

## Information-Seeking Behaviour of the Users of Academic Libraries: A Critical Review of Literature

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### ABSTRACT

This study offers a critical review of selected studies. A point of departure is the focus on the methodology used and the related issue of whether the inferences drawn are justified by the methodologies used. This is thus meant to be potentially useful for researchers in the broad area of information-seeking behaviour of the users in a digital environment. Eleven studies were selected for a deeper understanding of their users' information needs and information-seeking behaviour and to make suggestions on how to enhance the effectiveness of library services and their efficient utilisation. The libraries selected for the present study are diverse—college libraries, university libraries, public libraries and a Government Department library. Our review is based on the results obtained through critical study and examination of the literature with the main focus on the Information Seeking Behaviour of the users. There is a diverse range of libraries and users covered by these studies, and several interesting hypotheses could be statistically validated. Without statistical validation of hypotheses, the inferences lack robustness. This is a striking weakness of the extant literature—including the sample examined here. However, some constructive suggestions are made. These include a focus on special libraries, methodological extensions and refinements, and a broadening of the hypotheses and validation of inferences. We believe our review fulfils an important gap as scant attention is given to analytical rigour.

**Keywords:** Information needs; Information-seeking behaviour; ISB; Information retrieval; Academic libraries; Digital libraries

### 1. INTRODUCTION

Information is vital for an individual's personal development and professional advancement. Recent decades have witnessed an explosion of information through the expansion of internet services and digitalisation of books, reference material and other forms of printed material. Libraries play a pivotal role in providing users access to this information through printed material and Internet services. Information-seeking behaviour denotes a set of actions that users undertake to obtain access to desired information through library services. Information-seeking is a broad term, as it involves expression of information needs, seeking of information, evaluation and selection of information, and use of this information to satisfy the users personal, career goals and institutional goals. Awareness of information needs and information-seeking behaviour of different users is useful for planning, implementation, and operation of library and information system and services.

A stylised description of information-seeking draws upon Ellis<sup>1</sup> (1989) characterisation in the context of social sciences—starting, chaining, browsing, differentiating, monitoring, and extracting. Starting indicates information-seeking patterns of researchers beginning research in a new area. Chaining refers to the process of following chains of citations or other

forms of references or sources found during starting activities. Browsing is semi-directed or semi-structured searching in an area of potential interest. Differentiating identifies different sets of sources in terms of their probabilities of containing useful material. Monitoring is confined to those people following developments in specialised areas. Finally, extracting involves going through a particular source and selectively identifying relevant materials from it. This broad analytical framework will inform own research on information-seeking in special libraries that cater to a mixed clientele of users—serving and retired civil servants, eminent politicians and academics, research scholars and post-graduates seeking professional advancement.

Apart from college and university libraries that cater to the information needs of students and faculty members, there is now a growing recognition of the usefulness of (special) public libraries that serve a highly mixed clientele of students such as candidates preparing for competitive examinations for civil services and other segments of the resident population trying to update their knowledge of domestic and global affairs, and for entertainment purposes. Some key missions comprise providing opportunities for personal creative development, promoting the creativity of children and young people, facilitating access to the cultural expression of all performing arts, providing access to a range of community information, as also to local enterprises, associations and interest groups.

As policy design and implementation have increasingly become evidence - based, large data sets are now available. These include household surveys, specialised surveys and data from periodic reports that help government ministries/state departments monitor and assess the impact of policies on target groups and for policy analysts to subject official claims to closer scrutiny through state-of-the-art statistical methods. Examples include Ministries of Health and Family Welfare, Finance, Commerce, Labour and Employment, Agriculture and Farmers' Welfare, Statistics and so on. There are corresponding departmental libraries in state governments serving similar purposes. Digitalised information has facilitated its timely availability and uses both by the Ministries/Departments and policy analysts. Since much of the information is in the public domain, it is accessible to various users. Often comparisons of performance in different sectors are, however, marred by definitional changes.

A major concern is lack of coordination between different Ministries/Departments resulting in avoidable duplication and inconsistencies. Another related concern is the resource crunch resulting in budget cuts and pruning of e-resources and print material in most libraries-especially of e-journals and imported books. A third is inadequate technical skills of library staff and, as a consequence, users do not efficiently get access to e-resources. Finally, although print resources are still the most frequently used ones, electronic resources are becoming increasingly popular. Access to networked computers is the main resource for the use of databases and other electronic resources.

