Information-Seeking Behavior of Research Scholars: A Developing University's Perspective

Dr. Muhammad Zahid Raza[1], Dr. Asif Ali[2],

Abstract

Objectives: This study has been designed to determine the information-seeking behavior (ISB) of research scholars at the University of Sargodha, Pakistan. ISB was assessed by exposing purposes of information, preferred information sources, monitoring new publications, managing print information, managing electronic sources, sifting information sources, selecting information resources, and selecting the preferred format of scholars.

Methodology: A structured questionnaire-based survey using a quantitative research approach was adopted to achieve the study's objectives by collecting data from all the research scholars of the University of Sargodha, Pakistan.

Findings: This study concludes that a majority of research scholars use information for synopsis preparation, followed by data collection, data analysis, open defense, and article publishing in their ISB. A majority of research scholars preferred the Internet for information seeking, followed by books, journals, and electronic databases. A majority of scholars monitor new publications in their research by reading abstracts and indexes followed by tables of contents. Scholars categorized their information sources by subject and library name. Most of the scholars manage the information sources in separate folders, followed by Google Drive, hard drives, and USBs. The majority of scholars read the introduction and conclusion, followed by the abstract, index reading, etc. Scholars mostly used electronic format, followed by print format.

Significance: The present study was conducted to invigorate the scholarly literature in the present digital era context. This study will provide us with a comprehensive true picture regarding the ISB of research scholars of developing universities that will be supportive to plan bibliographic teaching, information literacy programs, researchers' information behavior for policymakers, educationists, researchers, librarians, faculty, and higher education departments. The results have practical and theoretical ramifications for academic and research institutions, federal and provincial higher education commissioners, and policy organizations.

Keywords: Information, information-seeking behavior, researchers, scholars, Pakistan.

[1]Deputy Chief Librarian, Department of Physics, University of the Punjab, Lahore.
Zahidraza.dsw@pu.edu.pk ORCID: 0000-0002-1661-3931 https://orcid.org/0000-0002-1661-3931
[2] Lecturer, Department of Information Management, University of Sargodha, Pakistan
asif.ali@uos.edu.pk

Introduction:

Research in the field of library and information science or information management revolves around studying the information-seeking behavior (ISB) of the researchers. Scholars studying information need and ISB have examined this issue in different situations and identified several factors that influence how people seek information, such as the type of information sources available and the methods used to access them (Boyd, 2004). Similarly, Banwell and Coulson (2003) conducted a study on user studies, focusing on investigating user desires, expectations, needs, contexts, and tasks. Additionally, user studies also shed light on "use areas" by examining the usage of specific information resources, as well as the challenges faced by users.

Information is a stimulus that expands the researcher's vision. Ikoja-Odongo and Mostert (2006). Information is considered an asset for every human being in his whole life. Information is a basic need to achieve any goal or completely different tasks. We seek information from different sources such as people, media, printed documents, libraries, information centers, etc. However, the information needs of researchers are different from those of common people. The information resources of libraries are broad sources. Libraries play a significant role in satisfying the information needs of research scholars.

Buckland (1991) analyzed the Oxford English Dictionary. "Information involves the process of conveying knowledge or news about a specific fact or event. It encompasses the act of sharing facts or receiving information about something." In today's world, information has become a liberator of mankind. A person who is informed will not be dependent on others' decisions (Large et al., 1998). Reitz (2012) defined the term information seeking as "the journey undertaken by individuals as they strive to fulfill their quest for relevant information.

Information seeking is "the action or process of gathering information in both technological and human contexts." Information retrieval and information seeking are linked but not the same. Veena (2016) defined behavior as "the manner in which an individual conducts themselves, particularly in relation to others, such as displaying positive or negative conduct, or the actions and functionality of a person, animal, or living entity in a specific circumstance, examining acquired behaviors and attitudes.

Wilson describes information behavior as "the totality of human behavior in relation to sources and channels of information, including both active and passive information seeking and information use." ISB is a complete process that consists of action for perceiving the desired information by someone. Wright (2010) stated that ISB surrounded the assessing, retrieving, evaluating, and collecting of information. Information gathered through online library resources is called searching behavior.

Different scholars develop different models of ISB to give a roadmap and guidelines to users for fulfilling the information needs. The most effective and famous are Wilson's models, 1981 and 1996. Wilson has devised different models to explain the information-seeking process through these models, but among all models, Wilson's 1981 and 1996 models have the most importance. Both models provide basic instruction on how to make effective the information-seeking theories.

The objective of Wilson's model of information seeking is to cover all the aspects of the information-seeking process against the user's information need. Wilson describes that ISB occurs when a user needs information to fulfill any specific task. For this purpose, users consult many formal and informal channels. As a result, the user will be satisfied if he/she finds relevant information; otherwise, the user will consult any other source. The model also explains that the user cannot depend on information sources; the user can perceive information from other people, such as experts, friends, and colleagues. This model was used to meet the objectives of the study.

