

Chapter 4. Research findings

4.1 Introduction

Postgraduate students experience needs that are different from the needs of other client groups at higher education institutions. The purpose of this chapter is to describe the electronic research needs of postgraduate students at the Faculty of Education of the University of Pretoria from the results of research survey that I carried out at the university. The format and conditions of the research survey have been discussed in detail in previous chapters.

In this chapter I shall describe the demographic background against which the study was conducted. I shall also identify the electronic research needs experienced by postgraduate students, establish relationships between variables and analyse statistically significant relationships. Where no relationships exist, I shall present the data and analyse each variable in turn. I shall also present the data according to various categories of needs that are implicit in the research questions in chapter 1, the categories that emerged from the literature survey in chapter 2, and the conceptual model that I proposed in chapter 3.

I analysed data from the questionnaire where applicable and supplemented it with data from the survey. In this chapter, the main focus is on addressing the second research question 2 (see Figure 13).

Figure 13. Research question 2



What *specific* electronic research needs are experienced by postgraduate students at the University of Pretoria, Faculty of Education?

4.2 Demographic background against which the research was conducted

4.2.1 The context of the Service Unit Groenkloof, Academic Information Service, University of Pretoria

The Academic Information Service (Library) consists of ten service units that are divided on the basis of the faculty that they serve at the university. The Groenkloof Service Unit, which I also refer to as "the Education Library", had never previously, at the time when I commenced this research, conducted any kind of formal and comprehensive needs assessment to identify the needs of client groups working specifically within the field of education. Because of a lack of resources, needs are currently addressed as they occur rather than proactively (which is obviously the ideal). Computer facilities at the library are limited. Library facilities and services at the time of writing consist of the following facilities and services.

Facilities

- ❑ A training venue with one computer for the instructor, and one data-projector.
- ❑ Ten computers that are used by library clients for conducting their research. One of the computers has a DVD player. The computers all share one laser network printer.
- ❑ Internet access to library subscription sites (such as electronic databases and electronic journals to which the library subscribes) are available free of charge. The library offers unrestricted access for registered users to the following information resources across disciplines:

Table 5. Access to information resources offered by the Academic Information Service (AIS Management Team 2005)

Information Resource	Number of titles available through this resource
Full text Databases (Online)	16
Bibliographic Databases (CD ROM)	39
Bibliographic Databases (Online)	120
E-books	467
Monograph Titles (OPAC)	578 512
Print Journal Titles (OPAC)	3 791
E-journal titles	25 000
E-reserves articles	20 121
E-exam papers	2 000
Audio-visual media	20 914
E-theses	366
E-learning course pages	987
World Wide Web	Restricted to academic and scholarly web pages accessible through Google Scholar™

Over recent years there has been a dramatic increase in subscriptions to electronic journal titles. These today in fact far exceed the number of print journal title subscriptions that the library buys each year. Online information is in many ways far more convenient for clients. One advantage is that titles can, for example, be accessed independently of time and location. Because the transition from print to electronic format is taking place by degrees, we, the librarians of the Academic Information Service, find ourselves in an environment that supports both print and electronic formats. It is enormously challenging for one thing to serve clients who entertain vastly different approaches to and expectations of how they should conduct research. Such clients also present with different learning styles and expectations as well as radically personal needs, attitudes and assumptions. All these factors contribute to making service provision in a library such as the Academic Information Service a challenge that changes literally from day to day and client to client.

If one also takes into account the fact that many of our postgraduate students in the Faculty of Education are from previously disadvantaged communities, the challenge for us as professional academic librarians becomes one of meeting each

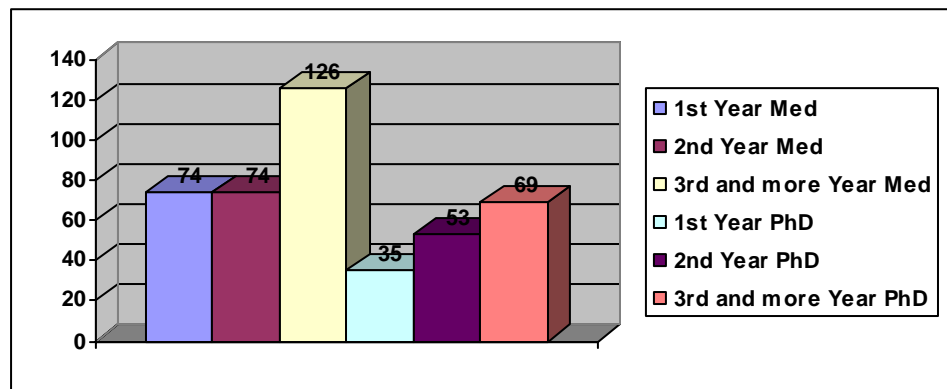
new client on the basis of his or her expectations of what a library such as ours can deliver. Once we have addressed the client's minimal expectations, we can then attempt to lead each client gradually to embrace whatever other services may contribute to a quality research experience. Many of the best facilities that the library has to offer need to be introduced to clients from all demographic profiles. It is these facilities that can make all the difference between a merely satisfactory (but perhaps tiresome) research experience – and one that is of exceptional quality and deeply satisfying to the client. Librarians are often presented with opportunities to take clients to new levels of competence and satisfaction in their research and study. These opportunities often arise spontaneously during the course of interaction between researchers and staff. The challenge to academic librarians such as ourselves is to identify the client's need or deficiency in such circumstances, and then to offer the kind of service that would help the client to be a more efficient and satisfied researcher.

Students who want to access web sites such as Google™ that are outside the Web Access Management Table (WAM table) need first to open an Internet account with the faculty administration. Each student receives a certain allocation of megabytes per year free of charge. After they have used those, they have to pay to access web sites outside the Web Access Management Table. Access to scholarly and academic web sites through Google Scholar™ is free of charge. Each student receives an e-mail address (including limited server space) when registering with the university.

The web service offered by the Service Unit (Education Library) is managed in the following way. Information specialists at the service unit manage the library web site and address the electronic learning and research needs of undergraduates and postgraduates simultaneously. Students may also voluntarily subscribe to an electronic library newsletter that is currently issued on an irregular basis.

Table 6 (next page) shows that the following postgraduate students were registered at the Faculty of Education of the University of Pretoria on 14 March 2005 (Jeannie Beukes, personal communication, March 14, 2006). We make a distinction in the data between postgraduate students who are progressing as expected – i.e. 1st and 2nd year students – and students who are already taking longer than the expected minimum time to complete their studies.

