Internet Literacy Skills among Research Scholars of Rajshahi University, Bangladesh: A Study

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Abstract

Now a day Internet has become indispensable part in modern research work. There is no research work carried out in modern era where Internet can't effectively be utilized. Quick and easy access to scholarly materials and enormous number of e-resources makes it more dependable sources of information for research scholars. That's why a modern researcher must have the competencies and some sorts of skills in searching and retrieval of information over Internet. The present study was carried out with a view to explore the extent of Internet literacy skills among research scholars of Rajshahi University, Bangladesh. For this purpose primary data in relation to assess the level of Internet literacy skills collected through a self-designed questionnaire. 125 research scholars were randomly selected and distributed them questionnaire to which 96 research scholars returned the questionnaire with a response rate of 76.8% out of which 92 respondents (96%) access Internet. The study revealed that a high percentage of the research scholar (78.26%) access Internet to support research and development. Though majority percent respondents (96%) have idea on advanced literature search techniques yet half of the respondents usually search Internet for specific piece of information using 'exact phrase'. A high percentage of respondents have practical knowledge on search engines (89.13%) and web browser (83.69%) while a majority of them don't have any idea on semantic web (95.65%), programming language (83.69%) and web development (81.52%). Majority percent of the respondents have the awareness towards the usage of some web resource tools like SNS, e-mail and blog sites. In the case of e-journal database, OPAC and citation index database, almost half of the respondents are unaware. More than half of the respondents neither use narrowing parameters nor avoid adjectives, prepositions, and articles in search phrase. Use of Boolean operator, term truncation, wild card, bracket and nesting command and proximity operators are not familiar in most of cases under survey.

Keywords: Internet Literacy; Rajshahi University; Research Scholars.

Introduction

Bangladesh is one of the most densely populated countries in the world (14,97,72,364 as on 15 March 2011) with a average Internet penetration rate (66.862 million as on September 2016)[1,2]. Though Internet came in private service sector of Bangladesh in the mid of 1996 the concept of Internet became familiar in 2012 through launching 3G internet service in mobile phone service[3,4].

University of Rajshahi is one of the oldest public universities located in Rajshahi, Bangladesh. At present the university has 57 departments organized into 10 faculties, 7 institutes, 25,000 students (approximately) and more than 1200 teachers, which make the 2nd largest university of Bangladesh [5]. Considering the multifaceted and dynamic role of the Internet, universities of all sizes and types are now connecting to the web and thus providing myriad Internet facilities to students, teachers, researchers and officials. Rajshahi University is one of the leading higher academic institutions of Bangladesh that has positively begun to take advantage of this superior technology for her large population. The university

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formally launched Internet in April 2000 through a Rajshahi-based local ISP, Three Sons Ltd. establishing a fiber optic backbone-based Local Area Network [6].

Effective Internet access is dependent not only on availability of technological support and infrastructure but too on some sorts of skills and efficiencies what we better call 'literacy' of Internet users. Internet literacy is nothing but better ability to work with Internet services. This ability can be multifaceted capabilities i.e. how to search relevant, accurate information over Internet by avoiding useless one; how to work effectively with various Internet tools, techniques and applications to meet up demand of social, academic, business, personal, research and recreation work.

Internet Literacy

Internet is the grand network of networks while literacy means knowledge that relates to a specified subject [7,8]. Therefore Internet literacy is critical skills that help to use Internet properly by avoiding unsafe and illegal content and ensuring security and privacy. Bawden (2001) think that the concept of Internet literacy derived as a part from general information literacy, which is further constituted by traditional literacy, computer literacy, library literacy, network literacy (synonymous with Internet literacy), and digital literacy[9].

Livingstone, Bober & Helsper (2005) defined Internet literacy as "the ability to access, understand, critique, and create information and communication content online". They argue that due to growing prominence of Internet such ability, skills, and competencies on Internet are required to get effective result [10].