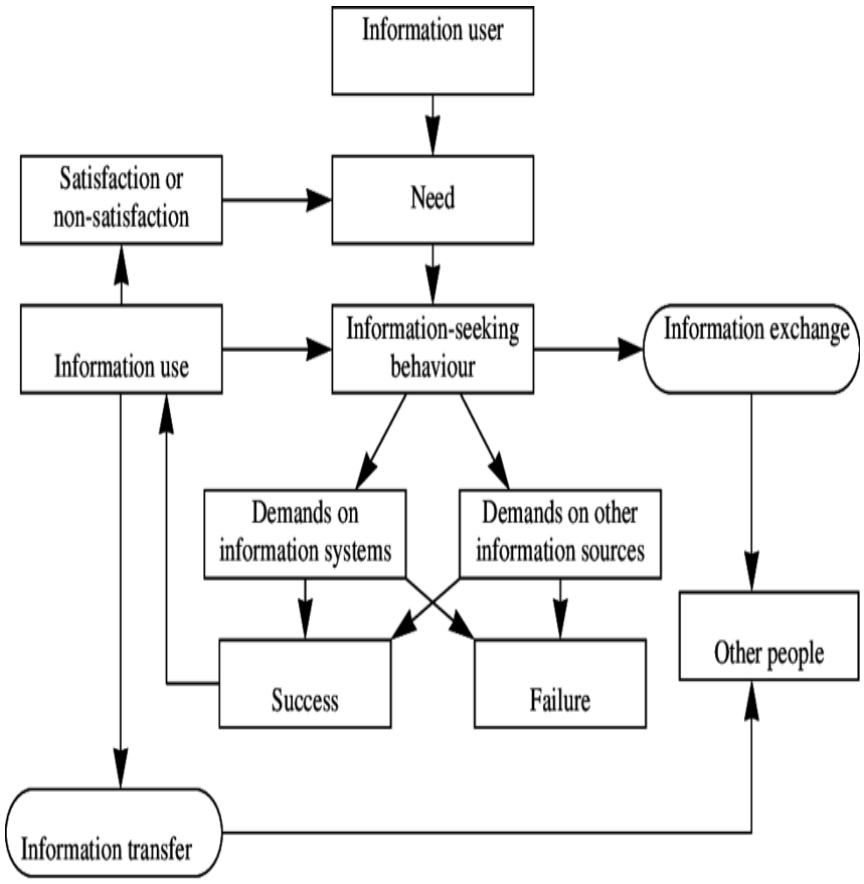

Figure 1: Wilson's 1981 model

ISB is still a crucial field for study. Libraries and other information providers make an effort to comprehend the information needs of their patrons and how they attempt to satisfy those needs. This knowledge aids in the development and provision of suitable user-centered information systems and services. A lot of research studies on ISB of research scholars (Banerjee, 2019; Ge, 2010; Haines et al., 2010; Lone et al., 2017; Manjunath, 2018; Marouf, 2010; Niu et al., 2010; Pareek, 2013; and Sheeja, 2010) have been conducted in the world, but in Pakistan there were a few studies on a smaller scale (Ahmed et al., 2019; Habib et al., 2018; Haider and Ya, 2021; Jan et al., 2022; Khan, 2017, 2020; Rafiq et al., 2009). To fill this gap, the study is going to be conducted. The University of Sargodha is a developing university (an institution of higher education that is actively improving its infrastructure, academic programs, and research capabilities to enhance its overall quality and impact) in the Punjab province of Pakistan, and the results of this study will enable us to understand the ISB of the research scholars of developing universities in developing countries. This study will provide us with a comprehensive true picture regarding the ISB of research scholars of developing universities that will be supportive to plan bibliographic teaching, information literacy programs, and researchers' information behavior for policymakers, educationists, researchers, librarians, faculty, and higher education departments. The results have practical and theoretical ramifications for academic and research institutions, federal and provincial higher education commissioners, and policy organizations.

Research Questions of the Study

1. What are the purposes of the information-seeking of scholars at the University of Sargodha?
2. What are the preferred information sources of the scholars of the University of Sargodha?
3. How do scholars of the University of Sargodha monitor new publications?
4. How do scholars of the University of Sargodha manage print information?

5. How do scholars of the University of Sargodha manage electronic information?
6. What are the practices of scholars for sifting information sources?
7. What are the practices of scholars for the selection of information resources?

What is the preferred format of scholars?

