in the library's collection. Collection development policies must also consider how interlending (ILL) and document delivery are going to be dealt with. Joswick and Stierman (1997:54) contend that librarians must consider the

specialised needs of faculty in order to support the professional development of researchers.

4.5.1.1   Need for core journals

Researchers have found that there are a few journals in each field of study that are used significantly more than others. Librarians have traditionally sought to hold collections of the most important printed journals and then to get other material through mechanisms like interlibrary loans. The theoretical basis for the notion of a core set of journals is Bradford's Law, which hold that most important articles occur in a few journals which are central to that discipline (Jacobs *et al.* 2000:567).

At Trent University it was found that 80% of recorded use of journals come from only 15% of the titles covered in a survey and that 33% of the journals covered had no recorded uses (Scigliano 2000:49). In the library of Stockholm School of Economics, it was found that 11% of the journals are never read and that 34% are read only one to five times a year (Ericson-Roos 1997:213). Researchers and academics need these core journals to be available to them at a moment's notice and collection developers must find out which journals are core to the disciplines taught at their institutions and ensure that the library subscribes to these.

Ericson-Roos (1997:220) makes the point that because researchers require access to these core journals at a national level, these must be identified and acquired for local researchers and also for resource sharing. There can be no interlending within a country if no-one in the country subscribes to the journals. It is essential that libraries subscribe to the most important journals in each field or offer some alternate way of providing timely access to them (Joswick & Stierman 1997:54).

4.5.1.2   Need for document delivery facilities

In Pedersen and Stockdale's (1999:48) study, academics complained that there was limited availability of journals in their library and that there are delays in obtaining papers from remote sources. As it has been shown that quick access to information is important to scholars, there is a need to provide at least the core journals to academics

and researchers in the library. Although articles can be transmitted in digital form, there are usually delays in processing requests for the delivery of these documents from remote sites.

Whilst it would be ideal for researchers and academics to have all journals available to them in either print or digital format, this is unlikely to be affordable in even the most heavily funded libraries. This means that an efficient document delivery system is needed by scholars to allow them to get the articles they require as quickly as possible.

4.5.2   Dependence on monographs

Although print journals are the most valuable information sources to academics and researchers, a need for books is still experienced by these users and creators of information. At a South African Technikon, a survey revealed that academics consider a good collection of books to be "very important", and that of journals to be "important" – especially when it comes to information for their teaching requirements (Van Zijl 2002:8). In a survey carried out amongst the academics at the Stockholm School of Economics, 50% of respondents found books to be more important than journals and a further 35% found them to be as important as journals for their teaching needs (Ericson-Roos 1997:213).

It is common for researchers of the information needs of humanists to find that books or monographs are more valuable to these scholars than any other information resources. Herman (2004a:40), for example, found that researchers in the humanities consider seminal monographs to be the first place to look when they start reviewing literature. The vast majority of theologians surveyed by Gorman (1990:146) claim to read between 10 and 50 books annually. They find the collection of books in their library to be inadequate. South African artists prefer books to journals as information resources (Van Zijl 2000:245). In Hiller's longitudinal study at the University of Washington, academics in the humanities and social sciences still consider books to be more important than either journals or e-journals (Hiller 2002:8).

Another group that places a high value on books is the social scientists who have also been found to show a considerable preference for books. This was found in Hiller's survey as referred to above. At the Stockholm School of Economics, monographs are the preferred medium by academics for teaching purposes (Ericson-Roos 1997:215). They consider journals to be too theoretical for their students. Books give better introductory material as well as breadth of coverage and summaries.

Although there is a conception that books are more the domain of undergraduate students than of researchers, this was found not to be the case at the University of Sussex. Pendlebury *et al.* (1994:134) found that more than half the books that were borrowed from that library had been borrowed by both undergraduate and research students.

It is not only humanists and social scientists who still experience a need for books and other monographs. At Washington State University academics requested that the library purchase more monographs in future (Forward-looking library use survey … 1998:220). Likewise at Martin University, books were given top priority by academics as media to be purchased to meet their needs (Williams 1996:35). Textbooks are considered very important in most disciplines for conducting literature reviews in the early, exploratory stages of research projects (Jirojwong & Wallin 2001:70).

A computer science researcher in Herman's (2004a:41) study said he does not use books because they contain only rehashed material. Although one cannot generalise this to all computer scientists, in surveys into the information needs of academics, researchers and scholars in the sciences and technology tend in general to prefer journals as sources of information as discussed in section 4.5.1.