Obasuyi and Otabor (2012) defined Internet literacy for under graduate student as a relative measure of students' capacity to make use of the internet for educational and learning purposes. It is not just about website analysis but the skills it takes to read, disseminate and evaluate online sources in order to socialize, network and collaborate with people [11].

Rapid growth in amount, type and format of information on Internet forced its users to become literate. There are several factors to be considered for Internet users behind internet literacy. Islam and Begum's (2010) observations in this regard are worth mentioning for why such skills and competencies on Internet are required [12]:

• Internet does not have any general web pages uploaded policy. Anyone can upload any type of materials beyond ethics, moral and values.

• Internet does not have regular or any kind of weeding policies. As a result Internet seriously suffers from outdated information with current one.

• Internet covers comprehensive collections that often mislead users to pick up the right information at right time.

• There is no definite indexing system for organizing huge array of information resources in Internet. Among this huge bulk of information it is very tricky for users to differentiate which are relevant and which are not.

• Internet does not ensure quality control of information being uploaded for all websites. Lack of evaluation or review of information sources through billions of web pages, it has sometimes become difficult to trace out right information at all the time.

Research Objectives

The present study was designed mainly with a view to explore Internet literacy skills and competencies among research scholars. The other objectives which are also pertinent with main objectives as follows:

• To know their preferences and knowledge level in the usage of Internet;

• To investigate their search techniques and strategies in Internet;

• To identify how they evaluate web resources

Materials and Methods

The present study was exploratory in nature using survey method. The data was collected by a structured questionnaire consisting of 16 different questions relating to reflect literacy skills and competencies of the respondents regarding information searching and retrieval techniques on Internet. The questionnaire comprising of both open and close questions was formulated based upon basically literature review. The questionnaire had been broken into four distinct parts for the purpose of easy understanding for the respondents, and straightforward data analysis, viz. demographic Information, Internet use and preferences, search techniques and strategies and evaluation. The respondents of the present research are basically research scholars who are currently pursuing Mphil or PhD degree under different departments and institutes of Rajshahi University, Bangladesh. The structured questionnaire was randomly sent to 125 research scholars in Rajshahi University. In reply 96 questionnaires (at the rate of

76.8% response) were returned to the researchers out of which 92 respondents (96%) access Internet. Five and in some cases three likert numbering scales have been used here to depict frequency and other levels for getting respondents opinions. All the gathered data have been analyzed by using modern descriptive statistical methods and presented in tabular, graphical and theoretical form.

Results and Discussion

The collected data were analyzed, classified, and tabulated. The questionnaire based on a set of questions was implied to collect data. In this section, analysis has been prepared only those questions which are essential to conduct the objectives of the study.

Weighted arithmetic mean has been used here. For measuring frequency as for example, qualitative terms have been arranged in ascending order i.e. from 'Always' to 'Never'. So, lower the mean value means better value in frequency and other scales. For getting result upper limit has been counted here if there is fraction in numeric value of mean score only when the fraction is equal and more than .5. The analysis has been shown in different angles through both tables and graphs.
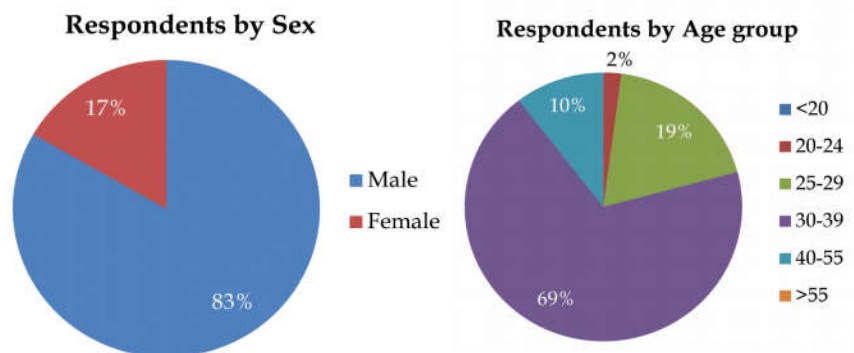