Research Design and Methodology

To explore the research questions of the study, a quantitative research approach was used, and a survey method was used. The study aims to identify the information-seeking behavior (ISB) of research scholars. The targeted population of this study was comprised of all the male and female research scholars of the University of Sargodha. Only scholars who were working on their thesis and dissertation were included in the population. 294 scholars were selected as a population by departmental survey.

A simple random sampling technique was used to collect data. A questionnaire was developed based on a literature review; the main theme of the questionnaire was taken from the model of ISB of social sciences scholars (Al-Suqri, 2015). The questionnaire was modified according to the objectives of the study for the local context. The instrument was comprised of three parts. The main dimension of the questionnaire was taken from the relevant research studies, and after consultation with experts, the questionnaire was restructured and modified. After modification, to examine the validity, a questionnaire was sent to the experts for the expert review. Some minor changes were recommended by the expert. After re-modification, a questionnaire was distributed to the selected population.

A list was prepared that included the names, contact numbers, and e-mail addresses of scholars. The questionnaire was distributed in print and online through Google Docs. The printed questionnaire was distributed to scholars who belonged to the science subjects and were available in labs for their research work. A total of 258 respondents responded from the total population of 294 research scholars. The response rate percentage was 87%. After data collection and ensuring the accuracy of responses, the data was entered in SPSS-22. To achieve the objectives of the study, the desired descriptive and inferential tests were applied to the data.

Ethical considerations were followed to complete the study. Consent was gained from participants to fill out the questionnaire in the study. Additionally, autonomy, confidentiality, and anonymity of all respondents via the use of a self-administered questionnaire as the primary data collection tool were maintained throughout the study. Data was collected for the purposes outlined in the study. Transparency was ensured in data handling and reporting, and coercion or undue influence was avoided while securing participation.

Literature Review

The researcher tried to sum up the maximum literature of the research area. The researcher tried to describe all the definitions related to the topic. The researcher tried to give a clear understanding of the models of information-seeking behavior (ISB). The literature was taken from different research articles and theses. "Information-seeking behavior of research scholars" was used as a keyword. Research articles were downloaded from different electronic databases.

Information behavior refers to the actions undertaken by individuals to recognize their information requirements, explore various avenues for obtaining relevant information, and effectively utilize or convey the acquired information. ISB refers to the process of people searching for and using their needed information. The following studies are relevant to the ISB of researchers. National and international perspectives are covered in this literature review.

In their study, Rafiq et al. (2009) examined the information-seeking habits of the research and development community in the textile field of Pakistan. The findings indicated that researchers employ a combination of traditional print resources and digital sources to meet their information requirements. But books are a preferred source for information seeking. Researchers want more access to electronic and digital resources through the university library. The majority of the researchers use email and the internet as electronic tools. The use of library websites and OPAC is very rare. There is a need to increase the use

of OPAC and the web page of the library. Regarding search engines, Google, Yahoo, and MSN are mostly used, and for email, Yahoo and Hotmail are more preferred. The majority of researchers and faculty visit the library two or three times a week. Researchers are satisfied overall with library services. They had no opinion about the collection in the library, but some teachers showed that the collection is not sufficient to complete their teaching and research needs.

The study's conclusion demonstrates that medical students can improve their IT abilities to obtain information in this age of technology. The administration of medical institutions can create policies for health information literacy, funding allocation, education development, and traditional health education. They can also work with library personnel to improve services and fulfill medical students' information needs (Haider & Ya, 2021).

Ahmed et al. (2019) explored that researchers with extraverted personality traits showed greater concern for information demands. Conversely, pupils who exhibited conscientiousness were becoming more and more information seekers. Conscientiousness was shown to be the most appropriate personality trait overall for LIS students. A noteworthy distinction was also noted in every one of the LIS students' personality attributes.

Postgraduate students' ISB is satisfactory, as evidenced by the results and discussion, which show that all the students look for information to advance their careers, read the newest articles, write research articles, take notes for assignments, update their current knowledge, and prepare for exams. Postgraduate students have also inquired about how to access the HEC digital library services at home and at the institution, as well as how to use a Virtual Private Network (VPN), read books online, and conduct research on other websites. The conduct of postgraduate students in seeking information was significantly influenced by factors such as age, gender, and the educational background of their parents (Habib et al., 2018).

Jan et al. (2022) revealed in a survey that new knowledge, professional growth, and study and research activities accounted for the majority of students' information demands. The academics make use of a variety of materials and sources to meet these needs. Journal articles, textbooks, and research projects were frequently the sources they turned to when they needed information. When seeking information, pupils frequently favored books with some significance. The following additional criteria were crucial in the selection process: novelty, topical relevance, publisher reputation, and colleague recommendations. The majority of students said that new exhibits, open access programs, and book exhibitions improved the library's resources and offered better services.

