Web based information retrieval pattern of doctoral students in Calicut University

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A structured questionnaire survey of 104 full-time doctoral students in Calicut University reveals that majority of the doctoral students belonging to science departments access the web daily. Most of the doctoral students search the web with simple keywords. Google is the most preferred search engine followed by Yahoo. The use of traditional library resources (print-based) among the doctoral students belonging to science departments has decreased considerably. Majority of the doctoral students are not fully satisfied with access to web-based information resources and indicated 'slow internet accessibility' as their main reason for dissatisfaction. The findings of this study would assist universities in India to develop strategies and policies that could make better use of web-based resources for education and research.

Introduction

The World Wide Web has become the most important information and communication medium in the recent years. The web is a convenient source of specific information which students are increasingly using to complete their assignments and projects[1]. There are millions of websites and webpages on the internet, written by thousands of individuals, companies, organizations, universities, governments, etc. The web can be searched to gain access to a wide range of resources including technical reports, standards, specifications, patents and databases using various search engines and directories. The web can also be used to provide current and up-to-date information on progress in current research projects and assignments, upcoming conferences, seminars and publications via project homepages, bulletin boards and online mailing lists.

As far as information retrieval is concerned, the web enables researchers a more personalised approach to gain access to technical information than in a print or traditional library environment. Majority of researchers explore the web without formal help and training. Exploring the web requires quite different knowledge and skills from those that are required in a print and traditional library environment. The authenticity and quality of web based information is extremely important in the academic and research context. The web as a whole is not well organized and retrieving information from the web is becoming increasingly complicated. The plethora of information available and the corresponding lack of organization of this information can be a barrier to web users.

University of Calicut, the second university to be set up in Kerala, came into being in 1968 with the objective of developing human resources in the northern districts of Kerala by extending the reach of higher education and promoting research in all areas of development with particular emphasis on technology, art and culture of Kerala. At present there are 32 teaching departments offering post graduate courses and providing research facilities in a variety of subjects. The study attempts to assess the web-based information retrieval pattern of doctoral students in Calicut University. The study also identifies the major factors that promote or hinder the use of web-based information resources.

Literature review

Although there is already a rich and extensive body of literature investigating the information seeking and retrieval pattern in the electronic environment, this study attempts to assess the web-based information retrieval pattern of doctoral students. Ward and Newlands[2] conducted an experiment to investigate how exactly students use web-

based information. The study reveals that most of the students just printed or copied the documents straight away from the computer without editing or even having read them to the end. Andrew and Robert[3] found that a key factor for students to use the web as an information resource was time. Most of the students had only a vague understanding of the way search engines work which resulted in poor exploitation of the facilities. Students regarded that web-based resources were more up-to-date than traditional sources but they placed less trust in content. In another study, Grimes and Boening[4] found that students were evaluating web-based resources only superficially and they were indeed using unauthenticated web resources. Cothey[5] examined web users' information searching behaviour in higher education institutions to detect whether there was any change in an individual's web information seeking behaviour after the individual gains experience. The analysis reveals that users access the web often, which was more sporadically, as they become more experienced. Users relied on a passive link clicking or browsing style of information searching. Bond[6] found that the most successful way of finding the web documents was by the efficient use of search engines and a lack of understanding of the advantages of developing search strategies and poor searching skills were the main underlying factors for the successful retrieval of web documents.

Haneefa and Sreelatha[7] assessed the use of e-journals by the doctoral students of Calicut University. They found that almost all the doctoral students were aware of e-journals and majority of them had access to e-journals through the INFONET Centre of the University. Al-Ansari[8] investigated the pattern of internet use by faculty members of Kuwait University. The analysis reveals that the faculty members used the internet mostly for information gathering for research and communication through e-mail. It helped them to save time, find up-to-date information and cooperate with other colleagues. Islam and Panda[9] reported that web-based information was important for research work and traditional library and printed materials were more effective to researchers than web-based information resources. Khare, Thapa and Sahoo[10] in their study found that the rate of internet use was more in research scholars of science, life science, engineering and management as compared to the research scholars of arts, social sciences, law, education and commerce.

Among the non-users of internet, the number of female research scholars was more as compared to males.