Fig. 1: Sex and Age distribution of the respondents
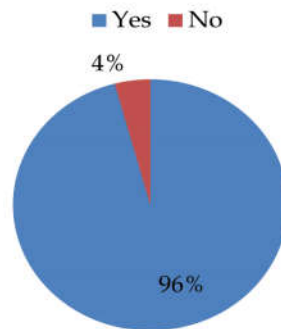

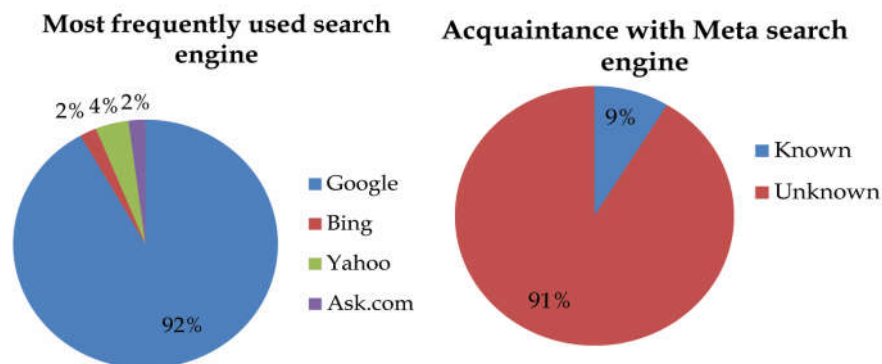**Fig. 2:** Internet access by the respondents

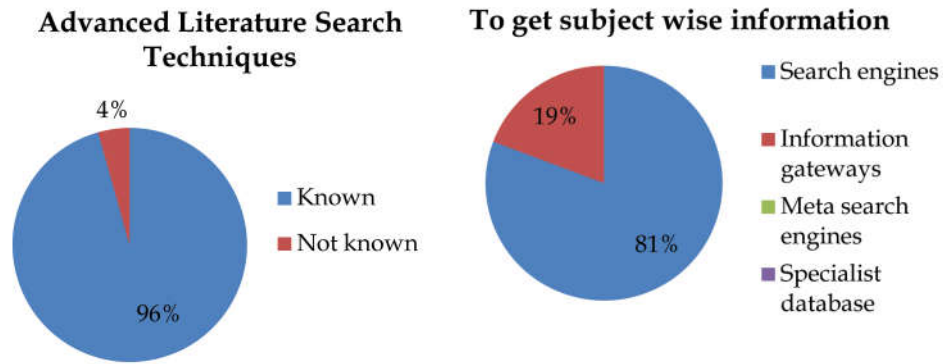**Fig. 3:** Search engine and Meta search engine

Fig. 4: Advanced literature search techniques and search tools to get subject wise information

Table 1: Reasons to use internet (multiple responses)

Reasons	Number & Percentage
To communicate with others	82 (89.13%)
To support research & development	72 (78.26%)
To update subject knowledge	70 (76.08%)
To prepare class notes for learning	44 (47.82%)
To carry out project work	36 (39.13%)
To attend or organize seminars/workshops	30 (32.60%)
To write research paper	68 (73.39%)
To get relevant information of interest	60 (65.21%)
To be ICT expert	2 (2.17%)
To be well informed	48 (52.17%)
To have entertainment	48 (52.17%)
Others	4 (4.34%)

Table 2: Knowledge level on ICT tools and techniques

ICT tools and techniques	1	2	3	Weighted $\overline{x}$	Rank
Web browser	15 (16.30%)	77 (83.69%)	-	1.84	1
Search engines	10 (10.86%)	82 (89.13%)	-	1.89	2
Web development	6 (6.52%)	11 (11.95%)	75 (81.52%)	2.75	3
Programming language	5 (5.43%)	10 (10.86%)	77 (83.69%)	2.78	4
Semantic Web	-	4 (4.34%)	88 (95.65%)	2.96	5

(N.B. *Scale:* 1= Sound knowledge, 2=Practical knowledge, 3=Don't have any idea)

Table 3: Crawlers based search engine Vs human powered directories

Response pattern	Number & Percentage
Capable to differentiate	8 (8.69%)
Don't have idea	84 (91.30%)