Billings (2000:10) found that the physical contents of research libraries still constitute a much larger proportion of scholarly information than that available on the Internet. In spite of the lauding of digital information, books are still very popular with scholars and it appears that it will be some time before this popularity wanes. Wood (1997:232) found that the use of monographs has increased. He states that scholars still show higher regard for scholarly monographs than for information found on the

Internet because the former undergo critical review before they are published. In his study, scholars indicate that they find Internet material to be unreliable and that the material lacks authority.

For these reasons, it would be unwise to neglect the development of a collection of print monographs and journals. Scholars need these information resources both for teaching and for research. Hiller (2001:617) discovered that the main concern of academics about libraries was that it should have a high quality collection of print resources.

4.6   NEED FOR ELECTRONIC MEDIA

Because academics and researchers are more dependent on information than most other groups, they have been forced to adopt information technology-based information resources and services. Herman (2001b:437) states that they will always be "central players in the information arena". In spite of this, academics and researchers with a few exceptions have not yet adopted them as a preferred format for information transfer, although there is considerable growth in the electronic media industry.

Initially, acceptance of electronic media was slow. Eighty percent of respondents in Maughan's (1999:356) survey said that they did not have enough experience in the use of electronic resources to be able to evaluate them. Zhang (1999:747) found that only 32,3% of scholars in her survey cited electronic resources in their papers. Scholars in the arts and humanities are particularly disinclined to learn to use electronic media. Lougée *et al.* (1990:237) found that electronic media are the least used sources of information amongst humanities scholars, especially older scholars and those who showed a strongly positive attitude to the library. None of the humanities scholars and researchers in Herman's (2004a:41) study thought that the shift from print to electronic media merited a mention.

Researchers concur, however, that there is a clear move towards increased acceptance of electronic resources by academics and researchers. Herman's (2004b:129) academics in Israel indicated that electronic resources were essential to scholarly

work, although they were often not as important to them as face-to-face interaction with other scholars. She also found that overall academics have been gradually moving towards the electronic information era and towards a more positive attitude towards computer-based methods of information retrieval (Herman 2001b:433, 452). Hiller (2001:613) found the electronic resources are becoming increasingly important to academics. There appears to be consensus that academics are increasing their use and acceptance of these electronic media.

In some studies, researchers and faculty were found to prefer e-resources to print media. This was found to be more likely in certain specific disciplines. At the University of California, Berkeley, 64% of respondents in the faculty of business preferred electronic materials and about 50% of those in the chemistry and political science faculties also prefer electronic media (Maughan 1999:359). Some findings in this regard refer specifically to e-journals and are cited in section 4.6.1 of this thesis. Preferences for e-media appear to correlate with the level of information technology (IT) skills of academics. At Leeds Metropolitan University, academics with advanced levels of IT skills display a higher degree of use of electronic media (Hewitson 2002:48).

Scholars have found that there are many advantages to using online resources. In a focus group study conducted at Penn State University, it was found that academics and researchers realise the potential value of electronic resources. These interviewees, as well as those in other studies, said that they need remote, 24-hour access to these resources with flexible, full-text search options and would prefer one single resource that covers many areas of the curriculum (Johnson 2004:73; MacEwan 1999:318; Pullinger 1999:170). Faculty members in the University of Nevada, Las Vegas, found that the library's computer-based resources save them time, made them more confident in their review of available literature and helped them to identify resources in remote libraries and archives (Starkweather & Wallin 1999:647). In this same study, respondents stated that they need electronic media for teaching purposes as they are useful for adapting and adjusting their curricula and for introducing students to good sites (Starkweather & Wallin 1999:647). E-resources are valued increasingly because of the escalating costs of printing which are irrelevant in the digital environment (Miller 2000:647). An added advantage cited by academics in

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Israel is that the searcher has hyperlink access to documents (Herman 2001b:453). Academics also need e-resources such as online catalogues and electronic bibliographic databases to search for known items and for less directed searches (Palmer & Neumann 2002:105).

4.6.1 Dependence on electronic journals

According to a survey carried out by Nelson (2001:205), e-journals have had only a limited scholarly impact. At Texas A&M University it was found that only 36% of academics use e-journals (Tenner & Yang 1999:5-6). Of those disciplines that have e-journals, 42% prefer these e-journals, whilst 47% still prefer print. When asked about library subscriptions, 61% said that they would prefer the library to subscribe to print journals. Only 28% of the respondents in Tomney and Burton's (1998:423) study indicated that they had used electronic journals. These respondents were predominantly younger researchers.