The study conducted by Madhusudhan[11] to assess the use of internet by the research scholars of University of Delhi, India reveals that major factors that hampered the effective use of the internet were inadequate computers with internet facility, slow internet connection and lack of skills and training. Biradar, Rajashekhar and Sampathkumar[12] analyzed internet searching behaviour of students and faculty members of Kuvempu University. The study shows that the main purpose of using Internet was study and teaching activities and that Google and Yahoo were the preferred search engines. Lewandowski[13] also found that the two major search engines, Google and Yahoo, perform best and participants approach them more frequently than other search engines. In a study to assess the online use and information seeking behaviour of UK researchers, Nicholas, Clark, Rowlands and Jamali[14] found that research intensive universities were characterized by high volume use and short session times, and sessions which utilized few of the search functions available. Open access journals featured strongly in the ranked lists of life sciences and history; and Google was an extremely popular means of accessing journal content.

In general, the use of web and information seeking and retrieval pattern in the electronic environment are studied and discussed at different levels. However, there is a little research that focuses on the web-based information retrieval pattern of doctoral students in developing countries like India. Most of the studies have been conducted in developed countries. Thus, there are still gaps in this area that are available for future research. This study provides an insight into the current web-based information retrieval pattern of doctoral students in the universities of Third World. It is expected that the findings of this study would assist universities in India to develop strategies, policies and future plans that could make better use of web-based information resources for education and research.

Objectives of the study

- To examine the current web-based information retrieval pattern of the doctoral students;
- To determine the different web search methods used by the doctoral students;

Table 1 — Place(s) of web surfing

Place(s)	Doctoral Students		
	Science Depts.	Non-science Depts.	Total
Home	3(6.52)	7(12.07)	10(9.62)
Department	8(17.39)	11(18.96)	19(18.26)
Cyber Café	16(34.78)	36(62.07)	52(50)
All above	19(41.31)	4(6.90)	23(22.12)

Note: Figures in parentheses give percentage

- To compare the use of web-based information resources among the doctoral students belonging to science and non-science departments;

- To ascertain the extent to which the doctoral students are using traditional library resources;

- To identify the specific factors that hindered the use of web-based information resources; and

- To assess to what extent the doctoral students are satisfied with the web-based information resources.

Methodology

A survey method based on a structured questionnaire was used for the study and the questionnaires were administered directly to the doctoral students. In preparing the questionnaire, similar studies and previously drafted questionnaires in this area were consulted. This study was confined to all the full-time doctoral students of Calicut University. A total of 131 questionnaires were distributed to the doctoral students at various times during the months of September to December 2009. A total of 113 filled in questionnaires were received back. From these, 104 questionnaires were found to be usable, which comes to an overall response rate of 79.4 per cent. The 104 responses comprised 46 (44.2 per cent) doctoral students belonging to science departments and 58 (55.8 per cent) doctoral students belonging to non-science departments. Nine questionnaires were rejected, as they were incomplete and not properly filled. The data collected through questionnaires were converted into machine-readable form and imported into the statistical analysis package, SPSS. The data were analysed and inferences made based on standard statistical methods.

Results and discussions

Place of web surfing

The doctoral students were asked to indicate the place(s) of access to web and the responses are summarized in Table 1. It reveals that half of the doctoral students (50 per cent) access the web from the Cyber Café. A few (18.26 per cent) students access the web from their departments itself and only 9.62 per cent students use the web at their home. The Calicut University has a Cyber Café for surfing the Internet. It shows that majority (62.07 per cent) of the students belonging to science departments and 34.78 per cent students belonging to non-science departments access the web from the Cyber Café. A few students from the science departments (17.39 per cent) and non-science departments (18.96 per cent) access the web from their departments.

Frequency of web surfing

Table 2 gives the frequency of web surfing by the doctoral students. The analysis shows that a good number (40.38 per cent) of students surf the web daily. A few (30.77 per cent) of the students access the web once in a week and 23.08 per cent of the students access the web two or three times in a week. Very few (5.77 per cent) students surf the web as and when required.