Table 4: Awareness towards the usage of web resource tools

Web resources tools usage	Knowledge level scale					Weighted $\overline{x}$	Rank
	1	2	3	4	5		
e-mail or mail group	35 (38.04%)	34 (36.95%)	16 (17.39%)	5 (5.43%)	2 (2.17%)	1.97	1
SNS	30 (32.60%)	32 (34.78%)	12 (13.04%)	6 (6.52%)	12 (13.04%)	2.33	2
Blog sites	30 (32.60%)	21 (22.82%)	18 (19.56%)	6 (6.52%)	17 (18.47%)	2.55	3
e-journal database	6 (6.52%)	24 (26.08)	12 (13.04%)	8 (8.69%)	42 (45.65%)	3.61	4
Citation index database	10 (10.86%)	14 (15.21%)	4 (4.34%)	8 (8.69%)	56 (60.86%)	3.93	5
OPAC	4 (4.34%)	12 (13.04%)	-	16 (17.39%)	60 (65.21%)	4.26	6

(N.B knowledge level scale: 1=Fully known, 2=known, 3=known somewhat, 4=hardly ever known, 5=Not known at all.)

Table 5: Search strategies during searching

Search strategies	1	2	3	4	5	Weighted $\overline{x}$	Rank
Using exact phrase	46 (50%)	14 (15.21%)	12 (13.04%)	10 (10.86%)	10 (10.86%)	2.14	1
Avoiding always adjectives, prepositions and articles	4 (4.34%)	14 (15.21%)	16 (17.39%)	8 (8.69%)	50 (54.34%)	3.93	2
Using narrowing parameters	-	14 (15.21%)	16 (17.39%)	10 (10.86%)	52 (56.52%)	4.09	3
Using Boolean operator	2 (2.17%)	4 (4.34%)	14 (15.21%)	8 (8.69%)	64 (69.56%)	4.39	4
Using term truncation	-	2 (2.17%)	12 (13.04%)	10 (10.86%)	68 (73.91%)	4.57	5
Using proximity operators	-	6 (6.52%)	4 (4.34%)	12 (13.04%)	70 (76.08%)	4.59	6
Using site searching	-	2 (2.17%)	10 (10.86%)	10 (10.86%)	70 (76.08%)	4.61	7
Using wild card	-	6 (6.52%)	2 (2.17%)	4 (4.34%)	80 (86.95%)	4.72	8
Using bracket and nesting command	-	-	4 (4.34%)	12 (13.04%)	76 (82.60%)	4.78	9

(N.B. *Frequency Scale:* 1= Always, 2=Frequently, 3=Sometimes, 4=Seldom, 5=Never)

Table 6: Alternative search approaches

Alternative search options	No. and Percentage
Use advanced search option of search engine	42 (45.65%)
Use different search engine and meta search engine to search it again	16 (17.39%)
Search it in different bibliographic, e-journal and open source database	18 (19.56%)
Search it in various open access institutional repository	12 (13.04%)
Search it in various subject directories	14 (15.21%)
Using different (near) synonymous words and related words to search it again	26 (28.26%)
Search it in various libraries' web portals	12 (13.04%)

Table 7: Perceptions on Internet and web resources

Perceptions on web resources	1	2	3	Weighted $\overline{x}$	Rank
Information over Internet have no geographical boundaries	36 (39.13%)	44 (47.82%)	12 (13.04%)	1.74	1
Most of the information on web is valuable	26 (28.56%)	46 (50%)	20 (21.73%)	1.93	2
Huge hit but few to pertinent in search engine search list	22 (23.91%)	48 (52.17%)	22 (23.91%)	2	3
Most of the information on Internet are free	16 (17.39%)	54 (58.69%)	22 (23.91%)	2.07	4
Pertinent and valuable information are not complementary at all	16 (17.39%)	52 (56.52%)	24 (26.08%)	2.09	5
Most of the information on web is reliable and authentic	8 (8.69%)	66 (71.73%)	18 (19.56%)	2.11	6