Academics and researchers give various reasons for the slow acceptance of electronic journals. Herman (2001b:444) attributes the reluctance to a lack of readiness to use the new medium. She also found that academics consider paper publications to be more portable and that the deep-seated habits of researchers are hard to break. McKnight's (1997:3) study reveals that scholars do not typically read journals at their desks or in the library. They move around while reading print articles but are forced to maintain a single position at a computer screen. Scholars also find browsing by subject less easy with e-journals than with print journals because they first have to browse through title and author levels before getting to the contents of journals. This impedes their ability to browse for the serendipitous revelations they sometimes require. Other hindering factors researchers discovered are a lack of awareness about the use of e-journals, lack of familiarity with the technology and scepticism about the rating of e-journals compared with print journals. It was also found that academics sometimes have the impression that e-journals are not "real" publications worthy of pursuit. Ericson-Roos (1997:217) found that few academics read e-journals regularly. Respondents in the latter study indicated that the reason for this is that it is difficult to find e-journals on the Internet and that they are concerned about the quality and value of e-journals (Tomney & Burton 1998:426). Although there are

ongoing efforts to eliminate these problems, they remain a cause for concern. Interestingly enough, 91% of the respondents indicated that they wish to know more about e-journals.

Not only are they considered of lesser importance as sources of scholarly information, but scholars are also loath to submit papers to e-journals for publication. This came about because universities initially were not very willing to consider submissions to electronic journals for tenure review (Budd & Connaway 1997:846). Massey-Burzio (1999:632) found that humanists in particular tend not to read e-journals and are disinclined to publish in them. In spite of this, depending of the status of the e-journals, some academics in more recent surveys indicated that they would submit papers for publications in this medium (Nelson 2001:209; Tenner & Yang 1999:8).

In spite of these findings, there is a trend amongst academics and researchers towards increased acceptance of e-journals as sources of information (Nelson 2001:210). In Herman's (2001b:433) study, 25% of the respondents indicated that they are willing to switch to e-journals in the future. Tomney and Burton (1998:425) found that, although e-journals are not very popular presently, it is conceivable that the use of this medium will increase steadily.

As academics and researchers become more aware of e-journals, so their need for this medium is increasing. Pullinger (1999:169) found that scientists who are regular users of e-journals access them once a month on average. Publicker and Stoklosa (1999:19) found that the more e-journals the library provides for researchers, the more they come to expect. This shows that familiarity with this electronic medium increases user needs for e-journals. Hiller's (2002:8) longitudinal study reveals that scholars are finding e-journals to be increasingly important to them. This is particularly true of scholars in the health and pure sciences. In Hiller's study, however, no group consider e-journals to be more important than print journals. He found that the gap between the importance of print and electronic journals is closing, which points to increased acceptance of e-journals.

Their value has increased to such an extent that Morrow (1999:8) maintains that the core requirements of academics and researchers are quick and easy access to a critical

mass of e-journals, a substantial back file of between five and ten years, gateways supporting one-stop shopping and the ability to browse, search and print these e-journals.

There are significant differences in the degree of need for e-journals between scholars in different disciplines. Nelson (2001:207) found that they are used mainly for research, which leads one to expect that they will have more value to researchers and academics in those disciplines where quick dissemination of findings is crucial. He found that it was mainly researchers in the fields of business, health sciences and the applied sciences who use e-journals regularly. This is confirmed in Tomney and Burton's (1998:423) survey. They also found that the highest use of e-journals is in the field of business sciences, then in the sciences and engineering fields. Science and technology researchers at the Max Planck Society in Germany showed a significantly high need for e-journals and an unwillingness to return to print versions of journals only (Rusch-Feja & Siebeky 1999:1). It was mainly the biomedical and chemical, physical and technical researchers who expressed such a need for e-journals at this institution. Scientific researchers were also found to be regular readers of e-journals by Pedersen and Stockdale (1999:44). Sixty percent of these researchers regularly access at least one e-journal. It must be added that this high incidence of e-journal use might be attributable to shortfalls in library subscriptions to print journals at their institution. Academics in the computer sciences are also enthusiastic users of e-journals as they have to keep up to date with new developments in their field (Herman 2004a:43). Budd and Connaway (1997:847) found that social scientists also show some interest in e-journals. In their study, social scientists displayed the highest need for e-journals, followed by physicists and chemists. The least interest in e-journals was found in the arts and humanities (Nelson 2001:207; Tomney & Burton 1998:423).