It was also found that majority (58.70 per cent) of the doctoral students belonging to science departments and a few (25.86 per cent) of the students belonging to non-science departments surf the web daily. A few of the

Table 2 — Frequency of web surfing

Frequency	Doctoral Students		
	Science Depts.	Non-science Depts.	Total
Daily	27 (58.70)	15 (25.86)	42 (40.38)
2/3 times in a week	13 (28.26)	11 (18.97)	24 (23.08)
Once in a week	6 (13.04)	26 (44.83)	32 (30.77)
Once in a month	-	-	-
As and when required	-	6 (10.34)	6 (5.77)

Note: Figures in parentheses give percentage

Table 3 — Time spend for accessing the web

Time	Doctoral Students		
	Science Depts.	Non-science Depts.	Total
Less than 1 hour	16(34.78)	37(63.79)	53(50.96)
1-2 hours	23(50)	21(36.21)	44(42.31)
More than 2 hours	7(15.22)	-	7(6.73)

Note: Figures in parentheses give percentage

students belonging to science departments (28.26 per cent) and non-science departments (18.97 per cent) access the web two or three times in a week. A very few students (13.04 per cent) from the science departments and a good number (44.83 per cent) of the students from the non-science departments surf the web once in a week.

Time spent for accessing the web

The doctoral students were asked to indicate the average time they spent for accessing the web at a time. Table 3 reveals that about half (50.96 per cent) of the students use the web for less than one hour and a good number (42.31 per cent) of the students use it for one or two hours. A very few (6.73 per cent) students access the web for more than two hours. It shows that 50 per cent of the students belonging to science departments and 36.21 per cent of the students belonging to non-science departments surf the web for one to two hours at a time. Majority (63.79 per cent) of the students belonging to non-science departments and 34.78 per cent of the students from science departments use the web for less than one hour. A few (15.22 per cent) students from the science departments use the web for more than two hours. It is found that the average time taken for surfing the web by the doctoral students belonging to non-science departments is less compared to the students belonging to science departments.

Purpose of using the web

The students were asked to indicate the purpose of using the web and the responses are summarized in the Table 4. The analysis shows that all the doctoral students belonging to science departments access the web for a

Table 4 — Purpose of using web

Purposes	Doctoral Students					
	Science Depts.		Non-science Depts.		Total	
	Yes	No	Yes	No	Yes	No
Searching research related materials	46 (100)	-	28 (48.28)	30 (51.72)	74 (71.15)	30 (24.85)
Searching subject databases	46 (100)	-	5 (8.62)	53 (91.38)	51 (49.04)	53 (50.96)
Accessing e-books	46 (100)	-	3 (5.17)	55 (94.83)	49 (47.12)	55 (52.88)
Accessing e-journals	46 (100)	-	31(53.45)	27 (46.55)	77 (74.04)	27 (25.96)
Carreer information	46 (100)	-	58 (100)	-	104 (100)	-
Communication	46 (100)	-	58 (100)	-	104 (100)	-
Downloading programs, files, images	46 (100)	-	49 (84.48)	9 (15.52)	95 (91.35)	9 (8.65)
Entertainment, fun, games, etc	46 (100)	-	9 (15.52)	49 (84.48)	55 (52.88)	49 (47.12)

Note: Figures in parentheses give percentage

variety of purposes ranging from communication to entertainment. About half (48.28 per cent) of the students belonging to non-science departments use the web for retrieving research related materials, and a very few (8.62 per cent) access the web for searching subject databases. It reveals that only three (5.17 per cent) students from non-science departments use e-books and about half (53.45 per cent) of the students use e-journals. All the students use the web for communication and downloading programs, files, and images.

Frequency of using the web for different purposes

Here an attempt has been made to find out the frequency of using the web by the doctoral students. The data (Table 5) reveals that about half of the students very frequently use the web for retrieving research related materials (50.96 per cent) and accessing e-journals (57.69 per cent). About half of the students frequently use the web for communication (51.92 per cent) and downloading (55.77 per cent) purposes. It shows that about half of

the students never use the web for accessing subject databases (50.96 per cent) and e-books (52.89 per cent), and majority of them belong to non-science departments.

Frequency of using search engines

The use of web search engine has become common place among web users, and is increasingly being used in all aspects of society[15]. As the amount of information on the web continues to grow, web-based information resources will continue to be a primary source by which users find information. The students were asked to indicate the search engines used and the responses are summarized in the Table 6. It reveals that all the doctoral students use Google and about half (48.08 per cent) of them use Yahoo very frequently. No one uses Hotbot and Web Crawler search engines. Majority of the students do not use AltaVista (77.88 per cent) and Excite (91.35 per cent) search engines.

