Internet use among students at St Joseph's Theological Institute in South Africa: Empirical findings and implications for network literacy

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Abstract

Although a review of the literature shows that there are numerous studies on the use of the Internet, the unparalleled growth of the World Wide Web makes it incumbent upon researchers to continually study patterns of use and users' information seeking behaviour. In that regard, a study was carried out at St. Joseph's Theological Institute in South Africa in 2007 to investigate Internet use with the focus on the assessment of the level of network literacy among students. Network literacy - the ability of the end–user to identify, access and use electronic information resources from the information network, is cited as one of the factors influencing the use of the Internet. Data was collected through a self-administered questionnaire and an in-depth interview with the Librarian. Findings revealed that the major problems facing the Internet users at St. Joseph's were the shortage of computers and lack of training in the use of Internet services. Further, students did not use a wide variety of Internet resources such as search engines and computer – mediated communication tools effectively. Recommendations in aid of improving Internet use and network literacy at the Institute were made. Other institutions using the Internet may benefit from this study if the problems that are highlighted in this study are relevant.

Keywords

Computer-mediated communication tools, Internet use, Information seeking, Network literacy, User studies.

1 Introduction

The Internet and the World Wide Web (WWW) have significantly transformed how information is accessed, located and used. Higher education institutions have not been immune to these developments (Byron & Gagliardi 2000; Spennemann 2007).

Learning has become more flexible than in the traditional academic set - up. Curricula can be developed collaboratively and educational materials can be distributed cheaply. Students can interact with study materials and lecturers easily, using a wide range of communication tools. In short, the Internet is gradually defining how information is being used and communicated at many institutions of higher education. As a network of networks, the Internet provides access to information on remote computers, electronic mail, transfer files, global bulletin boards, discussion lists, blogs, wikis and a variety of tools to share and disseminate information and knowledge.

The use of the Internet has the following advantages (Adogbeji & Akporhonor 2005; Anderson 2001; Anasi 2006; Ani, Uchendu & Atseye 2007; Chifwepa 2003; Davis 2002; Ellsworth 1994; Healey 2004; Hong, Ridzuan & Kuek 2003; Jagboro 2003; Jones 2002; Kaur & Manhas 2008; Ke 2002; Lindsay & Mclaren 2000; Luambano & Nawe 2004; Lubans 1999; Madhusudhan 2007; Nachmias & Segev 2003; Ngai *et al* 2008; Ngulube & Thompson 2008; Ojedokun 2001; Olalude 2007; Olatokun 2008; Omotayo 2006; Scherer 1997; Spennemann 2007):

- offering an inexpensive and versatile mechanism of connecting users to global knowledge;
- providing access to the WWW and related Internet tools;
- facilitating teaching and learning;
- serving as an essential tool for information processing and delivery;
- easing communication of information and knowledge;
- producing material on-line for use by others;
- providing access to information and knowledge 24/7; and
- facilitating resource sharing.

However, many users do not benefit from the advantages offered by the Internet partly due to the lack of the required infrastructure to access it, lack of motivation to use it and their poor level of network literacy.

2 Background and context

Since the Internet is an important teaching and learning tool at the tertiary education level, it is argued that an investigation of use of the Internet and level of network literacy at St Joseph's will aid in identifying challenges experienced by students in information retrieval and provide strategies to deal with them in order to facilitate more effective use of the Internet by these students at the institution. Furthermore, strategies on how to address the identified challenges in order to facilitate more effective use of the Internet by students at the institution are provided.

The St Joseph's Theological Institute is located in KwaZulu-Natal in South Africa. Most of the students at the Institution are from communities that were historically disadvantaged by the apartheid system. There were three academic departments at the Institution at the time of the study, namely Philosophy, Theology and Religious Studies. The three academic departments at the institution offered a two year diploma and a three year Bachelor's degree in each of the disciplines. Facilities to access the Internet were introduced in 2003 via 70 computers which were housed in the Main Library. The study was done in 2007 three years after the introduction of Internet facilities at St Joseph's to ascertain documented conclusions that students' initially inadequate search information skills using the Internet (Barry 1997; Hildreth 1997; Scott & O'Sullivan 2005; Tsai & Tsai 2003) can be substantiated in another context.

To effectively participate in the information economy one needs to be information literate. The four dimensions of information literacy that assist people to acquire, process, understand and utilise information to solve problems, make decisions and become effective lifelong learners are conventional literacy, computer literacy, media literacy and network literacy (Hu 1996; Martin 2006; McClure 1994; Wen & Shih 2006). This study focused on the fourth dimension of information literacy because a review of the literature revealed that the concept of network literacy has not been adequately researched (Savolainen 2002; Ngulube & Thompson 2008).