In the so-called SuperJournal project to study the acceptance and use of e-journals amongst academics and researchers at Loughborough University, it was found that 67% of the active SuperJournal users use SuperJournal no more than 0,5 sessions per month, and 98% use it no more than three sessions per month (Eason *et al.* 2000:486). The need for articles to be available in Personal Document Format (PDF) is overwhelmingly larger than for those in Hypertext Markup Language (HTML) format

in the SuperJournal project and it was found that when articles are discovered, most users print them instead of reading them online (Eason *et al.* 2000:488). Eason *et al.* (2000:494) found that regular users of e-journals are predominantly researchers or postgraduate students.

4.6.2   Dependence on electronic books (E-books)

In the late 1990s, publishers brought out books in electronic format which could be read on a computer screen or by using e-book readers. In spite of the obvious advantages of protecting books from theft and defacing, allowing networked access to e-books from the user's desktop and allowing access 24 hours a day, seven days a week, these e-books have not been readily accepted by academics. Herman (2001b:449) found that they are not widely used.

In a study carried out in the United Kingdom, it was found that although very few academics use e-books, there are some who are enthusiastic about their potential for purposes of research, study and teaching (Bennett & Landoni 2005:12). Overall, however, respondents in this study do not express a great need for e-books. Many academics feel that the usability of e-books is currently too poor to offer a real alternative to printed books when it comes to serious academic study (Bennett & Landoni 2005:15).

In the library of the Swiss Federal Institute of Technology (ETH-Bibliothek) in Zurich, Switzerland, however, the response to e-books is more positive. This library now has a collection of web-based e-books from several prestigious publishers and aggregators covering the fields of technology and science. User statistics of e-books reveal that there is an increase in usage over a period of time (McLuckie 2005:100). McLuckie (2005:101) comes to the conclusion that the continued success of web-based e-books is likely, particularly for academics and scientific institutions.

Although in general the acceptance and use of e-books has been slow amongst scholars and researchers, it seems that for those who have taken the time and trouble to investigate this new format for information transfer, e-books meet a need. They

should thus be included in a research collection and their presence and potential value should be explained to library clients.

4.6.3   Dependence on aggregated journal databases

Several publishers and database vendors have created products which consist of full-text access to a preselected group of journals. Libraries and consortia can then subscribe to these databases and then users have access to articles in any of the journals included in the package for as long as the subscription continues.

Academics and researchers at the University of Washington believe that the top priority of libraries should be to deliver full-text articles to their desktops (Hiller 2002:10). The most urgent need for this was expressed in the faculties of science, engineering and health sciences. These are the same faculties who expressed the highest need for e-journals. Publicker and Stoklosa (1999:18) believe that the increased need for full-text access to articles is that users now have sophisticated needs and want to link directly from their search results to the full-text articles without having to take separate steps for identification and access. This saves academics time, which is one of their most urgent needs. Ashoor and Kanamugire (1996:177) confirm this finding because they found that full-text aggregated databases or datasets ensure that users have quick access to relevant information and that libraries should provide large budgets to subscribe to these datasets and to maintain the hardware, software, licences and networking charges required to bring these services to the desktops of their users.

As aggregated journals databases are still relatively new, acceptance of them is not universal amongst academics and researchers. Seventy percent of the academics at Washington State University said they had never used online full text journals (Forward-looking library use survey … 1998:219). When asked for improvements that the library should implement, however, they requested that the library provide more access to full-text articles (Forward-looking library use survey … 1998:220). Academics at a Technikon in South Africa displayed limited use of aggregated services (Van Zijl 2002:7). Many academics at that institution were not aware of these databases and had never used them.   Aggregated journal databases were found

to be most popular amongst the management sciences (Van Zijl 2002:8). It must be added that at the time of the survey, the only aggregated services on offer to academics at that institution were *EbscoHost* and *Emerald*, both of which are more geared towards the business and social sciences than to other disciplines.

From these findings, it would appear that the need for aggregated journal databases is limited amongst scholars and researchers, but that it is considerable amongst those who have accepted them as a valuable information resource and know how to use them. The trend of increasing dependence on these databases follows a similar path to that relating to e-journals.

4.6.4   Dependence on CD-ROM

Information has been available on CD-ROM for several years, and has proved useful to academics and researchers. At the University of Malaysia, respondents found CD-ROMs easy and convenient to use (Majid & Mansor 1996:53). The prime reason given by 81% of academics for conducting CD-ROM searches was research (Majid & Mansor 1996:54). Thus researchers need CD-ROM databases primarily as research aids. This finding was confirmed at the University of Wollongong, Australia, where it was found that it was overwhelmingly Master's and Doctoral students who use the CD-ROM databases – and these are mainly researchers (Hyland & Wright 1995:96). Although some researchers use and like CD-ROM, 63% of the academics in the International Islamic University in Malaysia, do not use the CD-ROM services, mainly because they are unaware of the databases (Majid & Abazova 1999:106).