There are two reasons that motivated our present study: (i) we are not aware of a rigorous review of literature in the area of information-seeking behaviour and search strategies used by diverse users: students, researchers, policy makers, and others. Indeed, we have not come across any comparable review that pays due attention to analytical rigour required for addressing diversity of information-seeking behaviour in a growing digitised environment. (ii) More specifically, it is necessary to formulate hypotheses (such as preference for different sources of information by age, gender, occupation) and use appropriate statistical techniques to validate them with the sample at hand, and draw credible inferences.

## 2. OBJECTIVES

The present study is undertaken to critically review the available selected literature centred on information needs and information-seeking behaviour of the users of various academic libraries towards the following objectives:

- Understanding the information needs of users
- Understanding the information-seeking behaviour of users
- Critically examining the information needs and information-seeking behaviour of users
- Suggesting measures for enhancing the effectiveness of library services for their efficient utilisation.

## 3. METHODOLOGY

The present study is undertaken to critically review and examine the available selected literature focused on

information needs and information-seeking behaviour of the users of various academic libraries for a deeper understanding of their users' information needs and information-seeking behaviour and to offer suggestions on how to enhance the effectiveness of library services and their efficient utilisation in a digital environment. For this purpose, we reviewed the available literature and selected the most relevant, guided by the objectives of the study. An important contribution of the study is to highlight limitations of descriptive analysis which must be supplemented by validation of specific hypotheses in the area of Information - seeking behaviour of library users. Each study has been summarised briefly, followed by a critical examination and comparison of objectives, methodologies, salient findings, validation and concluding observations. A thread that runs through our review is whether the inferences follow from the analyses conducted. As our review illustrates, this is a major limitation of the studies reviewed, especially because data collected are amenable to rigorous testing of hypotheses. A broader awareness of this limitation could help researchers avoid common pitfalls.

## 4. LITERATURE REVIEW

As there is a substantial overlap in the themes covered and methodology used with minor variation, the studies were critically examined in the following order. Most studies were published in the last two decades and selected for their thematic relevance. Besides, these are based on moderate-to-large samples that are amenable to statistical validation.

Pareek and Rana<sup>2</sup> (2013) study, focused on the information-seeking behaviour and library use by research scholars at Banasthali University, raised high expectations. The analysis was based on a large sample of researchers. The main findings include less frequent use of e-resources than print material, books and e-journals are mostly used. The respondents found library services useful but showed little awareness of e-resources. Recommendations include more effective training of researchers in using e-resources, expansion of library infrastructure, and access to internet services in hostels. As the sample design is not discussed, it is risky to generalise. Besides, as cross-tabulations do not allow for confounding changes, the findings cannot be taken at face value. So, the methodology used is weak. Some of the interesting questions that this study could have addressed include whether the level of satisfaction varied by discipline, e.g. social sciences, computing, aeronautics? Whether there were frequent consultations between faculty and library staff and between students and library staff about computing, aeronautics and social science materials? These questions could be answered through multiple regression analyses, when the dependent variable is continuous (eg, frequency of visits, hours spent) or a qualitative response model such as probit when the dependent variable is ranked (eg, high level of satisfaction, moderate satisfaction or hardly any satisfaction).

Sethi and Gautam<sup>3</sup> (2013) presented comprehensive description of the library services such as document borrowing, borrowing of books, reference services, e-resources etc. It was found that no literature review was done. Their study comprises the use of the internet by the staff, different purposes for which

the internet is used, popular sites, sources from which users obtain information about websites, favourite search engines, and the problems faced. The users' sample comprises CSS cadre Section Officers, Under Secretaries and other senior officers. A large sample of officials has been used. The findings include that most of the users relied on the internet to access information, the majority of users were familiar with how to use the internet to access information; the majority of users preferred Google as their favourite search engine; internet users were satisfied with the infrastructure support. Suggestions include insertion of a home page for quick access to relevant information, upgradation of internet services, improvement of technical capabilities of the library staff, and a controversial suggestion to block access to entertainment websites. Analytical content is low, as none of these inferences follows from rigorous statistical analysis. As in the previous case, both multiple regression could be used (eg, when the dependent variable is continuous as in the case of hours devoted to internet search, or a probit model when the dependent variable is quality of internet service).

Ellis and Haugan<sup>4</sup>, (1997) explore the information seeking in the R&D department of an international oil gas company. The information seeking patterns of engineers and research scientist at Statoil's Research Centre, Norway, were considered in relation to the research activities in stages and different types of project. Eight categories used to describe the information seeking are: Surveying, chaining, monitoring, browsing, distinguishing, filtering, extracting and ending. The analysis relates to research projects within the key competence areas of Statoil's plan and use of information and information seeking within these areas. It develops an overview of communication in research projects and the role of information seeking in relation to the performance of project work tasks. Information needs vary greatly as a person progresses through a project. Even then there were variations in the patterns of information seeking of the research scientist and engineers, the behavioural characteristics were similar and the study identified categories of information seeking behaviour that replicate those of previous studies of academic researchers. Even though this study pertains to a research centre in Norway, it is reviewed for its systematic analysis and rich policy insights.