Niu et al. (2010) conducted a study on scientific researchers from five large research universities in the US. The most important finding is the use of electronic methods for searching scholarly content. Another notable form is the novel communication form. Many faculty members used blogs, wikis, and multimedia. In collaborative search systems, academic social bookmarking systems, open shared rankings and reviews, open access journals, and online sharing of bibliographic databases and annotations are all examples of new scholarly communication information technologies.

The Faculty of Social Sciences at Kuwait University used 93% of books for class preparation, 79% for conducting research, and 55% for keeping up to date. Journals were used 59% for class Preparation and 51% for research. The thesis used 6% for class and 77% for research, while 50% of faculty members of psychology used raw data for research and 67% of geography faculty members used technical reports for personal development. Using informal ways, 27% of participants seek information from colleagues in the university for class preparation, 42% for research, and 31% for personal development. 24% gathered information from reference librarians, and for research, 48% got information from library staff. From faculty members outside the university, 2% gain information for class preparation and 44% for research purposes. The majority of participants are satisfied with journals, books, and theses and not fully satisfied with raw data and unpublished research regarding meeting their informational needs. The participant thinks that books and journals are very important, theses and papers are less important, and photographs and raw data are not important for their information needs (Marouf, 2010).

Sheeja (2010) explored in her study information-seeking behavior and user perceptions of academic researchers and found that the use of the Internet and conference proceedings is most prominent among science students, while social science students preferred print journals. Scholars of both fields depend on e-journals to keep up to date. Social science students depend on other libraries more than science students. There is a significant difference between science and social science scholars regarding the perception of the adequacy of print journals and database collections. There is no significant difference between science and social science scholars on the perception of e-journals. The study proved that both fields' scholars are dissatisfied with library services.

ISB researchers exposed that in their quest for information, these researchers relied heavily on electronic information sources. Online catalogs and e-mail are ranked as being less important than the Web, databases, and e-journals among the eight different types of Internet information technologies that were evaluated. Researchers in the social sciences use electronic information sources more frequently than those in the humanities. When compared to their more senior counterparts, doctoral students and assistant professors use electronic information resources more frequently. Electronic resources were used by every participant in the survey at some time during the study process, and they will all continue to be used as a source of information. These researchers place a premium on having quick access to information at all times and locations, which drives their need for expanded electronic information resource availability. Electronic resources, however, are thought to be less accessible and/or not as important to the researcher's field of study in other disciplines (Ge, 2010).

Pareek (2013) investigated in their study the ISB of researchers at Banasthali University. The study showed that researchers preferred print sources rather than electronic services by the library. Researchers mostly use books and journals for their research. Researchers also respond that the central library of the university plays a vital role in fulfilling their information needs, and researchers prefer library use and research guides for research. It is noted that researchers are not familiar with available electronic resources and document delivery services. Some suggestions are provided by researchers that there should be a proper training program for researchers, and the use of the library should be part of the curriculum. Access to electronic resources should be at the hostel through a virtual private network, and there is a need for proper book shelving.

Lone et al. (2017) conducted research on the effect of internet use on the ISB of researchers. They found that 88% of participants used the internet, 52% used Boolean search, 20% used phrase search, 19% used proximity search, and 7% searched by using truncation. The majority of scholars always used OPAC for information searching, while 16% used card catalogs mostly, and 88% of researchers never used card catalogs. To seek information, 64% consulted with a reference librarian, 28% used a research guide, and 7% discussed it with colleagues. The frequency of using information resources is 65% of participants always using the internet, 56% always consulting books, and 63% of researchers always reading research journals. Awareness of library services 32% know about indexing and abstracting; 17% don't know about bibliographic services, 64% are aware of interlibrary loans, and 67% know about reference services.

Differences in gender in information-seeking of researchers regarding the use of electronic devices the use of smartphones is prevalent in males and females, while the use of computers and laptops is more prevalent in males than in females. Males use more online resources like databases and websites, while females use journals more than males. In faculty use of online resources, the web is equally in use, and researchers of the faculty of social sciences use databases more than the faculty of natural sciences (Khan, 2017).

Manjunath (2018) conducted survey research to point out the information need and ISB of research scholars at Bangalore University. Results showed that 33% visit the library daily, 35% once a week, 18% once a month, and 6% occasionally. Of the time spent frequently in the library, 20% spent 1 hour, 31% spent 1 to 2 hours, and 5% of participants spent above 4 hours in the library. The majority of researchers who used the internet for reading purposes was 32%, 98% of researchers used email, and 88% used e-journals and e-books. The frequency of using search engines is Google 91%, Yahoo 67%, MSN 36%, and Bing 18%. Awareness about electronic resources is 90%, and 9.9% of researchers are unaware

of the electronic resources. The information needed by most researchers is research articles, which is 26%. For writing papers, 36% of researchers seek information, and for updating knowledge, 25%. Regarding information-seeking problems, participants responded that lack of time, incomplete information, lack of knowledge of library use, old material, scattered information, and behavior of library staff are the major issues.