(N.B. *Perceptions Scale:* 1= Exactly right, 2=Partial Right, 3=Not right at all)

Table 8: Reliability levels on domain name

Top level domain	1	2	3	4	5	Weighted $\overline{x}$	Rank
.com	28 (30.43%)	36 (39.13%)	10 (10.86%)	-	18 (19.56%)	2.39	1
.gov	30 (32.60%)	20 (21.73%)	12 (13.04%)	-	30 (32.60%)	2.78	2
.edu	18 (19.56%)	28 (30.34%)	16 (17.39%)	-	30 (32.60%)	2.96	3
.org	16 (17.39%)	32 (34.78%)	12 (13.04%)	-	32 (34.78%)	3	4

(N.B. *Reliability Scale:* 1= Most Reliable, 2=Reliable, 3=Somewhat Reliable, 4=Not Reliable, 5=don't know)

Table 9: Checklist for evaluating web resources

Evaluative parameters	1	2	3	4	5	Weighted $\overline{x}$	Rank
To check the up to datedness of web resources	30 (32.60%)	20 (21.73%)	16 (17.39%)	6 (6.52%)	20 (21.73%)	2.63	1
To check the accuracy of information of web resources	28 (30.43%)	22 (23.91%)	14 (15.21%)	6 (6.52%)	22 (23.91%)	2.69	2
To check the reliability of web resources	24 (26.08%)	22 (23.91%)	20 (21.73%)	2 (2.17%)	24 (26.08%)	2.78	3
To check the authority of web resources	22 (23.91%)	20 (21.73%)	14 (15.21%)	8 (8.69%)	28 (30.43%)	3.00	4
To check the purposes and objectives of the web resources	16 (17.39%)	20 (21.73%)	24 (26.08%)	2 (2.17%)	30 (32.60%)	3.11	5

(N.B. *Evaluative Scale:* 1= Always, 2=Most often, 3=Sometimes, 4=Seldom, 5=Never)

Demographic Information

A total of 96 respondents (76.8%) returned their questionnaire out of which 80 respondents were male and 16 respondents were female from different research institutes and departments of Rajshahi University, Bangladesh. Age ranges of the respondents have been classified into six pre-defined category in which it is visible that majority percent respondents (69%) under survey belong to the age group of 30-39. The Figure 1 shows the sex and age distribution of the sample.

Internet use and Preferences

Internet Access by the Respondents

Respondents were asked to indicate whether they access internet or not. 92 respondents gave answer "yes" and only four respondents answered "not". These 92 respondents who access Internet were taken under the present survey. The Figure 2 shows the result.

Reasons to use Internet (Multiple Responses)

The respondents (92) who access Internet were asked to show the reasons why do they use Internet and related technologies. There were given twelve options to expose their motives. The table 1 shows that the respondents under survey use Internet and related technologies to communicate with others (89.13%) and to support research & development (78.26%), to update subject knowledge (76.08%), to write research paper (73.39%), to get relevant information of interest(65.21%), to be well informed and to have entertainment (52.17%), to prepare class notes for learning (47.82%), to carry out project work (39.13%), to attend or organize seminars/workshops (32.60%).

Knowledge Level on Internet Tools and Techniques

Respondents were asked to indicate their knowledge levels on Internet tools and techniques by giving three options viz, '*sound knowledge level*', '*practical knowledge level*' and '*don't have any idea*'. The table 2 presents that 89.13% respondents under survey have practical knowledge on search engines while 10.86% respondents have a sound knowledge on it. The 83.69% respondents use web browser while 16.30% of total respondents have sound knowledge on it. 95.65% and 81.52% of total respondents gradually have no idea on 'semantic web' and 'web development'.

Search Engine and Meta Search Engine

The respondents were asked in the case of choosing search engine which one they use most frequently. No doubt about this Google (92%) is the most frequently used search engine to explore relevant information. Meta search engine minimizes the search time by combining the search results of several search engines. In our research maximum respondents (91%) even don't know the term "meta search engine" (Figure 3). Those who indicate that they are familiar with meta search engine are further asked to mention which one they use most frequently. In reply they mentioned 'Dog pile', 'Kartoo', and 'Mamma' used most frequently.