Table 6. Postgraduate students enrolled at the Faculty of Education on 14 March 2005 according to their level of progress



Postgraduate students who are not completing their studies in the expected minimum time of two years exceed the second year numbers. This increases the possibility that some of them will not complete their studies at all. Not shown here are those students who decided to end their studies by the above date (14 March 2005) because of a lack of support on the part of the faculty and other role players such as the Academic Information Service (AIS).

Provision also needs to be made for an additional 8 839 distance students in Education who visit the campus during contact sessions.

It is against this background that I analysed the data received from respondents. The respondents who participated in the questionnaire and survey respectively (these were discussed in chapter 3) are divided as shown in Table 7 on the next page.

Table 7. Postgraduate students enrolled at the Faculty of Education of the University of Pretoria who participated in the questionnaire and survey

Research Instrument	Number of respondents (n)	Respondent %
Questionnaire	122	28.3%
Survey	44	6.16%

28.3% of all postgraduate students at the Faculty of Education participated in the *questionnaire*, while 6.16% of all postgraduate students at the Faculty of Education participated in the *survey*. Since the data represented in this study is mainly from the questionnaire administered to postgraduate students in Education, the data may be one-sided. I shall not therefore claim generalisability for the research results. Data from the survey which was conducted across faculties was adduced in support of findings from the questionnaire. In total, only 9.6% of postgraduate students across various disciplines participated in the survey (Association of Research Libraries 2005, p. 50).

49.7% of postgraduate students who participated in the survey fell in the age group 23-30, while 35.3% fell in the age group 31-45.

Services

The staff allocated to assist postgraduate students consists of three information specialists and a service unit leader. These are assisted by three administrative staff members and four evening staff members. Postgraduate students enrolled with the four departments are divided amongst the three information specialists according to the department with which they are enrolled.

The following services are offered by the three information specialists:

- Bibliographic searches and references for postgraduate students from databases to which the library subscribes
- Assistance with inter-library loans
- Training on an individual basis or within a group. Students are taught referencing techniques and are trained to use the various educational databases.

- Provision of letters of reference for registration with other academic libraries apart from the Academic Information Service of the University of Pretoria

I analysed the research questions and the data from the questionnaire in the context of all facts and information set out above.

4.3 Electronic research needs of postgraduate students in the Faculty of Education of the University of Pretoria

The report of data obtained from the questionnaire below is supplemented by results from the survey where applicable. It focuses on the ways in which postgraduate students prefer to conduct their research, on the tools and applications they prefer, and what they expect and need in order to conduct their research. Once again it should be emphasised that because this report focuses on the response from postgraduate students in Education only, the data is limited in scope and application and cannot be generalised across disciplines or faculties. And since the greater proportion of the sample who participated in the questionnaire were first year postgraduate students, it is probable that their needs had not yet become fully evident either to themselves or to the library staff.

For a discussion of the research methodology (including the research instruments), please refer to chapter 3.

The *Chi-Square test for independence* was used to test the validity of the relationships between the variables. In some cases warnings were issued by SPSS (data computation software) as a result of low frequency counts in certain tables (see Addendum G). In those cases I did not use the test because it is not possible to establish statistical significance. Certain interpretations were, however, still possible.

I identified the following categories of needs from data in the context of the conceptual model in chapter 2.

4.3.1 Electronic access needs

Electronic access needs refer to the various ways in which students prefer to access research material and online content that supports their research. It also refers to the accession of information of an administrative nature and to the frequency with which someone accesses online material, virtual products and resources from the Internet and a library.

While some students still prefer traditional paper-based information, the LibQUAL+™ Survey makes it clear that postgraduate students care less and less about the physical building and tend to rely more and more on electronically available resources and information. Their responses indicated that they find the library a far too noisy locale in which to work (M. Hammes, personal communication, November 9, 2005), and that they would rather therefore access library services electronically from a place that is less stressful to them.

The need most frequently expressed by postgraduate students in the LibQUAL+™ Survey relates to the electronic access of research information. Postgraduate students feel that they are not well informed about the information resources that the library offers. They also regard library resources as being too few and too old, and they are of the opinion that they cannot access them adequately (M. Hammes, personal communication, November 21, 2005). Researchers have a high regard for electronic journals because they know that they are (by their very nature) up to date and that there are no restrictions on their availability (as there are with print journals). Text from such journals is also more easily manipulable. Researchers therefore naturally prefer such electronic journal resources to print journals. It is hardly surprising therefore that electronic journals are the most important resource for researchers and postgraduate students (M. Hammes, personal communication, November 21, 2005), and that their expectations with regard to these (electronic) journals are very high indeed. When they find it difficult to access e-journals because of inadequate bandwidth at home or accessing password-protected and subscription-based databases and journals, postgraduate researchers experience very high levels of frustration and discouragement. It is worth mentioning at this point that the difficulties that researchers experience when trying to access the library's electronic resources is nearly always caused by the fact that such researchers are ignorant of the correct procedures for accessing the electronic journals, databases and e-journals to which the library subscribes. Thus, for example, when the client is using Google™

to search from home, the database vendor or journal platform doesn't recognise the client automatically as being a client from the University of Pretoria. Deep frustration is caused by the client being unable to gain access to a full text password protected article.

The respondents in the survey also expressed a definite need for a Google-like search interface to make the search process more user friendly. This is an issue that is currently being addressed by the Academic Information Service as it investigates ways of working with Google Scholar™. The proposal is to use Google Scholar™ as a federated search engine that will search across all databases and e-journal platforms (including open access scholarly publications) simultaneously after a single authentication of the user. In this scenario, once the user has been authenticated, the client will be allowed access to full text articles in all databases and e-journal platforms to which the library subscribes.

Other access needs that were expressed in response to the open-ended question "Please enter any comments about library services in the box below" from the survey (see Question 40, Addendum F), included the following:

- Unlimited free Internet access from within the library to academic/research web sites
- Full text online access to earlier versions of journals – from 1995 and earlier
- Access to more e-books
- More user-friendly interfaces. The library web page is very confusing at the moment and it is deeply daunting to users who frequently find themselves overwhelmed as they try to navigate their way through various databases and platforms.
- A secure physical area for students who are using laptops
- One username and password for accessing all applications in the university
- A rationalised and simplified library web page. Researchers feel that the information on the library web page is too deeply linked.
- Extended access to the library. The present library opening times prevent postgraduates from working as much as they would like to. Postgraduate researchers (as was noted earlier) tend to have day jobs and to conduct their research at unconventional hours during the night.
- More online study material. Online study material for postgraduates is very limited.