Network literacy can be characterised as the ability of the end – user to identify, access and use electronic information resources from the information network (Barry 1997; Savolainen 2002). Network literacy has four major components (Barry 1997; Savolainen 2002):

- knowledge of information resources available on the Internet;
- skilful use of ICT tools to access networked sources;
- judgement of the relevance of information; and
- use of computer-mediated communication tools.

Part of the network competence model of Savolainen (2002:223-224) provided the theoretical framework and the basis of the research questions that guided the current investigation. The research questions were formulated as follows:

- What are the Internet use patterns among students at St Joseph's?
- Do students at St Joseph's have knowledge of information resources available on the Internet?
- How do students at St Joseph's use available information and communication technologies (ICTs) tools to access networked sources?
- To what extent do students at St Joseph's use computer-mediated communication tools?

3 Delimitations of the study

One of the components of network literacy model of Savolainen (2002) - the ability to judge the relevance of information retrieved from the Internet is beyond the scope of this study. The reasons for the exclusion of this component are:

- the fact that scholars are not agreed on the concept of judging relevance; and
- some degree of reservation exists about the use of the survey method in aid of an interpretation of the behaviour of users in judging the relevance of information retrieved from the Internet on a deeper level.

Many studies emphasise recognition of the relevance of retrieved documents as an essential factor in searching for information in a networked environment (Ford & Mansourian 2006; Mansourian & Madden 2007; McClure 1994). It is conceded that it is necessary to establish how users determine the quality and relevance of information they retrieve from the Internet because many resources exist in an unregulated networked environment as anyone can publish information on the Internet. Furthermore, no one has to approve the content that is posted on many websites before it is made public (Gilster 1997; Harris 2007; Kirk 1996). That raises questions of accountability, authenticity and authority, for example.

At the heart of the problem of judging the relevance of information resources retrieved from a networked environment is that scholars are not agreed on the criteria to be used (Savolainen & Kari 2006). In fact, investigating this particular component of network literacy is further complicated by the fact that:

> …the same person may judge the same document relevant or non – relevant at different points in time, even within a single search session. Different searchers may also disagree on the relevance of a document to a search request (Ruthven, Baillie & Elsweiler 2007).

Other than the problems of determining how end – users judge the relevance of retrieved documents evident in the literature (Ford & Mansourian 2006; Savolainen & Kari 2006), the research methodology adopted in the current study was a major limitation in researching users' behaviour. As a research method, the use of surveys by means of self-administered questionnaires, does not lend itself to an interpretation of the behaviour of users in judging the relevance of information retrieved from the Internet on a deeper level. Literature suggests that data collection methods such as interviews, observations or in-class library exercises and search diary activities are the methods of preference in such cases. Suggestions from the literature and limitations on a practical level justified the exclusion of the investigation of this component of network literacy.

4 Methodology

The survey approach was used to measure Internet usage and the three network literacies enumerated in section 2. The survey research method was also used in the study of

Internet use among students in Botswana (Ojedokun 2001), Nigeria (Adogbeji & Akporhonor 2005; Anasi 2006; Jagboro 2003; Omotayo 2006) and Tanzania (Chachage 2001; Luambano & Nawe 2004). A pre-tested self-administered questionnaire with both open-ended and closed-ended question items was distributed to all 188 students registered at St Joseph's Institute. Data from the questionnaire was supplemented by an in-depth semi-structured interview with the Librarian.

Out of the 188 questionnaires distributed to potential respondents only 65 (34.6%) were completed and returned. Despite several reminders and follow-ups, the response rate remained very low, a well documented characteristic of self-administered surveys. The low response rate normally raises concerns about the validity of findings. According to Babbie and Mouton (2001:261) the consensus in survey research was that a response rate of 50% was considered adequate for analysis, while 60% was good and 70% was considered to be very good. Although the response rates recommended by Babbie and Mouton (2001:261) have a chance of reducing the response error in research, Payne and Payne (2004:222) pointed out that the typical response rate for self-completion surveys was 33%. Indeed, Monopoli *et al* (2002) analyzed their data with a response rate of approximately 25%. In that regard, the results of the current study were analyzed and findings presented despite the low response rate of 34.6%.