It is particularly in the humanities that full-text databases on CD-ROM have become important. To these academics and researchers it is important to have access to critical editions with hypertext links to major articles. Great literary works are available on CD-ROM allowing for keyword searching (Massey-Burzio 1999:631). There is a problem though as it is not possible to read a page and the footnotes at the same time and humanists need the footnotes. Humanists at the Eastern Illinois University found CD-ROMs to be useful for providing bibliographic information and actual raw data (Laribee & Lorber 1994:138). Some popular CD-ROM databases are

ABI-Inform, *Medline*, *ERIC*, *Social Science Citation Index*, *Humanities Index* and *Books in Print* (Hyland & Wright 1995:92-93; Majid & Mansor 1996:53).

Even engineering researchers have found CD-ROM databases useful. At King Fahd University of Petroleum & Minerals (KFUPM) researchers in the engineering sciences use CD-ROM frequently and most respondents in that survey are satisfied with the CD-ROM services at their institutional library (Ashoor & Kanamugire 1996:177).

In developing countries like Nigeria, CD-ROM databases are often found to have an overly Western bias and the university libraries find the high subscriptions are unsustainable (Oduwole 2001:44). An added problem is inadequate and unreliable telephone systems which retard the response time to online CD-ROM products. These problems make CD-ROM databases of little use to some academics at African institutions.

This researcher predicts that as online databases and e-journals become better known and more accessible to academics and researchers and as bandwidths are increased, the need for CD-ROM will continue to diminish in favour of the new online technologies. References to use of CD-ROM are difficult to find in surveys carried out in the 21st century.

4.6.5   Dependence on the Internet

In the 21st century there are very few academics and researchers who do not have access to the Internet. In an Australian study it was found that 96% of faculty members have PCs in their offices and these are connected to the Internet (Applebee *et al.* 2000:200). Budd and Connaway (1997:846) likewise found that most of the respondents at their institution have access to the Internet. Admittedly access to the Internet is not as universal in less developed countries (Pedersen & Stockdale 1999:48), but researchers and academics in such countries usually have some means of accessing the Internet, albeit less frequently than those with PCs in their offices and homes.

Initially users had the impression that the Internet was "almost a panacea to all information problems" (Kibirige & DePalo 2000:14) and it is increasing in popularity amongst some information seekers. Morrow (1999:1) found that teachers and researchers are increasingly turning to the Internet as their preferred information source. Herring (2001:215) discovered that faculty – particularly those in the science disciplines - are generally satisfied with the Web as a research aid. Academics in Herman's (2004b:124) study expressed a need for the Internet as a ready source of information which can be delivered swiftly to them. They also liked the fact that the most recent information was available through the Internet to meet their information needs. In one study (Jirojwong & Wallin 2001:70) 47% of the respondents claimed that they consulted the Internet frequently for their information. In another (Kibirige & DePalo 2000:14), 91% of academics were found to use the Internet at least once a week. Although the Internet is readily accepted as an information source by most academics, it has been found that end users are usually unaware that much online searching is less precise or that searches may be less effective than those using more formal information retrieval mechanisms (Schwartz 2002:254).

Academics at small colleges and polytechnics appear to rely more heavily on the Internet as a source of information than those in larger institutions. This could be attributable to a shortage of other information resources in their libraries. At Leeds Metropolitan University, formerly a polytechnic, the Internet was found to be the electronic information service most frequently used by academics. Respondents expressed relatively little need for subscription-based services like indexes and abstracts and e-journals and even less of CD-ROM services (Hewitson 2002:45). Even when users are aware of subscription-based services, they prefer the Internet for finding information in their fields (Hewitson 2002:46). Herring (2001:216) found that academics in so-called community or junior colleges in the USA hold the Internet in higher esteem than do those in 4-year colleges and universities. She attributes this to the different levels of research required at the two types of institution and to the fact that the community colleges have smaller print collection. In South Africa it is thus probable that this premise holds true as technikons and universities of technology have collections that are smaller than those of universities.

The Internet meets certain specific information needs. As a communication tool, academics consider the Internet to be valuable (Budd & Connaway 1997:846). Applebee *et al.* (2000:202) state:

> The ability to communicate with colleagues both within Australia and internationally using Internet-facilitated e-mail was identified by isolated academics as "critically important".