- The need for access to embargoed e-journals. Embargoes (i.e. a holding period put on the journal by the publisher, restricting access to the most recent issues) on e-journals can hamper research.

The electronic access needs of postgraduate students were addressed through the following questions from the questionnaire (Table 8) – see also Addendum C:

Table 8. Questions from questionnaire that addressed the e-access needs of students

Q4	Which of the following do you prefer when conducting your research?
Q12	When using the library web page, which of the following do you prefer?
Q14	How often do you plan to use the online library services/facilities?
Q15	When conducting research using the electronic databases and electronic journals, which of the following do you prefer?

The following questions from the survey tried to establish the frequency of access of online resources (library usage patterns):

Table 9. Questions from survey that tried to establish online library usage patterns

Q31	How often do you use resources within the library?
Q32	How often do you access library resources through a library web page?
Q33	How often do you use Yahoo™, Google™, or non-library gateways for information?
Q40	Please enter any comments about library services in the box below.

4.3.1.1 Most respondents expect to use *both* library databases and Internet search engines when conducting their research

In the conduct of research, 21% of the respondents prefer to only use Internet search engines such as Google™; 14% prefer to use the authoritative databases to which the library subscribes (see Table 10). The majority (64%) indicated that they use both library databases and Internet search engines when conducting their research. 78% of all the respondents will therefore make use of subscription databases while 85% expect to make use of Internet search engines. This makes it clear that the Internet is slightly more preferred by postgraduate students for

purpose of research. More therefore will make use of the Internet or of the Internet and library databases.

Table 10. Preferences of students with regard to the use of online resources

	Number of respondents (n=118)	Respondent %
Internet Search Engines	25	21%
Library databases	17	14%
Both of the above	75	64%
I don't use any of the above	1	1%
Total	118	100%

The results of the survey also indicated that a greater number of researchers prefer to access Internet resources on a daily basis while accessing library resources only once a week (see Table 11). While only 25% of postgraduate students access library databases on a daily basis, 47.4% access other Internet resources on a daily basis. 4.5% of students indicated that they never access library resources through the library web page, thereby implying that they never utilise library databases and e-journals at all.

Table 11. Results from the survey indicating preference with regard to online resources

	Daily	Weekly	Monthly	Quarterly	Never	Total
How often do you access library resources through a library Web page?	179 25%	302 42%	129 18%	74 10%	32 5%	716 100%
How often do you use Yahoo™, Google™, or non-library gateways for information?	339 47%	191 27%	87 12%	38 5%	61 9%	716 100%

4.3.1.2 Most respondents prefer a *separate* postgraduate web page

Table 12 shows that when they make use of the online library web page, the majority of students (78%) prefer a web page that addresses the specific needs of postgraduate students only. This suggests that they prefer not to have struggle with information on web pages that has no relevance for them. 19% of the respondents don't mind to share a web page that simultaneously addresses the needs of the various user groups at the University of Pretoria. They would not therefore mind sharing a web page with academics, undergraduates and external users.

Table 12. Preference with regard to a separate web page addressing needs of postgraduate students only

	Number of respondents (n=120)	Respondent %
A web page addressing the specific needs of postgraduate students	93	78%
A general web page addressing the needs of undergraduate and postgraduate students simultaneously	23	19%
I don't expect to use the library web page	4	3%
Total	120	100%

Table 13 shows that when one compares the frequency of access with the preference for a separate postgraduate web page, all students very definitely prefer a separate postgraduate web page – whether they access it on a daily, weekly or monthly basis.

Table 13. Relationship between frequency of access and preference with regard to a need for a specific web page for postgraduate students only

	Online daily	Online 1x per week	Online 1x per month
PG web page	32 76%	52 84%	6 75%
PG & UG web-page	10 24%	10 16%	2 25%
Total	42 37.5%	62 55.4%	8 7%

4.3.1.3 Most respondents expect to access the library web page at least once a week

Because the library web page is a support page that is constantly in demand, it needs to be accessible at all times. Table 14 shows that the majority of students (53%) expect to access the library web page at least once a week and that 36% expect to access it on a daily basis. 7% expect to access it once a month, and only 4% expect to seldom or never use the online facilities at all. 89% of the respondents will therefore frequently access the web page which offers access to online databases and full text electronic journal articles. The Internet seems to be easily accessible and available to the majority of postgraduate students. This indicates that they will rely very much on updated information on the library web page to support their research and on the web as a communication tool. The library might consider exploiting the high frequency of Internet use among postgraduates by actively promoting library support on its web page. The present web page is very static.

Table 14. Frequency of accessing the online library services

	Number of respondents (n=121)	Respondent %
Daily	43	36%
Once a week	64	53%
Once a month	9	7%
Seldom	3	3%
I don't plan to use any online services	2	1%
Total	121	100%

The above online library usage pattern is confirmed by the results of the LibQUAL+™ Survey (see Table 15):

Table 15. Library usage patterns of postgraduate students

	Daily	Weekly	Monthly	Quarterly	Never	Total
How often do you use resources within the library?	97 13.6%	259 36.2%	222 31%	117 16.3%	21 2.9%	716 100%
How often do you access library resources through a library web page?	179 25%	302 42%	129 18%	74 10%	32 4.5%	716 100%
How often do you use Yahoo™, Google™, or non-library gateways for information?	339 47.4%	191 26.7%	87 12.2%	38 5.3%	61 8.5%	716 100%

Table 15 shows that most postgraduate students (42%) access the library web page on a weekly basis. More students (25%) access the online library resources on a daily basis than those who physically use library resources on a daily basis (13.6%). 47.4% of postgraduate students who participated in the survey indicated that they use non-library gateways such as Google™ and Yahoo™ on a daily basis to search for information. Once again this is an indication that non-library search engines and web sites are preferred: 47.4% use non-library search

engines and web sites on a daily basis while only 25% use online library resources on a daily basis.

A comparison of the study year/group with the frequency of accessing the online services (see Table 16) shows that there is a statistically significant relationship between the study year for which students are enrolled and the frequency with which they access online services. Most 1st and 2nd year MEd students (59.5%) and 1st and 2nd year PhD students (47.6%) expect to access online services at least once a week. 50% of MEd students who are not completing their studies in the minimum required time of two years expect to access online services more often (i.e. on a daily basis), while 80% of PhD students who are not completing their studies in the minimum required time of two years expect to access the online services only once a week. It therefore seems that as PhD students make more progress with their studies, they will rely less on online services. The opposite is true of advanced MEd students who will rely more heavily on online services in their 3rd+ years of studies.