5 Major research findings and discussion

First, the general Internet use patterns of the students are discussed followed by an examination of the three network literacy competencies identified above.

5.1 Internet use patterns among students

Of the 65 students who completed the questionnaire 34(52.3%) had used the Internet and 31(47.7%) had not. Out of 24 respondents who gave reasons for not having used the Internet, 17(70.8%) respondents said that they had not received formal training and did not know how to use the Internet. The in-depth interview with the Librarian confirmed that no formal training on the use of the Internet was provided to the students. Lack of knowledge and skills to use the Internet has been highlighted in the literature as the main reason for non - use of this information resource (Adogbeji & Akporhonor 2005; Chachage 2001; Leelavathi & Doraswamy 2007; Luambano & Nawe 2004; Ojedokun 2001; Omotayo 2006).

The shortage of computers and slow network speeds were mentioned by 13 (54.2%) respondents. The interview with the Librarian revealed that the processing speed of the computers when accessing the Internet was slowed down by the available bandwidth and the network. Ten (41.7%) pointed to the unavailability of computers with Internet facilities. Inadequate provision of computers with Internet facilities and slow speed of computers were identified by past research as the reasons why students in an

African academic environment were not using the Internet effectively (Anasi 2006; Ehikhamenor 2003; Luambano & Nawe 2004; Mgobozi & Ocholla 2002; Mishra, Yadav & Kamini 2005; Odero-Musakali & Mutula 2007; Ojedokun 2001; Poda, Murry & Miller 2006). The perception of the students that the computers were not adequate was partly based on the fact that the ratio of computers to students was approximately 1:3 (70 computers to 188 students), and that the library where the computers were housed had limited opening hours as mentioned by 30 (88.2%) of the respondents.

The interview with the Librarian confirmed that access to the computers was restricted by the fact that the library was only open between 08:00 and 16:30 hours from Monday to Thursday and from 08:00 to 13:00 hours on Friday. Many students attend their lessons during these times making it almost impossible for them to be in the library where the Internet infrastructure was accommodated. Limited access to the Internet can be primarily attributed to systemic factors than any other problems.

Approximately half of the respondents 18 (52.9%) who were using the Internet said that they were self - taught. Furthermore, some 9 (26.5%) had trained themselves through Internet tutorials and by the use of the trial and error method. Similarly, Renwick (2005) and Salmon (2002) revealed that the majority of users of the Internet at the University of the West Indies were self-taught. Almost half of the respondents, that is, 16 (47.1%) were using the Internet for accessing academic related materials. Research confirms that the majority of the students in academic environments use the Internet for educational purposes (Ani, Uchendu & Atseye 2007; Gietzelt 2001; Islam & Panda 2007; Kaur & Manhas 2008; Markland 2005; Ojedokun 2001). That tends to suggest that the abuse of the facilities to access the Internet was limited among the students that were surveyed. The use of the entertainment and social networking functionalities was limited partly because the Institute limited access to such functionalities of the Internet.

5.2 Knowledge of information resources available on the internet

Knowledge of information resources available on the Internet is linked to the existence of the documents relevant to the needs of the searcher on the web (Ford & Mansourian 2006). Knowledge of information available on the Internet may be established by exploring the kinds of sources the students use and the extent to which they use these various source types (Chang & Perng 2001; Compton 1989). The categories of source types used to determine the users' knowledge of information resources available in a networked environment were adapted from Chu and Law (2007:31).