Crawlers Based Search Engine Vs Human Powered Directories

The crawler will periodically return to the sites to check for any new information. The administrators of the search engine determine the frequency at which this happens. No humans are involved in this process, which is the major difference between a search engine and a directory [13]. Dmoz is an example of a directory where people (rather than spiders) review and index information from websites.

Respondents were asked to differentiate between crawlers based search engine and human powered directories. They were given two options viz. yes and no through which they were asked to put their views. In table 3 majority percent of respondents (91.30%) were incompetent to demarcate between crawlers based search engine and human powered directories. Those who have idea on crawlers based search engine and human powered directories are further asked to indicate which human powered directory they used commonly. In reply most of the respondents indicated that they used to "yahoo directory" most frequently before it became defunct in 2014.

Awareness towards the Usage of Web Resource Tools

Internet users were asked to indicate their awareness level in handling web resource tools by providing five likert numbering scales started from 'Fully known to Not known at all'. The Table 4 shows that some of the researchers have best idea on how to use SNS (32.60%), e-mail or mail group (38.04%) and blog sites (32.60%). On the other hand some of the researchers don't have any idea on how to use e-journal database (45.65%), OPAC (65.21%) and citation index database (60.86%).

Search Techniques and Strategies

Advanced Literature Search Techniques and Getting Subject Wise Information

The skilled and literate Internet user must have

knowledge on advanced literature search techniques. Most of the respondents (96%) have ideas on advanced literature search techniques. To find out specific information related to subject field of interest maximum number of respondents (81%) prefer search engine as best search tool. The Figure 4 shows this result in details.

Search Strategies during Searching

Using exact search strategy can ensure precise search result. Respondents were asked to indicate their strategies while conducting search. Most of the respondents have given the answer "Never" in table 5. Researchers are habituated in conducting search using exact phrase (50%). That means during searching they don't avoid always 'adjectives', 'prepositions' and 'articles' in search phrase (54.34%). Researchers under survey also don't like to use Boolean logic (69.56%), wild card (86.95%), bracket and nesting command (82.60%), proximity operators (76.08%).

Alternative Search Approaches

Respondents were asked to indicate when they failed to get specific information using search engine what did they do then. They were given eight options to expose their views. The result shows in table 6. The respondents use advanced search option of search engine (45.65%), 17.39% of the respondents use different search engines and meta search engines to search it again; 19.56% search it in different bibliographic, e-journal and open source database; 13.04% search it in various libraries' web portals along with various open access institutional repository when they failed to get information using search engine normally; 28.26% use different synonymous or near synonymous words and related words to search it again.

Evaluation

Perceptions on Web Resources

Respondents were asked to reveal their perceptions on web resources. They were given some statements on web resources to ask their comments by three qualitative terms viz, exactly right, partial right, not right at all. Table 7 shows that maximum respondents have chosen partial right in all of the cases.

Reliability Levels on Domain Name

There are various types of domain name existing in the internet. Here the respondents were given four types of domain name viz; .com, .org, .edu, .gov and asked to mention which type of domain they rely most. They were given five qualitative terms to point out the level of dependency. The table 8 shows that .Gov is the most reliable domain name to the respondents (32.60%). More interestingly 32.60% respondents didn't clarify the level dependency on .edu and .gov. 39.13% respondents think that .com type of domain is reliable.

Checklist for Evaluating Web Resources

To check the accuracy and authenticity of web resources is prime most factor before use it in research and other works. In the case of using web resources how the respondents rate the evaluative parameters is most interesting to watch. For evaluating web resources they were given five qualitative options. The Table 9 shows that 23.91% respondents always check the authority of web resources while maximum number of respondents (30.43%) never checks it before use of web resources. A high percentage of respondents (32.60%) never check the purpose and objectives of the web resources while maximum number of respondents always check the accuracy (30.43%), up to datedness (32.60%) and reliability (26.08%) of information of web resources.