Table 16. Comparison of year of study groups with frequency of access

	Daily	Online 1x week	Online 1x month	Total
1st & 2nd Year MEd	22 34.4%	38 59.5%	4 6.3%	64 100%
1st & 2nd Year PhD	18 42.9%	20 47.6%	4 9.5%	42 100%
3+ Year MEd	2 50%	1 25%	1 25%	4 100%
3+ Year PhD	1 20%	4 80%	0 0%	5 100%

A comparison of the language group to the frequency of accessing online library services (see Table 17) suggests that the majority of first language English or Afrikaans students (71%) expect to access online services only once a week. Students with mother tongue other than Afrikaans or English expect to access online services almost daily (48.4%) or weekly (42.2%). There is not a significant difference between the latter with regard to frequency of access. In both cases – i.e. the Afrikaans and English group, and the “Other” group – there is a small percentage of students who only expect to access the online services once a

month. More students (9.4%) who speak a mother tongue other than Afrikaans or English expect to access online services only once a month.

Table 17. Comparison of language groups regarding frequency of accessing online library services

	Online daily	Online 1x per week	Online 1x per month	Total
Afr & Eng	12 23%	37 71%	3 6%	52 100%
Other	31 48.4%	27 42.2%	6 9.4%	64 100%

Table 18 shows that of all the respondents who indicated an expectation of daily or monthly access, the majority are from the "other" languages group (72% and 67%).

Table 18. Comparison of language groups with regard to frequency of accessing online library services

	Online daily	Online 1x per week	Online 1x per month
Afr & Eng	12 28%	37 58%	3 33%
Other	31 72%	27 42%	6 67%
Total	43 100%	64 100%	9 100%

A comparison of preference for only using search engines or databases or both for conducting research, and the frequency of access (see Table 19), shows no significant difference. The number of students who access the Internet or library databases, whether on a daily basis or only once a week, seems to be almost equal. Since there is a high demand for online resources, both the Internet and databases need to be accessible at all times. This is a strong indication that the library should rethink the accessibility of the 39 databases that are only available from standalone computers within the library. Students obviously prefer not to be dependent on resources that they cannot access via the Internet.

Table 19. Comparison of students who prefer the Internet or library databases and frequency of accessing online services

	Online daily	Online 1x week	Online 1x month	Total
Search using Internet	10 41.7%	11 45.8%	3 12.5%	24 100%
Library databases	7 43.8%	7 43.8%	2 12.5%	16 100%
Both	25 35%	42 59%	4 6%	71 100%

The majority of students plan to access both Internet search engines and library databases (see Table 20), whether on a daily or weekly basis. This once again indicates the high demand for online library resources.

Table 20. Comparison of students who use Internet search engines, library databases or both with frequency of access

	Online daily	Online 1x per week	Online 1x per month
Search using Internet	10 23.8%	11 18.3%	3 33.3%
Library databases	7 16.7%	7 11.7%	2 22.2%
Both	25 59.5%	42 70%	4 44.4%
Total	42 100%	60 100%	9 100%

Table 21 shows that most postgraduate students (42%) in the survey indicated that they access the library web page on a weekly basis. This is supported by results from the questionnaire which showed that most students (52.9%) plan to access library resources on a weekly basis alone (see Table 22). More students (25%) (Table 21) access the online library resources on a daily basis than those who physically use library resources on a daily basis (13.6%). According to the survey, students prefer non-library search engines and web sites (used by 47.4% on a daily basis). This pattern is confirmed by the questionnaire which shows that

most postgraduate students expect to use at least the Internet on a daily basis (23.8%) (see Table 20).

Table 21. Library usage patterns of postgraduate students

	Daily	Weekly	Monthly	Quarterly	Never	Total
How often do you use resources within the library?	97 13.6%	259 36.2%	222 31%	117 16.3%	21 2.9%	716 100%
How often do you access library resources through a library web page?	179 25%	302 42%	129 18%	74 10%	32 4.5%	716 100%
How often do you use Yahoo™, Google™, or non-library gateways for information?	339 47.4%	191 26.7%	87 12.2%	38 5.3%	61 8.5%	716 100%

Table 22. Frequency of accessing online library services

	Number of respondents (n=121)	Respondent %
Daily	43	35.5%
Once a week	64	52.9%
Once a month	9	7.4%
Seldom	3	2.5%
I don't plan to use any online services	2	1.7%
Total	121	100%

4.3.1.4 Most respondents prefer a *single access point* for all electronic research material

55% of the respondents would prefer to search all electronic material (i.e. the Internet, electronic databases and full text journal platforms) simultaneously by one entered search command alone, while 42% would prefer to search through the databases separately (i.e. one at a time) (see Table 23). If one compares this to the preference that the majority of students have for conducting their research

over the Internet (see 4.3.1.1), it once again becomes clear that students prefer a simple interface such as that of Google™ which contains only one search box that has to be filled in. A federated solution for searching has to be found by the library – one that will (1) make it easier for students to conduct their research and one that will (2) permit maximum usage of the very expensive databases to which the library subscribes.

Table 23. Search preferences with regard to search engines and databases

	Number of respondents (n=120)	Respondent %
Searching through all electronic material simultaneously	66	55%
Searching each database separately	50	42%
I won't be using electronic databases and electronic journals	4	3%
Total	120	100%

The need for a single search box is a need that was also frequently expressed by respondents who participated in the survey. These respondents also specifically prefer a **Google-like** interface because they find it very difficult to access databases and e-journals by using the current web page.

4.3.2 Transfer of data and computation

Transfer of data and computation refers to the need to access electronic tools in order to transfer data and to compute data from quantitative and qualitative research that has been conducted. Page-Shipp et al. (2005) are of the opinion that "the infrastructure should make it possible to transfer and otherwise share, between geographically distributed researchers or groups, large data-streams or datasets, including digital objects, and [to] share models and even computing capacity". Transfer of data can take place in a virtual environment onto or from a personal computer, laptop, palmtop or cell phone or onto or from a research network or secure server. From there it can be accessed from anywhere in the world or within a secure environment. Provision should be made for the

protection of such data. Others should only be able to access it by using a username and password.

The transfer of data and data computation needs of postgraduate students were addressed by means of the following questions from the questionnaire (see Addendum C).

Table 24. Questions addressing the data transfer and computation needs of students

Q 10	Which of the following software would you like to be made available on computers inside the library to support your research? You can choose more than one.
Q 9	How willing are you to make your assignments and research projects available on an institutional database so that they can be shared with the rest of the research community at UP and worldwide?