Table 1: Rate of use of web-based information resource N=34

Categories of source types	Information resource	Use always	Use some times	No opinion	Rarely use	Never use
Research – oriented sources	E-Journals	5(14.7%)	16(47.1%)	-	11(32.4%)	**2(5.9%)**
	Free web resources	18(52.9%)	7(20.6%)	1(2.9%)	7(20.6%)	**1(2.9%)**
	Portals	3(8.8%)	3(8.8%)	17(50%)	2(5.9%)	**9(26.5%)**
	E-databases	21(61.8%)	8(23.5%)	-	5(14.7%)	**-**
	E-theses	1(2.9%)	-	-	1(2.9%)	**32(94.1%)**
	E-prints	2(5.9%)	1(2.9%)	-	2(5.9%)	**29(85.3%)**
	E-books	3(8.8%)	-	-	7(20.6%)	**24(70.6%)**
Social networking tools[1]	Facebook	-	-	1(2.9%)	1(2.9%)	**29(85.3%)**
	Tagged.com	-	-	-	-	**34(100%)**
	Skyrock.com	-	-	-	-	**34(100%)**
	Mixi	-	-	-	-	**34(100%)**
	Friendster	-	-	-	-	34(100%)
	LinkedIn	-	-	-	-	**34(100%)**
	Blog early, blog often (Bebo)	-	-	-	-	**34(100%)**
	MySpace	-	-	-	-	**34(100%)**
Contact with research community	Online discussion groups	1(2.9%)	-	2(5.9%)	6(17.6%)	**25(73.5%)**
Professional sources	Technical reports	3(8.8%)	-	-	-	**31(91.2%)**
	Trade journals	7(20.6%)	8(23.5%)	-	-	**19(55.9%)**
Academic reference tools	Encyclopedia	9(26.5%)	16(47.1%)	-	9(26.5%)	**-**
	Bibliographies	7(20.6%)	16(47.1%)	-	11(32.4%)	**-**
	Dictionaries	10(29.4%)	-	-	12(35.3%)	**12(35.3%)**
Media	Newspapers	17(50%)	-	-	8(23.5%)	**9(26.5%)**
	Magazines	7(20.6%)	12(35.3%)	1(2.9%)	12(35.3%)	**2(5.9%)**
	Government Publications	4(11.8%)	-	-	3(8.8%)	**27(79.4%)**

The majority of web-based information resources were not used by more than half of the surveyed students. Many students were not frequently using most web - based information resources. E-databases (61.8%) and free web resources (52.9%) were the most frequently used. Professional sources and academic reference tools were not frequently used as indicated in Table 1. E-journals, encyclopaedias and dictionaries were not utilized by the majority of the respondents. Yet, these sources can serve as a useful stating point of reference when one is embarking on a search of information on a subject that one might be unfamiliar with. In a study by Chu and Law (2007) students perceived all the sources listed in Table 1 as important and they used them always. Admittedly, the two authors studied postgraduate students who may have had different perceptions and use of the sources to the undergraduates who constituted the population of this study.

When asked further the 21 (61.8%) respondents said that they did not use most of the resources enumerated in Table 1 because they were not aware of them. Adams and Bonk (1995), Dadzie (2005) and Luambano and Nawe (2004) identified the problem of insufficient awareness of the information resources as the main barrier to the use of many Internet resources. However, the interview with the Librarian at St Joseph's Theological Institution also revealed that the low usage of Internet resources was partly due to the fact that some lecturers put more emphasis on printed sources than Internet information when guiding students to relevant information resources.

5.3 Skilful use of available information and communication technologies (ICTs) tools to access networked sources

Studies have revealed that some students do not use the Internet because of their limited skills and knowledge (Luambano & Nawe 2004; Ojedokun 2003). The major variables used as a measure to answer the research question on skills to operate in a networked environment were the kind of search engines the students used to search the Internet, skills in navigating the Internet and formulating search queries.

Regarding search engines used, Yahoo was reported to be the most used search engine. A total of 14 (41.2%) of the respondents affirmed use of this search engine. Google came second with 12 (35.3%) respondents saying it was their first choice search engine. The two search engines almost enjoy equal popularity. A number of search engines were not selected from the list provided by the researcher (see Figure 1). Ojedokun (2001: 104) and Omotayo (2006:219) also found in their research that Yahoo was the search engine most favoured by the respondents. Studies conducted outside Africa show that Google was the most – used search engine (Asemi 2005; Kaur & Manhas 2008; Julien & Barker 2009; Madhusudhan 2007; Markland 2005). Meta - search engines such as Dogpile were not selected from the given list by any of the respondents. A further question revealed that 33 (97.1%) respondents were not familiar with the use of meta

– search engines (see Table 2). Figure 1 provides further details on the respondents' preferred search engines.