Discussion

It has been observed that most of the respondents are male research scholars (83%). Among the respondents, more than half of them are between the age group of 30-39 years (69%). Maximum number of the research scholars (96%) under survey access Internet. To communicate with each others (89.13%), support research and development (78.26%) and write research papers (73.39%) are the main reasons behind their Internet usage. Research scholars under survey have practical knowledge on web browser ($\bar{x}$=1.84), and search engines ($\bar{x}$=1.89) but they don't have too much idea on web development ($\bar{x}$=2.75), programming language ($\bar{x}$=2.78), and semantic web ($\bar{x}$=2.96).

Google is the most popular search engine (92%) and almost all of them don't know the term meta search engine (91%). Majority percent respondents are incapable to differentiate between crawlers based search engine and human powered directories (91.30%).

Respondents have knowledge on e-mail or mail group ($\bar{x}$=1.97), and Social Networking sites ($\bar{x}$=2.33). Blog sites ($\bar{x}$=2.55) are known somewhat

while e-journal database ($\bar{x}$=3.61) and citation index database ($\bar{x}$=3.93) are hardly ever known by research scholars under survey. The surveyed respondents did not recognize about OPAC and related services ($\bar{x}$=4.26).

For searching subject wise information search engines are the most preferred option (81%). Research scholars under survey were habituated with searching frequently using exact phrase ($\bar{x}$=2.14). They seldom use narrowing parameters ($\bar{x}$=4.09) and Boolean operators ($\bar{x}$=4.39) while browsing over Internet. They hardly ever avoid adjectives, prepositions and articles in their search phrase. They have never used proximity operators ($\bar{x}$=4.59), wild card ($\bar{x}$=4.72) and bracket and nesting command ($\bar{x}$=4.72) at the time of searching. Almost half of the respondents use advanced search option when they failed to get information in general searching on web.

The researchers under survey have vague ideas on top level domain. For that reasons they gave their consent that they can rely on commercial website ($\bar{x}$=2.39) whereas they have somewhat reliability on .gov ($\bar{x}$=2.78), .edu ($\bar{x}$=2.96) and .org ($\bar{x}$=3) type of top level domain.

Evaluating web resources before use it is the indicator of literate Internet user. In the present research the respondents sometimes check up to datedness ($\bar{x}$=2.63), accuracy ($\bar{x}$=2.69), reliability ($\bar{x}$=2.78), authority ($\bar{x}$=3), purposes and objectives ($\bar{x}$=3.11) of web resources.

Conclusion

The use of Internet and related technologies makes revolutionary steps in the emergence of new society. It brings radical changes in every sphere of life. Quick and easy access to huge bulk of information is not a pipe-dream. Instantaneous communication and quick sharing of knowledge among distance audiences are now reality. Due to the application of Internet resources and services peoples of 21st century are now witnessing enormous expansion in different areas of society like business, education, research, governance, communication, entertainment, culture etc. As a matter of fact it accelerates a long term effects on information generation, information capture, information transmission, information storage and seeking attitudes of users. The expansion and availability of Internet technologies have also introduced a descent change in usage, perceptions and endeavors of all kinds of people in society including students, teachers and research scholars etc.

To address the lack of understanding of the quality of Internet information Internet literacy training program can be designed to improve researchers' critical thinking skills in using Internet. Internet literacy provides users with knowledge and skills to efficiently and effectively access information, while accurately evaluating and assessing the information they receive from Internet [14]. To gain full advantage of Internet it is required that concerned institutions of higher education make better internet facilities available and also make an effort to make their research scholars aware of the merits of Internet and train them to use Internet effectively to meet their information needs [15].

Due to growing dependency on Internet, research scholars need to be Internet literate. The researchers should check the accuracy, relevancy, reliability, objectivity, currency of web resources before they use it in their research works. They should have clear idea on URL structure, top level domain, various web resource tools, search techniques and strategies to get better result from Internet.

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