4.3.2.1 Most respondents require access to software to conduct word processing, compile spreadsheets or make presentations

At present students have no access to any word processing, referencing, statistical, plagiarism detection software within or through the library. I used this question to try to establish what software postgraduate students need to support the transfer of data and data computation.

69.7% of the students would like to have access to MSOffice™ for word processing, spreadsheets and presentations. 39.3% need access to statistical software tools. 47.5% need access to software (such as End Note™) that will help them to compile bibliographies and apply referencing techniques (see Table 25). 13.1% indicated that they need access to web design software. Such software might help them to satisfy their need to create a virtual research environment of their own. Respondents were allowed to select more than one option.

Respondents didn't indicate any other software needs such as plagiarism software that verifies that research is free from plagiarism and copyright infringements.

They might simply be unaware that plagiarism software such as *My Dropbox™* and *TurnItIn™* exists because it has only been marketed to a few select lecturers and departments at the University of Pretoria. Plagiarism software is currently unavailable to students at the University of Pretoria.

Table 25. Software needs experienced by students

	Number of Respondents (n)	Respondent %
MSOffice etc.	85	69.7%
Statistical software tools	48	39.3%
Bibliographical software	58	47.5%
Web-design software	16	13.1%

4.3.2.2 Most respondents indicated that they are willing to share their data and research

63% of students reported that they are “most willing” to make their assignments and research projects available on an institutional database so that it can be shared with the research community at the University of Pretoria and the rest of the world (see Table 26). 33% of the students are willing to make *some* of their research available, and only 3% are unwilling to make it available at all. This desire to share one’s research with anyone who is interested rather than only a few select subscribers to some database exemplifies the mindset of those who support the growing open-access movement in scholarly publications throughout the world. This additional free-access visibility and exposure for researchers and their work positions researchers more favourably in the international research arena.

Table 26. Willingness of students to share data and research

	Number of respondents (n= 120)	Respondent %
Most willing to make all available	76	63%
Willing to make some available	39	33%
Unwilling, but open for discussion	4	3%
I am not prepared to make my intellectual material available on such a database	1	1%
Total	120	100%

4.3.3 Communication needs of students

Communication needs refer to the way in which students prefer to interact with the library and the staff within the library. Typical examples of such interaction would be a request for support from the library staff for help in addressing a specific research question or need, or a request to receive some kind of general library-related training that is relevant to their immediate research needs. Effective communication is two-way communication. The client needs to communicate with the library, and the library needs to communicate certain information to the client. Sometimes students don't know that they lack certain information and the library has to tell them what they need to know. The fact that the student population is multi-racial and multi-cultural and that the teaching languages of the university are Afrikaans and English are possible obstacles in the way of effective communication. One of the library's many responsibilities is to be always on the lookout for new ways of improving their communication with their multi-cultural and widely distributed client base at the university.

The LibQUAL+™ Survey makes it clear that the experience that postgraduate students have of the library is not as positive as that enjoyed by the academic staff and undergraduates (M. Hammes, personal communication, November 9, 2005). Students would like online services to be more user friendly. They want to be able to complete the whole registration process online and have immediate access to all library services. They also want information (such as the upcoming expiry dates of materials on loan) to be sent to them well in advance.

The data also shows that some students still prefer the old, more traditional methods of support and training to current innovative systems of electronic support. This shows that not all students are comfortable with an electronic or virtual research environment.

The communication needs of students were solicited in the following questions from the questionnaire (see Addendum C):

Table 27. Questions addressing the communication needs of students

Q3	What is your mother tongue?
Q5	When requiring help from an information specialist, I prefer to communicate ...
Q7	When receiving news and updates from the library, which of the following do you prefer?
Q8	I prefer library training to be conducted ...
Q13	When requesting online assistance from an information specialist, I expect online feedback within ...
Q16	When provided with information on electronic journal articles relating to your research topic, which of the following do you prefer?

4.3.3.1 The majority of students don't use Afrikaans or English as a first language

Only 47% of the students who completed the questionnaire spoke English or Afrikaans as a first language. The mother tongue of 45% of respondents was one of the nine other official South African languages. The mother tongue of the remainder (8%) was an African or a European language. In total therefore: 53% of the postgraduate students enrolled at the Faculty of Education speak a mother tongue other than Afrikaans or English. The library needs therefore to find ways better to support and accommodate second-language Afrikaans or English speakers. They might do this by, for example, providing online tools and services such as tutorials that are supported by a text or voice in the language of a student's choice.

4.3.3.2 Most students prefer face-to-face communication with the library

58% of respondents prefer to put a face to a voice when they communicate with the library. This is significant in an increasingly online virtual research environment where communication occurs (as it does today) more frequently in an electronic mode. The electronic helpdesk called "Ask a Librarian" offered by the Academic Information Service offers an e-mail and online chat facility through which students can post questions to the library or even "chat" to a librarian by means of e-mail. This chat facility is only available during library opening hours. The response time limit permitted by the library for questions that are posted via e-mail is 48 hours.

The survey indicates that 50% of students require online feedback within 24 hours, and that 10% require feedback "as soon as possible". The "Ask a librarian" support service does not therefore comply with the expectations of postgraduate students at the Faculty of Education. Further evaluation of this service needs to be conducted to establish its overall effectiveness.

The questionnaire data shows that only 28% of postgraduate students prefer to communicate via e-mail when help is needed and that they utilise the service that provides for posting questions and requests independently of the library's opening hours or location. 8% of the respondents indicated that they want to be able to communicate by telephone. The remainder (6%) prefer other means of communication such as SMSs, a bulletin board and facsimiles. Part of this 6% don't expect to communicate with the library at all.

The implication of this for the library is that it will have to find ways of offering a *personalised* service to postgraduate students. This could take the form of information specialists introducing themselves to their virtual clients by means of e-mail that includes a photograph with the first e-mail sent to the client.

4.3.3.3 Students prefer receiving an e-mail newsletter

Although the Education Library of the Academic Information Service (Service Unit Groenkloof) has experimented with electronic newsletters before, limited resources did not permit the continuation of this service on a regular basis. The questionnaire made it clear that students have a definite need for receiving

updates from the library. The data shows that 57% want to receive library news and updates through an electronic e-mail newsletter, 35% prefer a printed newsletter, and 8% would like to access a newsletter from the library's web page – in other words, on demand.

Students especially prefer the e-mail newsletter – no matter whether they plan to access online library services on a daily, weekly or monthly basis (see Table 28).