The objective of this research was to identify the ISB of research scholars and also to locate awareness of resources and consult resources by scholars at Vidyasagar University of West Bengal. A structured questionnaire was used. Most of the researchers who visit the library weekly are 30%, and monthly at 45%, and they spend 0 to 2 hours in the library for research preparation and mostly use research journals (Banerjee, 2019).

Khan (2020) studied in his research paper the difference in information needs of researchers. Most of the research students seek the information for their research topic selection. 40% of researchers get information to prepare their research proposal, and 33% seek information for citation management. In information sources, supervisor assistance is 40%, thesis is 47%, and 15% is by reference librarian. 44% of researchers used online databases, 40% used the library, and 39% used the internet as information resources. The majority of students' perception is that limited borrowing facilities by the library, poor ICT infrastructure, outdated information, and library staff behavior are major barriers to seeking information.

The literature reviewed revealed comprehensively the ISB of the researchers of the universities. It throws light on the practices of researchers to fulfill their information needs in this digital era of information explosion. It revealed that researchers were using all options, such as supervisors' assistance, OPAC, librarians, e-mails, e-journals, e-books, Google, Yahoo, MSN, electronic resources, IT skills, the internet, databases, print materials, etc., to find their information needs.

Findings of the study

The purpose of this study was to find out the information-seeking behavior (ISB) of research scholars of the University of Sargodha. This study used a survey method to collect data from the research scholars of the University of Sargodha.

Demographic Information

The details of the percentage and frequencies of respondents are given below.

Table 1

Gender of respondent

Gender	Frequency	Percentage
Male	143	55.4
Female	115	44.6
Total	258	100.0

Gender of respondents

The total number of respondents was 258, and 143 were male respondents and 115 were female. The percentage of males is 55.4%, and females are 44.6%. So the distribution of respondents is in favor of males rather than females.

Table 2

Education of respondents

Education	Frequency	Percentage
BS/Masters	8	3.1
MS/M.Phil.	202	78.3
Ph.D.	48	18.6
Total	258	100.0

Education of Respondents.

By the distribution of education, 8 respondents were from BS and master's levels, which is 3 percent of the whole population. Respondents from MS and M.Phil. are 202. A majority of respondents, 202 (78%), were MS/M.Phil. scholars, and 48 (18.6%) respondents were Ph.D. scholars.

Table 3
Faculty of respondents

Faculty	Frequency	Percentage
Faculty of Sciences	93	36.0
Faculty of Arts and Humanities	49	19.0
Faculty of Social Sciences	76	29.5
Faculty of Pharmacy	29	11.2
Faculty of Agricultural Sciences	11	4.3
Total	258	100.0

Faculty of respondents

The distribution of faculty-wise respondents is 93 (36%) from the Faculty of Sciences, 49 (19%) from the Faculty of Arts and Humanities, 76 (29.5%) from the Faculty of Social Sciences, 29 (11.2%) from Pharmacy, and 11 (4.3%) were from Agriculture Sciences.

Table 4
Purpose of information seeking

Purpose	N	Mean	Std. Deviation
Synopsis preparation	258	3.89	1.086
Data collection	258	3.86	1.183
Report Writing	258	3.77	1,300
Data analysis	258	3.71	1.208
Open defense	258	3.60	1.346
Publishing articles	258	3.59	1.384
Topic selection	258	3.59	1.335

Purpose of Information Seeking

In Table 4, the purpose of usage of information shows that the majority of research scholars use information for synopsis preparation with a mean (M = 3.59), data collection with a mean (M = 3.86), report writing with a mean (M = 3.77), data analysis with a mean (M = 3.71), for open defense with a mean (M = 3.60), for topic selection and articles publishing with a mean value (M = 3.59). These descriptions show that most of the research scholars use the information for the above-mentioned purposes at their priorities.

Table 5
Preferred Information Sources

Preferred Source	N	Mean	Std. Deviation
Internet	258	3.76	1.343
Books	258	3.67	1.265
Journals	258	3.67	1.262

E databases	258	3.62	1.267
Colleagues/friends	258	3.48	1.242
Personal sources	258	3.47	1.282
Personal Collection	258	3.39	1.253

Preferred Information Sources

The description of Table 5 shows the preferred sources for information-seeking by research scholars. It is revealed that most of the researchers use the internet for information seeking with a mean (M=3.76), books and journals with a mean (M=3.67), electronic databases (M=3.62), seeking information from friends and colleagues with a mean (M=3.48), personal sources with a mean (M=3.47), and from personal collections with a mean value (M=3.39). The majority of research scholars preferred the Internet, printed books and journals, electronic databases, and other information resources, respectively.