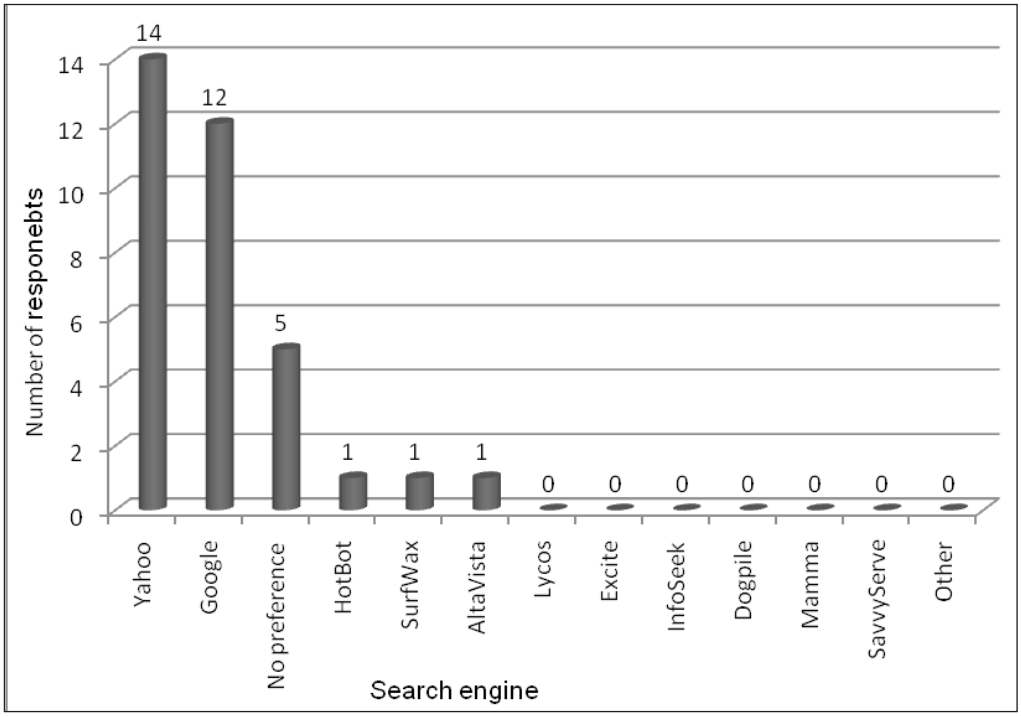

Figure 1: Favourite search engine preferred by the respondents N=34

The manner in which users search the Web has been characterised as either analytical or browsing (Large, Tedd & Hartley 1999). Analytical searching is premised upon the user's identification of the correct search terms and relevant sources. It is key to saving the searcher's time and yielding information that is closely related to the solution to the information problem (Large, Tedd & Hartley 1999:143). Making use of a five – point Likert scale students were asked to rate their level of agreement using with the statements pertaining to their skills to navigate the Internet and formulate search queries that were provided in the questionnaire. The results are presented in Table 2.

Table 2: Skills in navigating the Internet and formulating search queries N=34

Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Understand how a keyword search operate	-	1(2.9%)	-	2(5.89%)	**31(91.2%)**
Understand how a keyword subject search operate	-	1(2.9%)	-	2(5.89%)	**31(91.2%)**
Familiar with a full range of operators, such as the Boolean operators 'AND' and 'OR'	-	-	-	-	**34(100%)**
Understand that there are different databases available for different purposes	21(61.8%)	1(2.9%)	-	7(20.6%)	**5(14.7%)**
Familiar with the use of meta-search engines	-	-	-	1(2.9%)	**33(97.1%)**
Lack of knowledge of appropriate search engines to use in searching for information	15(44.1%)	12(35.3%)	-	6(17.6%)	**1(2.9%)**
Largely depend on browsing to identify suitable information from the Internet	33(97.1%)	1(2.9%)	-	-	-

Table 2 reveals that most students reported that they had limited skills in navigating the Internet and formulating search queries. It is evident that their analytical search skills were not adequate as all the respondents strongly disagreed that they were familiar with Boolean operators. Browsing was the major attractive way of seeking information on the Internet to most respondents as 33 (97.1%) strongly acknowledged their dependency on this informal way of seeking information.

Navigating and browsing skills, formulating a search query (Barry 1997:225) are essentials skills in a networked environment. The stress and effort associated with Web searching may be lessened by the ability to navigate the Internet and the formulation of appropriate search queries. Low search abilities of end – users were also reported by Adogbeji and Akporhonor (2005), Anasi (2006) and Monopoli *et al* (2002).

5.4 Use of computer-mediated communication tools

There are a number of computer mediated (CMC) tools which are freely available on the Internet. CMC tools consist of electronic-mediated communication systems that facilitate human communication across time and distance (Meskill & Anthony 2008; Olaniran 2006). Some of the technologies include asynchronous tools such as emails, mail - bases, shared network group folders, annotatable web - pages and databases, discussion boards (or fora/forums), frequently updated hyperlinked web - pages and web blogs, and synchronous ones such as computer conferencing, video - conferencing, instant messaging (text, voice) and chat (Olaniran 2006; Stevens 2004). Many CMC applications may facilitate students' collaborative and communication activities. The results of survey questions relating to the use of CMC applications to share information, delivers the following picture of the abilities of students.