Table 28. Format of the newsletter compared with the frequency of accessing online library services

	Online daily	Online 1x week	Online 1x per month
E-newsletter	29 69%	33 52%	4 50%
Web-newsletter	5 12%	3 5%	1 13%
Printed newsletter	8 19%	27 43%	3 38%
Total	42 37%	63 56%	8 7%

4.3.3.4 Students prefer face-to-face training

81% of all respondents indicated that they would like to receive face-to-face library training. 41% prefer face-to-face *group* training, and 40% prefer face-to-face training on an *individual* basis. A small percentage (10%) still want to be trained by printed manuals or pamphlets. Only 7% want to receive online training by means of a web page, a tutorial, a chat-facility or an e-mail-facility. None indicated that they wanted to receive training over the telephone.

4.3.3.5 Students want *feedback within 24 hours or less*

Because the average postgraduate student is in fulltime employment, he or she has to manage his or her limited time very carefully indeed merely to accommodate the multiple demands of work, family and study. 50% of postgraduate students expect online feedback within 24 hours or less, and 10%

want feedback as soon as possible. The majority of students therefore (60%) don't want to wait too long to receive feedback or a response from the library. 33% of the respondents expect online feedback within 1 to 3 days, and 7% within a week. Nobody indicated that they were prepared to wait up to one month.

4.3.3.6 Students prefer to receive *full text* electronic information about their research

The current practice amongst information specialists is to train students to undertake their own research. If the student still needs help after that kind of training, the information specialist will conduct a search on behalf of the student client and compile a bibliographical list of items that relate to the research topic. Very occasionally, full text articles will be forwarded to clients. Instead of forwarding full text articles to clients, information specialists prefer rather to forward the URL that will enable clients themselves to access a specific article. If clients access articles *themselves*, they will not end up possessing illegal copies of password-protected articles and databases.

The majority of respondents (47%) would like to receive full text journal articles when they access electronic journal articles for their research. Only 29% are satisfied with receiving a list of references with abstracts. 23% on the other hand want only the references to the articles, without the full text or abstracts.

When the nature of feedback on the research topic is compared with the expected time limit allowed for feedback, what emerges is that the majority of students (42%) who want to receive feedback within 24 hours or less also expect to receive the full text from the library (see Table 29). Where students indicated that they want the feedback as soon as possible, 75% of the students also want to receive the full text. What is obvious from this is that there is a very great demand for information specialists/librarians to provide as complete (full text) information as quickly as possible.

Table 29. Comparing the nature of feedback with the time allowed for feedback

	List of references	References & abstract	Full text	Total
24 hours and less	12 23%	18 35%	22 42%	52 100%
1-3 days	10 25.6%	10 25.6%	19 48.7%	39 100%
1 week	2 25%	4 50%	2 25%	8 100%
ASAP	2 16.7%	1 8.3%	9 75%	12 100%

4.3.4 Training and support needs

Training and support needs refer to training clients in how to use the library, in how to locate information on a research topic, in when to use a database, in which database to use, in where to find information on the web page of the Academic Information Service, in how to access information listed on the web page of the Academic Information Service, and in knowing when they should ask for help with their literature surveys and other needs.

The LibQUAL+™ Survey (M. Hammes, personal communication, November 9, 2005) showed that postgraduate students feel they are not adequately trained to use library databases and e-journal platforms.

The training and support needs of students were established by means of the following questions from the questionnaire (see Addendum C):

Table 30. Questions addressing the training and support needs of students

Q 5	When requiring help from an information specialist, I prefer to communicate ...
Q 6	When searching for information on my research topic, I prefer to ...
Q 8	I prefer library training to be conducted ...
Q 11	Would you like to receive training from the library on how to use the Internet?
Q 13	When requesting online assistance from an information specialist, I expect online feedback within ...
Q 16	When provided with information on electronic journal articles relating to your research topic, which of the following do you prefer?

4.3.4.1 Respondents prefer face-to-face communication

As I indicated in section 4.3.3.2 entitled "Communication needs", most students (58%) prefer to communicate face to face with the library staff. The library training that students receive provides them with the information literacy skills they need to conduct their own research. Students prefer this training to be undertaken in a face-to-face (live) format – perhaps because they need or value the possibility of immediate interaction and response from the librarian involved. Although the Internet offers a huge range of highly professional methods and formats for e-learning library content, students do not yet seem ready for this mode of training. Their current need is for the *physical* presence of the librarian/information specialist during their training in new skills.

4.3.4.2 Most respondents prefer to conduct their *own* research after being trained

The majority of students (43%) display a decided preference for conducting their *own* research by using bibliographic databases and the Internet *after they have been trained* by the library. Since the students themselves know their own information needs and preferences best, the library supports this (and their other) preferences. 25% of the respondents prefer to search for information themselves, but would like to be assisted by the library when they need assistance. Only 15% are prepared to conduct their own research *supported only by online help tools*. 10% of the respondents indicated that they expect to be able

to rely fully on information specialists (librarians) to conduct their research on their behalf. This percentage might be reduced if the respondents concerned were to be given a comprehensive training. 6% of the respondents indicated that they wouldn't need any assistance when searching for information. This seems to imply that they have sufficient confidence in their own skills to help themselves. To summarise: the majority of students (90%) are prepared to conduct their own research if they have the option of asking for help or skills training. It seems as though respondents tend to become independent library users once they have acquired the skills they need to conduct their own online research.

When the study year and group, and the preferences that students have with regard to the kind of support they need when they conduct their research (see Table 31) are compared, what becomes clear is that the majority of students from all groups once again prefer to conduct their own research after they have been trained or if additional assistance remains available. The kind of high quality training that clients expect will not only benefit themselves; it will also take the pressure off the university's librarians who, because the library is so chronically understaffed, often have difficulty in addressing individual client needs.

Table 31. Comparison of study year and group with the support preferences of students

	Librarian must find references for me	Search for info myself – after I have been trained	Search for info myself – using online help	Search for info myself – with assistance from librarian	Search for info myself – without any assistance	Total
1st & 2nd Year MEd	9 14%	26 40%	9 14%	15 23%	6 9%	65 100%
1st & 2nd Year PhD	1 2.4%	20 48.8%	9 22%	10 24.4%	1 2.4%	41 100%
3+ MEd	1 25%	1 25%	0 0%	2 50%	0 0%	4 100%
3+ PhD	1 17%	3 50%	0 0%	2 33%	0 0%	6 100%

The relational table on the next page (Table 32) seems to show that the majority of students who would require librarians to find references and information for them (75%) are from the 1st and 2nd year MEd study group. The reason for this expectation might be explained by the fact that 1st and 2nd year MEd students are engaging in formal research for the first time. They might therefore feel that they need as much security and support as possible. This would include offers of support and help from the library. My conclusion is that this group of students need to be well looked after by the library if they are to have a positive research experience in their postgraduate studies and so become lifelong researchers.