Most academics in the study by Applebee *et al.* (2000:203) indicated that the Internet helped then overcome their disciplinary isolation but that it did not replace their need for face-to-face meetings with colleagues and the attendance of academic conferences.

Academics are also the most represented sector of society in discussion groups because they had greater access to the Internet through their university networks (Majid & Abazova 1999:102). Research has shown that academics and researchers also need the Internet to search the library catalogues of other libraries (Budd & Connaway 1997:847) and to view ongoing and completed research reports (Herman 2004a:42). Specific data (such as statistics) required by researchers is also found relatively easily on the Internet (Budd & Connaway 1997:847; Herman 2004b:120).

Although the Internet is required by academics for many of their information needs, scholars have become wary of this information channel because of its many shortcomings (Herman 2004b:124).

Herring (2001:214) found that academics do not believe that the WWW provides sufficient information to do their research. Although they praised the availability of abundant information via the Internet, they question the accuracy, reliability and value of this information.

From research carried out regarding the need of academics for the Internet, it is clear that whilst they welcome the access to the information available via the Internet and find it essential for finding certain data and information, and as a communication tool,

they are sceptical of the value of the information for scholarly research compared to that of other information resources.

4.7   REQUIREMENTS RELATING TO INFORMATION RESOURCES

Academics and researchers require highly specialised and scholarly information for their work. For this reason they have specific information requirements that must be met through the information resources to which they have access.

The following requirements should be met to satisfy the information needs of academics and researchers.

4.7.1   Comprehensiveness

In Maughan's (1999:356) survey, faculty members were asked what they considered to be important in their library collections. In descending order of importance, they asked that their library collection be comprehensive, complete, have breadth and be accessible. Bruce (2001:160) also found that academics consider comprehensiveness to be very important for a literature review. Although comprehensive collections are beyond the reach of all but the most extensively funded libraries, most researchers expect to be able to turn to their library for their information needs and have these met from their local collection (Llull 1991:86).

The need for a comprehensive collection is higher in the sciences than in the humanities. Herman (2004a:40) found that humanities researchers are not concerned about the possibility of missing a piece of information, but in the computer sciences, the opposite is true. The researcher she interviewed is concerned about retrieving everything that has been published on a given topic because this is important in the sciences (Herman 2004a:41). Once he has collected relevant articles, he skims the references, working back to earlier publications. He also contacts knowledgeable colleagues for material he may have missed. An exhaustive literature review is very important in this discipline. Hewitson (2002:51) found that there is a widely held view amongst academics that they are missing out on a great deal of information.

They are often overwhelmed by the large number of hits they get when they conduct online searches.

Comprehensive collections are unrealisable today, and researchers must learn to discern which works are significant in their disciplines and ensure that these are available in the library (Barford 1997:55; Bruce 2001:161). Collection developers too must track down all the important works available and include these in the library's collection so that academics can have some measure of assurance that their literature searches will retrieve critical works in their discipline. This should be done in consultation with academics at their institution.

4.7.2   Access to retrospective material

Research has shown that the majority of academics and researchers do not require only the latest information. They also need to have access to older material. Broadus (1987:120) found, for example, that the most frequently requested material in his library was four to eight years old. Scientists at the University of Tennessee at Knoxville read articles with the average age of five years (Belefant-Miller & King 2001:104). In Morrow's (1999:6) study, it was found that social scientists need articles that span nearly 50 years. Access to these older articles is more important to them than the ability to link to full-text articles. This same study revealed that one of the core requirements of academics and researchers is to have a substantial back file of between five and ten years (Morrow 1999:8). In the humanities, scholars were found to use materials that predate the research by 20 to 30 years on average (Watson-Boone 1994:213). Maughan (1999:357) likewise found that information older than five years is still in high demand by academics.

This need for retrospective material is cited as a major drawback in the use of e-journals and full-text aggregated services (Eason *et al.* 2000:494; McKnight 1997:4). This is because archiving is questionable with this format and back issues are seldom available in the online databases and e-journals.

4.7.3   Special requirements for electronic resources

Due to the differences between traditional and electronic media, some researchers have isolated special criteria that are important to academics and researchers in the selection of electronic media.

Needs expressed by focus groups at Penn State University (MacEwan 1999:318) are that electronic resources should be quick and easy to use and have cross-references. They should have the ability to build quick bibliographies, provide quick access to resources and be updated frequently. They should provide large amounts of information, be user friendly and have keyword search capabilities. Results must be easy to email to searchers or other interested parties.