In another study conducted by Reddy, Krishnamurty and Asundi<sup>5</sup> (2018) the focus is on Information use, users' need and their information-seeking behaviour. The basic objective of this study was to review the literature and to check whether there is a possibility of new research in this area. The paper discusses the mediation between need and user behaviour. It reviews the contribution made by Ranganathan (1961), Bernal (1960), Taylor (1968), Viogt (1961) and Belkin (1982). All these studies relate to use, reader, information needs, and user approaches. Ranganathan's study delineates five laws of library science, focusing on the users, library and their needs; Bernal focuses on user analysis on the transmission of information; Taylor identifies information needs and these, in turn, are linked to psychology and are divided into four areas viz. Visceral needs, conscious needs, formal needs, and composed needs. Viogt identified that there are three types of users approach, viz. current, everyday and exhaustive. This helps in identifying the proper source of information. Belkin's model relies on the

psychological approach. He stated that information needs to emerge with the user's state of knowledge. The author also evaluates the Wilson (1996) model and stated that there was a missing link of Information Need which is an important link between Information Behaviour and Information Seeking. Apart from reviewing these studies, we are left with the impression that the authors do not make any independent contribution. What seems a glaring omission is how relevant are these approached when the information environment is so digitised? Besides, what would have been helpful is adaptation of these approaches to information-seeking behaviour of users in Indian libraries.

Fatima and Ahmad<sup>6</sup> (2008) conducted a study on the information-seeking behaviour of the students at Ajmal Khan Tibbiya College, Aligarh Muslim University. The objectives include the purpose of information - seeking, awareness and use of library resources, and the type of information sources. A random sample of 100 students was selected. The authors concluded that the library resources and services need to be increased. Libraries should initiate seminars and orientation workshops for users to use the library resources. These recommendations were made on the basis of descriptive analysis of the sample, subject to the caveat that there is no control for confounding factors. These recommendations would have been more convincing if backed with statistical analysis based on chi-square tests, analysis of variance and in greater detail through an unordered probit analysis of recommendations by user characteristics..

Thindwa, Chawinga and Dube<sup>7</sup> (2019) seek to identify the information-seeking behaviour of security students at Mzuzu University, Malawi. The main aims were to examine the information needs, sources and patterns of security studies by these students. The analysis is based on Kuhlthau's information search process model. The main findings are: (i) most of the students preferred the internet as a source of information; (ii) they need information for academic activities-specifically, preparing assignments and completing research projects. (iii) However, the students lacked online information literacy skills and they were overwhelmed by the flood of information. (iv) On the other hand, the students were constrained by limited Wi-Fi, poor internet connection and shortage of computer laboratories. (v) The internet has become a popular source of information; hence it is urgent to strengthen e-support to the students. While these recommendations are plausible, it is essentially a descriptive study as the findings do not follow from a rigorous empirical analysis. We believe that use of ordered/unordered probit analysis of, for example, sources of information (ranked/unranked) and use of information (ranked/unranked) would be useful.

Singh and Satija<sup>8</sup> (2008) concentrated on the strategies of information seeking of agricultural scientists working in ICAR (Delhi) and Punjab Agricultural University, Ludhiana. They aimed (i) to find out the purpose, nature, types of information required and strategies adopted by agricultural scientists in information -seeking. The analysis was based on a sample of 375 agricultural scientists through structured questionnaire. It highlights (i) the sources used by agricultural scientists, (ii) strategies adopted by them, and (iii) preference for sources.

It is found that scientists are highly dependent on library resources for accessing information. No literature review was carried out. Relying on a mere descriptive analysis, it is inferred that the agricultural scientists had different approaches for information-seeking in terms of accessing different sources. It is not surprising that the factors which influence information-seeking behaviour are individual needs of information, the resources and facilities available, and the knowledge of how to use these facilities. The analytical content is low, as even elementary statistical analysis using t-tests, analysis of variance, regression analysis and ordered/unordered probit analysis of, for example, sources of information/preferred sources of information would have yielded valuable insights.