Use of meta-search engines

Meta-search engines are sites that take queries, send

Table 5 — Frequency of using web for different purposes

Purposes	Doctoral Students				
	Very frequently	Frequently	Occasionally	Rarely	Never
Search for research related materials	53 (50.96)	14 (13.46)	6 (5.77)	1 (0.96)	30 (28.85)
Searching subject databases	6 (5.77)	16 (15.39)	29 (27.88)	-	53 (50.96)
Accessing e-books	2 (1.92)	14 (13.46)	29 (27.88)	4 (3.86)	55 (52.89)
Accessing e-journals	60 (57.69)	11 (10.58)	6 (5.77)	-	27 (25.96)
Carreer information	48 (46.15)	45 (43.27)	11 (10.58)	-	-
Communication	43 (41.35)	54 (51.92)	7 (6.73)	-	-
Downloading	4 (3.85)	58 (55.77)	23 (22.11)	10 (9.61)	9 (8.65)
Enjoyment, fun, play games	3 (2.88)	27 (25.96)	7 (6.73)	18 (17.31)	49 (47.12)

Note: Figures in parentheses give percentage

Table 6 — Frequency of using search engines

Search engines	Doctoral Students		
	Often	Sometimes	Never
AltaVista	4 (18.27)	19 (77.88)	81
Excite	-	9 (8.65)	95 (91.35)
Google	104 (100)	-	-
Hotbot	-	-	104 (100)
Web Crawler	-	-	104 (100)
Yahoo	50 (48.08)	54 (51.92)	-

Note: Figures in parentheses give percentage

them to a large number of search engines and return the result to the user. Most meta-search engines will collate results, re-weight them according to their ranking at each source engines, eliminate duplicates, and cluster them according to a topic. Table 7 shows the responses from the doctoral students about the use of meta-search engines. The analysis shows that majority (60.58 per cent) of the doctoral students do not use meta-search engines. Only 39.42 per cent of the students use meta-search engines. Majority (73.91 per cent) of the students belonging to science departments stated that they use meta-search engines. A large majority (87.93 per cent) of the students from the non-science departments do not use meta-search engines.

Frequency of using different search methods

Most search engines allow for the use of Boolean operators in searches. Boolean logic allows users to limit searches to specific phrases rather than simply keywords, to exclude irrelevant terms or phrases from

Table 7 — Use of meta-search engines

Use of Meta-Search engines	Doctoral Students		Total
	Science Depts.	Non-science Depts.	
Yes	34(73.91)	7(12.07)	41(39.42)
No	12(12.07)	51(87.93)	63(60.58)

Note: Figures in parentheses give percentage

Table 8 — Frequency of using different search methods

Search methods	Frequency		
	Often	Sometimes	Never
Simple	104 (100)	-	-
Boolean	47 (45.19)	42 (40.39)	15 (14.42)
Truncation	-	-	104 (100)
Field searching	-	-	104 (100)
Phrases	-	8 (7.69)	96 (92.31)

Note: Figures in parentheses give percentage

searches. The respondents were asked to indicate the frequency of different search methods used for retrieving information from the web. Table 8 indicates that all the doctoral students mainly use simple search methods for retrieving information resources. A good number (45.19 per cent) of them use 'Boolean' operators. The search methods like 'Truncation' and 'Field searching' are not familiar to the students and they do not use these methods. A very few (7.69 per cent) of the students use 'Phrases' for searching the web. It was found that most of the students use simple keywords for searching the web.

Changes in the use of traditional library resources

The doctoral students were asked about their approach to the use of traditional library resources (print-based). The data presented in Table 9 indicates that majority (60.58 per cent) of the doctoral students indicated that their use of traditional library resources decreased after

Table 9 — Changes in the use of traditional library resources

Changes	Doctoral Students		Total
	Science Depts.	Non-science Depts.	
Increased	-	-	-
Decreased	42(91.30)	21(36.21)	63(60.58)
No change	4(8.70)	37(63.79)	41(39.42)

Note: Figures in parentheses give percentage

the use of web-based resources. A good number (39.42 per cent) of the students stated no change in the use of traditional library resources. A large majority (91.30 per cent) of the students belonging to science departments and a good number (36.21 per cent) of the students from non-science departments stated that use of traditional library resources began to decrease after they began to use of web-based information resources. Only a very few (8.70 per cent) of the students from science departments stated that there is no change in the use of traditional library resources. But majority (63.79 per cent) of the students belonging to non-science departments indicated that there is no change in the use of traditional library resources. Majority of the students belonging to science departments stated that their use of traditional library resources has decreased after the use of web-based resources. It is also found that no student claims that there is an increase in the use of traditional library resources. Doctoral students belonging to science departments use the web more than the students belonging to non-science departments.