Berger and Hines (1994:307) found that their respondents require good quality electronic resources that are accessible and quick. These must be free, comprehensive, expert and must be networked with other libraries. They should also be readable, timely, relevant and authoritative (Kibirige & DePalo 2000:11).

It is necessary to formulate a strategy in a collection development policy dealing specifically with selection of electronic media in order to meet the needs of researchers and to ensure that a balanced and useful digital collection is available (De Stefano 2001:62).

4.8   DISCIPLINE-SPECIFIC NEEDS

Research and scholarly needs differ considerably from discipline to discipline. Herman (2004b:119) found that "the nature of an information need is subject-contingent". The major needs of academics and researchers in the core disciplines will be dealt with here.

4.8.1   Needs of scientists, health care scholars and engineers

Scientific, health care and engineering scholars are concerned with keeping up to date with recent information. They need information for all the stages of the research

process, namely stating the problem, methodology, gathering data, analysis and synthesis of the data, reporting the findings and applying this to practice (Gericke 2001:63-64). Noam (1997:2) describes the stages of the research process as creating knowledge and standards, preserving information and passing it on to others.

The needs of scientists are different at different times; depending on the project they are engaged in. They need to find information on specific subjects or they may need to brush up on a field or familiarise themselves with unfamiliar fields (Herman 2001a:395). Depending on the need they require a variety of information sources. During the early stages of their research or study, they are likely to need information from experts in their field and to use bibliographic databases (Berger & Hines 1994:307). Herman (2004b:119) found that primary sources of information are not as important to scientists as to humanists because the former are satisfied to have access to the published findings of their predecessors. For more in-depth information they express a need for up-to-date books (Neville *et al.* 1998:525) and journals or e-journals (Herman 2004a:45). Pullinger (1999:169) found that scientists are regular users of e-journals. At the end of projects, scientific researchers need more general scientific knowledge to interpret their data and integrate these into current scientific knowledge (Herman 2001a:397).

4.8.2 Needs of humanists

The term "university of technology" could lead to the misconception that it is only technological subjects that are taught at these institutions. Every university of technology teaches subjects in the human sciences, however. These include such disciplines as the fine and graphic arts, food and clothing technology, jewellery design, music and sound technology, performing arts and others. Research into the information needs of humanists reveals that their needs differ significantly from those of scientists. The most striking difference is their reliance on primary sources of information and on print media in preference to electronic media.

Much of the research and study carried out in the humanities involves seeking out well-established data or texts, original thought and interpretation of what is observed or read (Herman 2001a:395). The viewpoint of the author is thus very important for

scholars in some humanities disciplines. When subject matter calls for interpretation, it matters how a piece of information is presented (e.g. History). "Identifying biased and/or one-sided information for what it is forms an important part of research work" in the humanities (Herman 2004b:121).

Palmer and Neumann (2002:90) and Herman (2001a:395) found that humanists need to study primary sources closely as part of the research process. Such primary sources include original scores, art works and texts, *inter alia* (Stone 1982:296). This primary material is accessed mostly by travelling to the source of the information in remote locations if necessary (Herman 2004b:119). Academics in the humanities frequently need materials which is housed in foreign libraries and many have visited libraries abroad to track down the information they require (Massey-Burzio 1999:630). Face to face encounters with people they know personally or who are involved in their field of study was found to be very important to scholars (Herman 2004b:123).

Printed information sources are important to humanists. When asked to indicate their preferences for various formats, artists placed books first, then journals, slides, electronic databases, CD-ROM and exhibition catalogues (Reed & Tanner 2001:231). This finding is largely confirmed by van Zijl (2000:123) and Stone (1982:296), who found that books are the most needed information source for artists. In van Zijl's study, this was followed by journal articles, original works of art and then reference books. Reed and Tanner (2001:232) discovered that academics in the arts faculty still use paper resources even if remote electronic access is available. The book has been found to be central to humanists – either as a source of information or as a vehicle for disseminating findings and insights (Wiberley & Jones 1994:501). Herman (2004a:40) found that humanists first turn to the important monographs on a subject when reviewing literature. Their reliance on monographs means that humanists require access to the catalogues of other libraries so that they can track down relevant resources (Pankake 1991:10).

Journals are found to be the second most needed format for humanists (Broadus 1987:117). They expressed concern in one study about having to make do without

print journals as they do not want to read articles onscreen and need to be able to mark up articles for their research (Massey-Burzio 1999:632).