Table 6

Monitoring New Publications.

Monitor	N	Mean	Std. Deviation
Reading index/abstract	258	3.69	1.237
Through table of contents	258	3.51	1.242
By online forum and discussion group	258	3.34	1.327
By regularly reviewing journals	258	3.34	1.341
Consulting online reference sources	258	3.28	1.275
Amazon, Kindle, Lulu, Smash words	258	3.14	1,450

Monitoring of New Publications

Table 6 shows how research scholars monitor new publications in their research area. Here it is concluded that the majority of scholars mostly monitor new publications in their research by reading abstracts and indexes with a mean value (M=3.69), through the table of contents of sources with a mean (M=3.51), by regularly reviewing journals and online forums and discussion groups with a mean (M=3.34), consulting online reference sources with a mean (M=3.28), and using Amazon, Kindle, and other online publication sources with a mean (M=3.14).

Table 7

Management of Print Information

	N	Mean	Std. Deviation
By Subject	258	3.42	1.298
By library name	258	3.40	1.320
By call number	258	3.02	1.349
By accession number	258	3.00	1.364

Management of Print Information

Table 7 shows how research scholars categorized their print information sources. Statistics show that mostly research scholars categorized their information sources subject-wise with a mean score

(M=3.42), by library name with a mean (M=3.40), by call number with a mean (M=3.02), and by accession number with a mean (M=3.00).

Table 8

Management of Electronic Information

a	**N**	**Mean**	**Std. Deviation**
Save it in folder separately	258	3.69	1.247
Save in Google Drive	258	3.52	1.147
Hard drive of computer	258	3.52	1.251
Save in USB	258	3.47	1.387

Management of Electronic Information

Statistics in Table 8 show how scholars categorized electronic information sources. Most of the scholars categorized the information sources in separate folders with a mean score (M=3.69); scholars categorized the sources in Google Drive and hard drives with a mean (M=3.52) and in USBs with a mean (M=3.47).

Table 9

Sifting of Information Source

	N	**Mean**	**Std. Deviation**
Introduction	258	3.72	1,260
Conclusion	258	3.72	1.267
Reading Abstract	258	3.64	1.190
Skim it initially and save it for later use.	258	3.40	1.281
Reading Index	258	3.39	1.259
Whole resource immediately	258	3.30	1.297

Sifting of Information Source

Table 9 shows that the research scholars read the information sources thoroughly. So results conclude that the majority of the scholars read the introduction and conclusion with a mean score (M=3.72), read the abstract with a mean score (M=3.64), others skimmed the reading after searching or downloading and saved this for later use with a mean (M=3.40), index reading with a mean (M=3.39), and reading of the whole resource immediately with it (M=3.40).

Table 10

Selection of Information Resources

a	**N**	**Mean**	**Std. Deviation**
By reading abstracts	258	3.67	1.224
Source of the article	258	3.58	1.301

Validity	258	3.53	1.219
Publication Date	258	3.50	1.356
Quality of Information resources	258	3.50	1,300
Author Reputation	258	3.45	1.278

Selection of Information Sources

Table 10 shows how the research scholars selected the information sources. Statistics show that scholars mostly read the abstract of information to get information with a mean score (M=3.67); secondly, scholars check the source of an article with a mean score (M=3.58), the validity of the information source with a mean (M=3.53), the quality of information and publication date with a mean of 3.50, and through author reputation with a mean score (M=3.45).

Table 11

Preferred Format

a	N	Mean	Std. Deviation
Electronic form	258	3.59	1.201
Print form	258	3.55	1.256
Online	258	3.53	1.355

Preferred Format

Table 11 is about the preferred format of information source. Scholars mostly used electronic format with a mean value (M = 3.59), then print format with a mean (M = 3.55), and the least preferred format is online (on computer screen) with a mean (M = 3.53).

Discussion

This study concluded that purposes of usage of information show that the majority of research scholars use information for synopsis preparation, followed by data collection, data analysis, open defense, and article publishing. Likewise, Ahmed and Amjad (2014) elaborated with mean scores of 4.48, 4.40, 4.29, 4.25, 4.05, 3.98, and 3.96, respectively, respondents "frequently" used the electronic resources for learning, education, research, updating knowledge, reading articles, completing tasks, and drafting research proposals.

In terms of preferred information sources, the majority of research scholars preferred the internet for information seeking, followed by books, journals, and electronic databases. Conversely, Pareek (2013) investigated the ISB of researchers at Banasthali University and explored that researchers preferred print sources rather than electronic services provided by the library. This comparison shows that in the present digital era, research scholars prefer internet sources for ISB.