Sinha and Das<sup>9</sup> (2015) focus on the information seeking behaviour and needs of the rural population about Barak Valley, South Assam. This study was conducted using the survey methodology. A questionnaire was used as the tool for data collection along with observations and informal interviews in a few cases. The questionnaire were distributed among 300 users. On the basis of the cross-tabulation of responses collected, some proposals have been made. These include: there is need for more awareness about the public library services and the need to evaluate various information sources to get relevant information. The study further suggests that libraries should arrange seminars/ workshops, lecture programmes, etc. to promote library services. The study concluded that further research is also required to satisfy the information needs and seeking behaviour of the urban population of Barak Valley and other districts of South Assam and the North East. As an example of methodological weakness, a t-test would have confirmed whether the mean difference between user seeking more awareness of library services and those not seeking it is significant. It is also not helpful to know that more seminars/ lectures would be useful without evaluating their impact. Ex post impact assessment would be feasible if data exist on proportion satisfied and not satisfied with seminar quality.

Krishna Reddy and Karisiddappa<sup>10</sup> (1997) study focused on the information seeking Behaviour of professionals in the field of disabilities in India. The survey was conducted only of 160 professionals. The objectives of the study are to find out the communication channels used by them for recent information; and time and sources used in the research activities. The study concluded that the majority of users were not aware of the search techniques. It also mentioned that the latest technologies are not introduced due to an inadequate or insufficient budget. The study suggested that the special schools should provide adequate resources and collections to such users. The study appears to be limited and incomplete. It is a pity that the proper technological tools and resources are not provided due to budget constraints. Awareness levels could be specified and their associations with individual user characteristics could be analysed with an ordered probit model.

Kadli and Hanchinal<sup>11</sup> (2015) conducted a study of the information seeking behaviour of students of two law colleges in Mumbai. The objectives of the study were to find out the purpose, frequency of visits to libraries; the problems faced by law students; purpose of information-seeking and suggestions for improvements in the library services. The survey was done

on the basis of a questionnaire. A random sample of 250 students was selected. Both qualitative and quantitative methods were used for this study. The findings of the study reveal that print materials (books) are still used in information-seeking. Most students are aware of the legal online and offline databases. Still, the students faced problems with the internet and the lack of skills in information searching. It is recommended that the library should distribute online survey forms to improve the library services and also law librarians need to work with faculty to understand the information-seeking behaviour of students. A richer analysis would have identified the main difficulties experienced by users in accessing e-resources, search strategies, and adequacy of e-resources through, for example, a chi-square test and analysis of variance.

Ramaiah and Shimray<sup>12</sup> (2018) carried out a study to find out the services and facilities provided by Muffakham Jat College of Engineering and Technology Library, Hyderabad. The main objectives of the study were to examine the library use; identify the gaps in library collection, services and facilities; find out the use of digital libraries; and the use of library resources. The study was done by the survey method through a structured questionnaire which was circulated among 350 students. It has been recommended that to make library services better and more effective the library collection should expand, digitise the resources, more textbooks should be added besides the extension of library working hours. The objective of the study was to locate the gap but in findings, it was mentioned that users were satisfied with the collection. The study concluded that the library must improve electronic facilities. The library should attempt to provide new services to users with the change of time. Some omissions include levels of satisfaction across different services, and whether any suggestions were made about access to these services and whether the library concerned acted on these suggestions. Although most of these recommendations are sensible, they lack credibility without statistical validation. It is feasible, for example, to examine the associations between efficient utilisation of various library services and individual characteristics of the users (eg, age, gender, education, specialisation).

Kondamudi, Kumar & Tripathi<sup>13</sup> (2018) study explore the Users' perceptions of E-books at Jawaharlal Nehru University. The main objectives of the study is to examine the awareness among users about the e-books; to know about the how students, teachers and research scholars access, browse and use e-books in Jawaharlal Nehru university. The study is based on survey method through questionnaire to examine the reading behaviour and identify the gaps in accessing and using the e-books. The study was done on students (undergraduate or postgraduate), research scholars and faculty members of the University. An innovative feature of this study is formulation and validation of hypotheses using a non-parametric statistical method. The major findings of the study are (i) that Library users are not comfortable with e-books only; (ii) they want to use both e-books as well as print sources. The authors recommend more research in this area as their study is only confined to students, researchers and faculty members of one research university. They recommend more studies to be done

in this area to understand the rapid change in users' perception of e-books.

Maheshkumar and Jayaraman<sup>14</sup> (2014) conducted study to determine information-seeking behaviour and use of information resources by Academic Librarian in Coimbatore City, with the objective of studying the information requirements and their awareness of available library services. The methodology adopted in the study was to collect empirical data of 200 librarians of private college in Coimbatore. The outcome of the study indicated that the students needed assistance in order to meet their information requirements. The study also suggested that journals, library books and text books were popular sources of information for students' needs and they needed guidance in usage of such resources and services of the library. The study further suggested the use of questionnaire based information collection by the library about the students' ability to use the resources, to overcome this problem. The major limitation of this study is the sample size is much too small.