Table 4: Using network tools to share information N=34

Have used any of the following tools to share information	Yes	No
File Transfer Protocol	8(23.5%)	26(76.5%)
Archie	3(8.8%)	31(91.2%)
Usenet	4(11.8%)	30(88.2%)
Gopher	1(2.9%)	33(97.1%)
Listserv	7(20.6%)	27(79.4%)
Podcast (audio or video digital media files distributed over the Internet)	3(8.8%)	31(91.2%)
Instant messaging	2(5.9%)	32(94.1%)
E-mail	21(61.8%)	13(38.2%)
Blogs	-	34(100%)
Discussion boards	7(20.6%)	27(79.4%)
Other	-	-

E-mail was the frequently used CMC facility. The literature exposed that in terms of usage, the major use of the Internet was e-mail (Chachage 2001; Kaur & Manhas 2008; Jagboro 2003; Ojedokun 2001; Riahinia & Azimi 2008). Contrary to the findings by Lancaster *et al* (2007) instant messaging was not a popular communication technology at this particular college as only two respondents reported the use of this Internet tool. Participation in discussion groups involved 7 (20.6%) of the respondents.

On the list, which was given to the respondents to choose from, there was also a choice of web blogs and podcasts, but it seems that few of the respondents had used these tools. The majority 26 (76.4%) of respondents did not use FTP. According to the study by Hong, Ridzuan and Kuek (2003) students with better basic Internet skills were more positively predisposed toward using Internet tools for learning. The interview with the Librarian confirmed an awareness of the need for training of students which will enable them to use these Internet facilities. The low level of use may be partly attributed to lack of awareness and training on these tools.

When further questioned concerning e-mail use it was found that the vast majority, that is, 30 (88.2%) of respondents had their own web – based e-mail addresses. Just below half 16 (47.1%) of the respondents were using Yahoo mail as their e-mail account. This was followed by Hotmail being used by 13 (38.2%) of the respondents. The most common use of e-mail mentioned by 23 (67.6%) respondents was to communicate with friends and relatives. Communicating with lecturers at St Joseph's Theological Institute was indicated as the next main use of e-mail mentioned by four (11.8%) respondents. Jones' (2000) study of college students and Internet use also found that 19% of students actually communicated more with their professors via e-mail than face-to-face.

6 Conclusions and recommendations

The survey data should be treated with some caution. The sample that was studied was quite small as a result of a low response rate. The response error may affect the extent to which the results can be generalised. There is scope for further studies with bigger sample sizes. However, it can be concluded that the majority of the respondents 18 (52.9%) who were using the Internet said that they were self - taught. Furthermore, some 9 (26.5%) had trained themselves through Internet tutorials and by the use of the trial and error method. Almost half of the respondents reported that they used the Internet to access academic related materials. It was found that the Yahoo was marginally the favourite search engine. One of the problems facing the Internet users at St. Joseph's was accessibility to computers, the inadequate number of computers and the related information technology infrastructure.

On the other hand, respondents did not frequently use information resources available on the Internet. Their skills to use ICT tools to access information in a networked environment were inadequate. Computer – mediated communication tools were not adequately exploited. The results of this study seem to verify previous findings on the use of the Internet in an academic environment. In fact, it confirms the conclusion that students' search information skills using the Internet are initially inadequate (Barry 1997; Hildreth 1997; Ngulube, Shezi & Leach 2009; Scott & O'Sullivan 2005; Tsai & Tsai 2003).

Based on the findings we recommend that there should be more computers available to students at St Joseph's Theological Institute. The extension of hours of opening by

the library may increase accessibility to computers by students. Effective Internet use is largely dependent on the availability of computers (Renwick 2005). Furthermore, the availability of computers will allow for access to the Internet only. Acquiring the necessary skills will aid the effective use thereof. In that regard, training of the students to use the Internet is recommended so that they may have skills to function effectively in a networked environment. The Librarian should include network literacy competencies in the information literacy training programme. Skilful use of the Internet may enable students to effectively navigate the Internet, retrieve relevant information and exploit the advantages offered by computer - mediated tools. Students should also be encouraged to use Google as their search engine of choice because it is touted as a search engine that can search the web better than others (Brin & Page 1998; Rajkoomar & Moodley 2008; Regents of the University of California 2008).

Note

1. Major existing social networking tools at the time of the research are the ones that were listed in the questionnaire.

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