In terms of monitoring new publications, it was explored in the study that a majority of scholars mostly monitor new publications in their research by reading abstracts and indexes followed by tables of contents. Likewise, Habib et al. (2018) revealed that private sector students update their learning through different techniques, such as “I seek information to update with new knowledge" and “I seek information

to prepare myself for examination." "I seek information for making notes for an assignment." "I have access to using electronic resources." "Teachers give relevant articles and journals through e-mail."

In terms of management of their print information sources, this study revealed that most research scholars categorized their information sources subject-wise, followed by library name, call number, and accession number. Most of the scholars manage the information sources in separate folders followed by Google Drive and hard drives. Likewise, Irfan and Warraich (2019) revealed that researchers use their mobile phones and smartphones to send, exchange, and store material in draft folders for later use. They utilize a variety of apps, including Evernote, Google Calendar, alarm clock, and organizer, and arrange their information into folders. Print information is managed subject-wise in hard form.

The majority of the scholars read the introduction and conclusion, followed by the abstract and index, and then read the whole resource. Scholars mostly read the abstract of information to get information, followed by the source of an article, the validity of the information source, the quality of the information, the publication date, and the author's reputation. Scholars mostly used electronic format, followed by print format, and the least preferred format is online (on a computer screen). Likewise, Lee et al. (2012) elaborated in their survey that university students prefer to use online sources for their academic inquiries. The conclusion of this study is very helpful to reduce the barriers between the students and the library staff. Likewise, Haider (2021) revealed that the ISB of research scholars might be improved by reducing the barriers between the students and the library staff and the administration to improve and develop the strategies for enhancing the information literacy skills (ILSs) of research scholars.

The research scholars are using online digital platforms to fulfill their information needs in this digital-era world, and policymakers may use digital media to facilitate them in research support services. This study may enable policymakers and academicians to understand the current ISB of the research scholars and to plan bibliographic teaching and information literacy programs. Policymakers may be able to form new policies and strategies to facilitate the research of scholars in the current digital era of information technology. Research scholars are using advanced digital technologies to access their required information and the latest methods to preserve and manage the information, which may force policymakers and academicians to use new technologies and applications to facilitate the research scholars for a proper research environment.

Limitation of the study

This study only focused on finding out the information-seeking behavior of research scholars at the University of Sargodha, Pakistan. More studies may be conducted on the bases of qualitative and pragmatic approaches. More developing universities of the Punjab province may be included for further studies. ISB of the researchers of top-ranked universities of Pakistan may also be persuaded in further studies.

Conclusions

This study concluded that the majority of researchers prefer online media to fulfill and preserve their information needs. A majority of research scholars use information for synopsis preparation followed by data collection, data analysis, open defense, and article publishing in their ISB. A majority of research scholars prefer the internet for seeking information, followed by books, journals, and electronic databases. A majority of scholars monitor new publications in their research by reading abstracts and indices followed by a table of contents. Scholars categorize their information sources by subject and library name. Most scholars manage the information sources in separate folders followed by Google Drive, hard drives, and USBs. The majority of scholars read the introduction and conclusion, followed by the abstract, index reading, etc. Scholars mostly used electronic format, followed by print format. This study only focused on finding out the ISB of research scholars at the University of Sargodha, Pakistan, which is the developing university of the Punjab province of Pakistan. The results of the study may be generalized for other developing universities in the developing countries, and upgraded comprehensive

educational policies regarding bibliographic teaching, information literacy programs, and researchers' information behavior may be planned to address the ISB of the researchers in the developing universities of the developing countries.

Recommendations

The recommendations of this study may be generalized to other developing universities of the developing countries of the world due to the same socio-economic conditions of the developing universities of the developing countries.

1. Information literacy programs for the research scholars might be designed by keeping in view the current trends of the research scholars for their fruitful research support.
2. Refined and updated policies may be used by the policymakers to facilitate research scholars.
3. To use the internet for information seeking, the research scholars describe that scholars must be well prepared to understand the online tools for information purposes.
4. Seminars, workshops, and training will enable them to be more familiar with the online tools and databases for information retrieval purposes.
5. Research scholars are the busiest community of library users. They have a lack of time, so library services should be provided timely.
6. Most research scholars work on their research projects from home and cannot visit the library frequently, so there is a need to provide remote services through VPN.
7. There is a lack of research journals, so they should be subscribed to according to the needs of research scholars.
8. Information literacy programs and sessions should be conducted for research scholars to improve the information retrieval skills of scholars.
9. There is a need for a well-equipped IT lab and high-speed bandwidth internet.
10. Library discipline should be improved to provide a peaceful environment for research scholars.

References

Ahmed, S., Rehman, F., & Sheikh, A. (2019). Impact of personality traits on information needs and seeking behavior of LIS students in Pakistan. *Information Discovery and Delivery*, 47(3),125-134.