There is considerably less interest in electronic media in the humanities than in the sciences. These scholars do not use information technology as much as those in the sciences and social sciences (Wiberley & Jones 1994:503). A factor that could contribute to the lack of interest in electronic media is that the humanities are not included in as many of the full-text journals as are the sciences and social sciences (Reed & Tanner 2001:232). Whilst there are several databases and aggregated services that cater for scientists and social scientists, there are relatively few catering for the humanities.

Even the Internet is not as popular amongst academics and researchers in the humanities as amongst other scholars. Herring (2001:216) and Massey-Burzio (1999:624) both found this to be the case. Humanists in their studies show little interest in using the Internet as a source of scholarly information.

Interdisciplinary information resources are important to academics in the humanities. Those in the arts faculty in Reed and Tanner's (2001:232) survey indicated that interdisciplinary material is important to them. Palmer and Neumann (2002:109) also found that humanists move into other disciplines as they follow their research questions.

Scholars in the humanities were found to rely heavily on retrospective coverage of their subject field (Stone 1982:296). The rate of obsolescence of material in this field is very slow and older material remains important to humanists.

4.8.3   Needs of social and business scientists

Scholars in the social sciences experience needs that are more similar to those of scientists than to those of humanists. In research findings these two groups of academics are often grouped together as sharing information needs (Herman 2004b:119; Reed & Tanner 2001:232).

Primary resources are not very important to social scientists as they, like scientists rely on the published findings of researchers who preceded them (Herman 2004b:119).

Social scientists use a mixture of traditional and electronic media for their academic pursuits. Academics in the social sciences in a recent survey were found to be extremely interested in the maintenance of the quality of the print collection (Hiller 2002:11), proving that they still rely on monographs and journals as sources of information. Social scientists still consider monographs to be important (Gorman 1990:139; Hiller 2002:8).

However, they also rely heavily on journals as a source of information. Seventy percent of the respondents in a study at the Stockholm School of Economics stated that reading an abstract of a journal article is extremely important for their research and scholarship (Ericson-Roos 1997:217). An economist interviewed in another study indicated that he needs the most recent information published in journals as well as preliminary results of work currently being completed. He also needs reports on completed and ongoing research (Herman 2004a:42).

A genre of monographic publication that is becoming increasingly important to social science researchers and scholars is the official publication. These are available in print and increasingly in electronic format like CD-ROM and websites and are often available free of charge (Rusch-Feja 1996:332).

Databases such as *Emerald* and *EbscoHost* cover mainly the business and social sciences, so this means that e-journals and aggregated services are important to scholars in this field. This is for them an easy and convenient way to access journal articles covering their field of study. They do however experience a problem with this format because of the lack of retrospective material available. Many social science researchers and academics need articles that span nearly 50 years. This was found to be more important to them than the ability to link to full-text articles (Morrow 1999:6).

4.9   CONCLUSION

In this chapter it can be seen that academics and researchers require information for all their scholarly activities.

Quick and easy access to information has become extremely important to them and this need is largely met by the trend to provide networked online access to information resources made available to academics from their desktops. Portals and gateways to information that would meet their needs and also communication with gatekeepers of relevant information are required to speed up access to the most important information in each field. Scholars also require greater awareness of information resources to which they have access and also assistance in the use of electronic resources to be able to use these resources optimally.

As content becomes more important than the format in which the information is presented to researchers, so academics are finding a need for a greater array of information sources.

Traditional, print resources, especially monographic material and journals, are still very important to scholars,. These two formats are overall still the most needed vehicles used for finding information. However, there is a trend towards greater acceptance of electronic media, especially electronic journals (e-journals) and aggregated journals databases offering full-text articles from collections of journals on a subscription basis. E-books still have a limited following but use of them is also increasing. The Internet is used extensively by academics and researchers with varying degrees of approval and reliance and information available on CD-ROM remains quite important to academics, particularly in the humanities.

Academics would like their libraries' collections to be comprehensive and to offer them access to retrospective material.

Scholars in different disciplines have differing information needs when it comes to certain areas of collection development, however, the basic information needs show a large degree of uniformity.

Agre (2000:502) found that academics and researchers need an information infrastructure at their university to supply them with information. These services are largely uncoordinated and include the library, instructional networking, computing, telephones, media services, campus bookstore, course reader services, *etcetera*. The library is the most coordinated source of information and provides much of the scholarly information required by academics.

In the following chapter, the researcher will investigate the information-seeking behaviour of academics and researchers and also discuss current global trends in scholarly communication throughout the world.