Satisfaction with web-based resources

The respondents were asked to indicate to what extent they were satisfied with web-based information resources. They were provided three options to indicate their responses. Table 10 shows that only a few (20.19 per cent) of the doctoral students are fully satisfied with web-based resources. Majority (65.39 per cent) of the students are partially satisfied with web-based resources. It reveals that majority of the students belonging to non-science departments (70.69 per cent) and science departments (58.70 per cent) are partially satisfied with web-based resources. A good number (41.30 per cent)

Table 10 — Satisfaction with web-based resources

Satisfaction	Doctoral Students		
	Science Depts.	Non-science Depts.	Total
Satisfied	19 (41.30)	2 (3.45)	21 (20.19)
Partially satisfied	27 (58.70)	41 (70.69)	68 (65.39)
Not satisfied	-	15 (25.86)	15 (14.42)

Note: Figures in parentheses give percentage

Table 11 — Reasons for dissatisfaction with web-based resources

Reasons	Doctoral Students		
	Science Depts.	Non-science Depts.	Total
Slow internet accessibility	46 (100)	40 (68.97)	86 (82.69)
Lack of sufficient computer nodes	-	28 (48.28)	28 (26.92)
Lack of internet facility	3 (6.52)	11 (18.97)	14 (13.46)
Information overload	9 (19.57)	4 (6.90)	13 (12.50)

Note: Figures in parentheses give percentage

of the students belonging to science departments and two (3.45 per cent) students from non-science departments indicated that they are satisfied with web-based resources. A few (25.86 per cent) of the students belonging to non-science departments are not satisfied with web-based resources. Doctoral students are not successful in exploiting the web. Most of them do not know how to use the web for their research work.

Reasons for dissatisfaction with web-based resources

The questionnaire listed four possible reasons for the doctoral students to indicate their dissatisfaction with the use of web-based information resources. They were asked to mark all the items they considered applicable in their cases. Table 11 shows that all the doctoral students belonging to science departments and majority (68.97 per

cent) from the non-science departments indicated slow internet accessibility as the main reason for the poor use of web-based information resources. A few (26.92 per cent) of the students indicated that lack of computer nodes hinder their use of web. Lack of internet facility (13.46 per cent) and information overload (12.50 per cent) are the other reasons indicated by the students for the poor use of web-based resources. The major factors that hinder the use of web in Calicut University are the slow internet backbone speed and lack of computer infrastructure. Most of the departments in the University lack sufficient infrastructure for accessing the web and have a single workstation with internet connection.

Conclusion

Though the academic departments of Calicut University have internet access, the use of web-based information resources by the doctoral students of the University is not satisfactory. Findings of the study revealed that the internet access and infrastructure facilities are very poor in the departments of Calicut University. This is the main reason for the under-utilization of web-based information resources. Many students are therefore missing the opportunity to avail themselves of the many web-based information resources that could benefit them academically. Improved access to relevant information will result in an increase in the productivity in universities. Therefore, immediate steps should be taken to provide state-of-the-art computer infrastructure with full-fledged internet access in the departments. It is found that the use of web-based resources and the average time taken for surfing the web is comparatively high among the students belonging to science departments than the students belonging to non-science departments. It may be due to the fact that the web-based resources are comparatively high in science subjects than the non-science subjects. The use of traditional library resources among the doctoral students belonging to science departments has decreased considerably. However, traditional library resources are still more effective to the doctoral students belonging to non-science departments. It may be due to their greater familiarity with printed and traditional library resources.

Despite the explosive growth of internet and higher penetration rate of information and communication technologies among students, most of the doctoral students in Calicut University do not know how to use the web-based resources effectively. The doctoral

students should be taught to use a variety of searching methods and strategies when exploring the web. Search methods and strategies are very important and merely using search engines haphazardly should be avoided. They should know how to narrow down a search by filtering unwanted information using the best search terms. They should be made more aware of the many web-based information resources that can benefit them academically. They should be encouraged to use official websites of reputed institutions and organizations, consortia, e-journals and publishers. They should be able to locate, describe and justify a website with specific relevance to their information requirements. They should develop critical selection and analytical skills for locating, selecting and incorporating relevant information into their research work. Once this level of skills is achieved, the knowledge-acquisition process can significantly speed up[16]. The study concludes that the doctoral students in Calicut University should be provided full-fledged internet access, state-of-the-art computer infrastructure and training or orientation to make them more effective users of web-based information resources.

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