Al-Suqri, M. N., & Lillard, L. L. (2011). Barriers to effective information seeking of social scientists in developing countries: the case of Sultan Qaboos University in Oman. International Research: *Journal of Library and Information Science*, 1(2).

Banerjee, B. (2019). Information seeking behavior of research scholars of Vidyasagar University, West Bengal. *Library Philosophy and Practice* (e-journal), 2568.

Banwell, L., & Gannon-Leary, P. (1999). A review of the literature for the JUBILEE project:(JISC user behaviour in information seeking: Longitudinal evaluation of electronic information services). *New Review of Academic Librarianship*, 5(1), 81-114.

Boyd, A. (2004, April). Multi-channel information seeking: a fuzzy conceptual model. *In Aslib proceedings* (Vol. 56, No. 2, pp. 81-88). Emerald Group Publishing Limited.

Buckland, M., & Liu, Z. (1998). History of information science. *Historical studies in information science,* 1998, 272-295.

Ge, X. (2010). Information-seeking behavior in the digital age: A multidisciplinary study of academic researchers. *College & Research Libraries*, 71(5), 435-455.

Habib, A., Kazi, A. S., Ashraf, S., & Hadyait, M. A. (2018). Information seeking behavior of post graduate students in Lahore Pakistan. *International Journal of Research*. Retrieved on 19 December,2024researchgate.net/profile/Asma-Shahid Kazi/publication/325987939_Information_Seeking_Behavior_of_Post_Graduate_Students_in_Lhore_Pakistan/links/5ba0ab8ea6fdccd3cb5f2581/Information-Seeking- Behavior-of-Post-Graduate-Students-in-Lahore-Pakistan.pdf

Haider, M. S., & Ya, C. (2021). Assessment of information literacy skills and information-seeking behavior of medical students in the age of technology: a study of Pakistan. *Information Discovery and Delivery*, 49(1), 84-94.

Haines, L. L., Light, J., O'Malley, D., & Delwiche, F. A. (2010). Information-seeking behavior of basic science researchers: implications for library services. *Journal of the Medical Library Association: JMLA*, 98(1), 73.

Ikoja-Odongo, R., & Mostert, J. (2006). Information seeking behaviour: a conceptual framework. *South African Journal of Libraries and Information Science*, 72(3), 145-158.

Jan, s. U., ali, m., & awan, m. U. (2022). Information needs and seeking behavior of post graduate students of Kohat university of science and technology khyber pakhtunkhwa, pakistan. *Library philosophy & practice*.

Khan, A., & Khan, A. (2020). Information seeking behavior of postgraduate students in the University of Peshawar, Pakistan. *Library Philosophy and Practice*, 4380.

Khan, A., & Nisa, H. U. (2017). Gender difference in Information Seeking of research scholars at University of Sargodha. *Library Philosophy and Practice*, 2017, 1597.

Large, A., Beheshti, J., & Breuleux, A. (1998). Information seeking in a multimedia environment by primary school students. *Library & Information Science Research*, 20(4), 343-376.

Lone, S. A., Mir, A. H., & Ganie, S. H. (2017). Information seeking behaviour of research scholars of Faculty of social science, university of Kashmir: A Study. *International Journal of Library and Information Studies*, 7(1), 2231-4911.

Marouf, L., & Anwar, M. A. (2010). Information-seeking behavior of the social sciences faculty at Kuwait University. Library Review, 59(7), 532-547.

Manjunath, N., & Babu, K. S. (2018). Information needs and information seeking behaviour of research scholars in Bangalore University: A survey. *International Journal of Library and Information Studies*, 8(1), 332-342.

Niu, X., Hemminger, B. M., Lown, C., Adams, S., Brown, C., Level, A., ... & Cataldo, T. (2010). National study of information seeking behavior of academic researchers in the United States. *Journal of the American Society for Information Science and Technology*, 61(5), 869-890.

Pareek, A. K., & Rana, M. S. (2013). Study of information seeking behavior and library use pattern of researchers in Banasthali University. *Library philosophy and practice*, 887.

Rafiq, M., & Ameen, K. (2009). Information seeking behavior and user satisfaction of university instructors: A case study. *Library Philosophy and Practice*, 11(1), 1-12.

Reitz, A. R. (2012). Online consumer engagement: Understanding the antecedents and outcomes. Colorado State University.

Sheeja, N. K. (2010). A study of information-seeking behavior and user perceptions of academic researchers. Retrieved on 19 December, 2024 form Sheeja, N. K. (2010). A study of information-seeking... - Google Scholar

Veena, G. (2016). Role of Open Access Digital Repositories (OADR) on Information Seeking Behavior among Research Scholars: A study. *Journal of Library & Information Science*, 6(2).

Wright, C. (2010). Information-seeking behaviors of education literature user populations. *Teachers College Record*, 112(10), 2537-2564.