Table 32. Comparing study year and group with student support preferences

	Librarian must find references for me	Search for info myself – after I have been trained	Search for info myself – using online help	Search for info myself – with assistance from the librarian	Search for info myself – without any assistance
1st & 2nd Year MEd	9 75%	26 52%	9 50%	15 52%	6 86%
1st & 2nd Year PhD	1 8%	20 40%	9 50%	10 35%	1 14%
3+ MEd	1 8%	1 2%	0 0%	2 7%	0 0%
3+ PhD	1 8%	3 6%	0 0%	2 7%	0 0%
Total	12 10%	50 43%	18 16%	29 25%	7 6%

A comparison of language group with the search preferences of postgraduate students shows that both Afrikaans and English mother tongue speakers (38%) and other mother tongue speakers (48%) would prefer to conduct their own research after they have been trained (see Table 33).

Table 33. Comparison between study year and group and student support preferences

	Librarian must find references for me	Search for info myself – after I have been trained	Search for info myself – using online help	Search for info myself – with assistance from the librarian	Search for info myself – without any assistance	Total
Afr & Eng	8 15%	20 38%	7 13%	13 25%	5 9%	53 100%
Other	4 6.3%	31 48.4%	11 17.2%	16 25%	2 3.1%	64 100%

4.3.4.3 Respondents preference for face-to-face training

I discussed the preference that students have to communicate face to face in section 4.3.3.2 (Communication needs). This has been confirmed by the responses of students with regard to training. As in communication, students (41%) prefer to receive face-to-face training within a group, or face-to-face training on an individual basis (40%). 10% would like to get their training from printed manuals, pamphlets, etc., and only 7% prefer online training that uses the web page, tutorials, an online chat facility, e-mail, etc. None indicated that they want to receive any kind of training over the telephone.

Most Afrikaans and English mother tongue speakers prefer face to face training (65%) (see Table 34). This is also true of other mother tongue language speakers: most (58%) prefer face-to-face training as well.

Table 34. Comparison of language groups with regard to training preferences

	Face-to-face training	Telephone training	E-mail training	Total
Afrikaans and English	34 65%	6 12%	12 23%	52 100%
Other languages	33 58%	3 5%	21 37%	57 100%

What is evident is that there is no significant difference between the language groups when it comes to face-to-face training. More Afrikaans/English mother tongue speakers prefer telephone training (67%) than do other mother tongue speakers (33%) (see Table 35). When it comes to e-mail training, more **Other language** mother tongue speakers (64%) prefer e-mail training than do respondents from the Afrikaans/English mother tongue group.

Table 35. Language groups compared with training preferences

	Face-to-face training	Telephone training	E-mail training
Afrikaans and English	34 51%	6 67%	12 36%
Other languages	33 49%	3 33%	21 64%
Total	67 100%	9 100%	33 100%

4.3.4.4 Respondents want to receive Internet training

At present clients in the Education Library are only trained in how to utilise the most important databases that might contain education-related research material. From the results of this questionnaire it has become clear that students prefer to use Internet search engines or Internet search engines as well as library databases when they conduct their research rather than use databases only (see section 4.3.1.1). If students are going to retrieve authoritative research material that may be of crucial value to them, they need to be urgently trained in how to use the Internet with a commensurate degree of skill. 62% of the respondents indicated that they would like to receive training on how to use the Internet for conducting their research. Only 38% indicated that they wouldn't require any training in how to use the Internet.

A comparison of study year/group with the stated need for Internet training shows that the majority of respondents from all study year groups indicated that they need Internet training (see Table 36).

Table 36. Comparing the study year/group with the need for Internet training

	Want Internet training	Don't want Internet training	Total
1st & 2nd Year MEd	36 54%	31 46%	67 100%
1st & 2nd Year PhD	31 72%	12 28%	43 100%
3+ Year MEd	3 75%	1 25%	4 100%
3+ Year PhD	4 67%	2 33%	6 100%

The majority of respondents who indicated that they need Internet training come from 1st & 2nd year PhD and 3rd+ year MEd students (see Table 36). 3rd year (or more) PhD students were also interested in Internet training. There was less interest among 1st and 2nd year MEd students. More **Other** mother tongue language speakers (65%) than Afrikaans/English mother tongue speakers (35%) expect that they will need Internet training (see Table 37). Since English is the language that is most widely used on the Internet, this is not unexpected.

Table 37. Comparison between language groups

	Want Internet training
Afrikaans and English	26 35%
Other	49 65%
Total	75 100%

44% of students who plan to use only the Internet for conducting their research stated their need for Internet training (see Table 38). It seems as though the majority (56%) are adequately equipped to help themselves in this regard. But students who plan to use *only* library databases indicate an overwhelmingly high need for Internet training (82%). Perhaps it is their lack of expertise in using the

Internet that prompts them to state that they expect to use library databases only.

Table 38. Search preferences compared to Internet training needs

	Want Internet training	Don't want Internet training	Total
Internet only	11 44%	14 56%	25 100%
Library databases	14 82%	3 18%	17 100%
Both	45 61%	29 39%	74 100%

A comparison of the postgraduates' preferred mode of communication (face-to-face, telephonic, e-mail) with student preferences with regard to Internet training, shows that students who want Internet training prefer it to be conducted face to face. The fact that most students prefer face-to-face contact in support and training situations or when they communicate with staff in the library, seems to suggest that they are not yet ready to function in a virtual research environment only. Most of those who want Internet training also prefer face-to-face communication (63%) (see Table 39).

Table 39. Preferred mode of communication when receiving Internet training

	Want Internet training
Face-to-face communication	43 63%
Telephone communication	8 12%
E-mail communication	17 25%
Total	68 100%

Students who won't need Internet training will also rely more on the librarian to help them to find research material (17%) in comparison to students who are

prepared to receive Internet training (7%) (see Table 40). Since it is the policy of the library to encourage students to conduct their own research, the library will have to find ways of decreasing the percentage of postgraduate students who prefer not to receive any Internet training but prefer rather to rely on the librarian to find their references for them. The percentage of students (93%) who are prepared to conduct their own research after being trained is encouraging. This kind of labour-saving self-reliance needs to be promoted both by the library staff and by supervisors.

Table 40. Comparison between the need for Internet training and the search preferences of students

	Want Internet training	Don't want Internet training
Librarian must find references for students	5 6.8%	7 16.7%
Search by students themselves after training	35 47.3%	15 35.7%
Search by students themselves using online help	8 10.8%	10 23.8%
Search by students themselves with assistance from librarian	22 29.7%	7 16.7%
Search by students themselves without other assistance	4 5.4%	3 7.1%
Total	74 100%	42 100%

The students who want Internet training become more independent of assistance from the library (see Table 41). Only 6.8% of students, after they have been trained, will need assistance from a librarian. The remainder (93.2%) are happy to conduct searches themselves.

Table 41. A comparison of the percentage of students who want to receive Internet training with their search preferences

	Want Internet training
Librarian must find references for students	5 6.8%
Search by students themselves after training	35 47.3%
Search by students themselves using online help	8 10.8%
Search by students themselves with assistance from librarian	22 29.7%
Search by students themselves without other assistance	4 5.4%
Total	74 100%

This data shows that Internet training needs to be urgently addressed by the library. This aspect of e-research has thus far been neglected by the library. A possible reason for this neglect could be that some information specialists themselves do not feel properly equipped to conduct effective searches by means of Internet search engines.

4.3.4.5 Respondents require help within 24 hours or less

The urgency with which postgraduate students require feedback is once again confirmed when one views the kind of response time that they feel is acceptable: 60% of all respondents expect online feedback within 24 hours or less, or as soon as possible. 33% expect online feedback within 1 to 3 days, and 7% feel that it is acceptable to wait for up to one week. Nobody is prepared to wait one month.

4.3.4.6 Students prefer to receive full text electronic information for their research

When they get their feedback from the library, respondents indicated that they want such feedback to be as complete as possible. Most respondents (47%) would like to receive full text journal articles when they are sent information about electronic journal articles that are pertinent to their research. 29% want to

receive at least a list of references with abstracts, and 23% prefer only references to articles without any accompanying full text or abstracts.

4.3.5 Publishing needs (including primary data sharing needs)

Publishing needs refer to the extent to which students are prepared to make their research publicly available. Thus, for example, research may be deposited on an electronic database (UPeTD for electronic theses and dissertations), on an institutional research repository (UPSpace), or may simply be published for open access on the World Wide Web.

The following question tried to establish the willingness of students to share their final research publications and maybe primary data within an open access environment:

Table 42. Question that refers to the publishing preferences of students

Q 9	How willing are you to make your assignments and research projects available on an institutional database, in order to share it with the rest of the research community at UP and worldwide?
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4.3.5.1 Most respondents indicated that they are willing to make their research available within an open access environment

63% of students are "most willing" to make assignments, datasets and research projects available on an institutional database so that they can be shared with the rest of the research community at UP and throughout the world. 33% of the students are willing to make *some* of their research available, and only 3% are unwilling to make it available at all (but they would not mind discussing it). This willingness to share research products should be regarded by the university as an opportunity to help novice researchers to position themselves within the national and international research community. Through exposure of this kind, researchers makes themselves and their research more visible. By opening their research in this way they could open themselves to the possibility of national and international dialogue on their research interests.

4.3.6 Other (the open question)

In the questionnaire there was an open question that gave respondents the opportunity to indicate whether there are any other electronic needs they had of which the library should take note (Question 18).

In response to this question, 7% of the respondents indicated that they did not have any immediate needs; 7% indicated that they needed more training – specifically in how to use software such as Reference Manager™, Atlas.ti™, etc. 1 respondent wanted access to other academic South African libraries. Since this service is already offered by the library, it is obviously being unsuccessfully promoted. 3 respondents wanted to have access to full text e-journals/databases off campus. Since this possibility is also already available to all students off campus if they use the correct protocols, it becomes clear that students need to be properly trained and supported so that they can use library facilities more effectively. 1 respondent asked for friendlier service from library staff.

Because I wanted some degree of understanding of how well or otherwise respondents understood abbreviations that are used within the library environment, I asked respondents whether they knew what the abbreviation “UPeTD” stood for.

8% (6 out of the 122 respondents) knew that it stands for *UP Electronic Theses and Dissertations*, (the correct answer). The remainder (92%) made various guesses and some did not answer the question at all. This makes it clear that the library should rethink its use of abbreviations and acronyms. What these abbreviations and acronyms mean is not as obvious to clients as it should be. Having to conduct research in an environment can be very discouraging when one is confronted by a welter of abbreviations and acronyms such as UPSpace, UPeTD, Tyds@Tuks, ILL, IMPS, AIS, etc.

4.4 Summary

Postgraduate students at the Faculty of Education of the University of Pretoria expressed very clear needs with regard to the following:

- ❑ Electronic access: Students are becoming more and more dependent on electronic information and support that can be accessed independently of

time and space. The process of accessing information resources and library services should be made less complicated.

- ❑ Transfer of data and data computation: Students indicated that they need certain software if they are to conduct research. They are also prepared to share their data and to make it available to other researchers.
- ❑ Electronic communication: Students still prefer face-to-face communication and expect feedback to be as complete as possible. On the whole, they expect feedback to be sent to them within a very short space of time.
- ❑ Electronic training and support: Most students prefer to conduct their own research after they have been trained. They also need proper Internet training.
- ❑ Electronic publishing (this includes primary data sharing): Most students are in favour of sharing their primary data and other research on an institutional research database.

Research needs can develop or evolve over time. Such development and evolution depends to some extent on how well the researcher is able to conduct his or her own research. No matter how promising the topic or inspired the student, a researcher who is functionally inept in the mechanics of research will make little progress. The converse is also true. The more experienced, the more computer literate and the better trained a researcher is, the less he or she will require support from the library. The ideal is firstly that online library services should serve only as a portal that offers access to online research tools and material and secondly that library staff should never have to conduct research on behalf of clients. Since most students who participated in the questionnaire were first-time researchers, it is probable that their research needs had not yet crystallised at the time when they were asked to complete the questionnaire. If this is the case, asking them to express their needs and preferences accurately might have been premature (although not entirely unfruitful).

As I pointed out, I related the results of the data analysis to what I found in the literature survey (chapter 2). This I will address in chapter 5. The data analysis in this chapter provided a necessary foundation on which I could:

- ❑ profile current e-clients within a virtual research environment
- ❑ clearly establish and describe the role of the information specialist (librarian) within a virtual research environment
- ❑ recommend ways in which the needs of postgraduate students might be addressed