Saikia and Gohain<sup>15</sup> (2013). This study was undertaken to assess use and users' satisfaction on Library resources and services in Tezpur University. A questionnaire based survey was done for data collection. 200 questionnaires were distributed among students and research scholars of this university. The method used is cross-tabulation without any statistical validation. However, a merit is that it measures levels of satisfaction of the users. It was found that students and scholars visit the library almost daily. They are dependent on text books, newspapers and online journals to meet their information needs. However, library resources and services are not being fully utilised by students as they are not aware of services and resources. Library should develop and conduct user awareness programme. It is also suggested that recent editions of text books and reference materials should be added regularly. Training programmes regarding use of e-resources, enhancing awareness of services available should be conducted.

The study by Kumar and Chandrashekar<sup>16</sup> (2015) focuses on "Information seeking behaviour of library users at government first grade college, Kushal Nagar, Karnataka". The study is only based on faculty members (Library users) of the college. The main objective of this study is to identify the information used by the users of first Grade College, preference for resources, the process adopted by Faculties for getting the information. On the basis of replies received by the users, the authors found that the majority of the users access information through the internet library. The users faced some problems such as low internet speed, failure of electricity, shortage of time, among others. The study also revealed that users prefer to consult their personal collections on priority basis. However, two major limitations of this study are: (i) the sample size is much too small even for cross-tabulations; and (ii) without statistical validation, these findings lack credibility.

The study by Sengar and Gautam<sup>17</sup> (2005) examines the information services provided by PGIMER, Chandigarh and EHRC, New Delhi. Specifically, the objectives are (i) information sources offered to medical professionals; to assess the usefulness of information resources and services. The findings of the study reflect that the collections and services

of library need to improve. PGIMER library services are poor though the collection is good. EHRC should improve their collection and services. It is also recommended that both the libraries should launch some training programs for their users. Although the sample size is large and amenable to statistical analysis (such as use of chi-square, t-test for comparison of means), heavy reliance is placed on cross-tabulations that do not control for confounding effects (whether, for example, information seeking behaviour of Faculties varies with age). This is a major limitation.

## 5. ANALYSIS, INTERPRETATION AND FINDINGS

A unifying theme of the studies reviewed is information needs and information-seeking behaviour of users—college students, researchers, faculty members and staff, and a mixed set of users of public libraries. All studies were found to be based on structured questionnaires with an extensive overlap in terms of objectives and complete reliance on cross-tabulations in most cases. There has been a diverse range of libraries and users, and several interesting hypotheses could have been statistically validated. The strategy, therefore, is to confine our comments to differences in objectives, users, information-seeking behaviour of users, methodology including sample size, the validity of findings and constraints.

### 5.1 Aims of Selected Studies

Surprisingly, the aims do not vary much with the context: whether, for example, it is a college library, university library or a public library. Consider, for example, the study of college libraries. Kadli and Hanchinal<sup>11</sup> (2015) focuses on the information needs and information seeking behaviour of students through textbooks. Pareek and Rana<sup>2</sup> (2013) shared similar aims except that the emphasis is on the needs of research scholars was greater. Yet another notable case is Sethi and Gautam<sup>3</sup> (2013) who reported a case study of the Department of Administrative Reforms and Public Grievances. The focus was chiefly on the digital environment, use of search engines and adequacy of online information and the users comprising different levels of officers. Kondamudi, Kumar and Tripathi<sup>13</sup> (2018) examine the usage of e-books by library users. The study by Sengar and Gautam<sup>17</sup> (2005) reviews hospital libraries. Singh and Satija<sup>8</sup> (2008) It highlights (i) the sources used by agricultural scientists, (ii) strategies adopted by them, and (iii) preference for sources.

This is surprising as the diversity of users is likely to pursue different aims: students prefer textbooks, researchers prefer state-of-art research material, government officials prefer official documents. Besides, their search strategies are likely to differ. Students are more inclined to prefer print material, researchers are more inclined to prefer top journals in their areas of specialisation through on-line search, and government officials are likely to prefer print material and to a lesser extent e-notifications.

Most of these studies rely on cross-tabulations to arrive at inferences that are general without any controls for confounding variables (e.g. age, gender, occupation, career goals).

## 5.2 Methods and Materials

The samples used in these studies are of varying sizes – from a moderate sample to a very large sample. A few studies used random samples. The method of analysis was largely cross-tabulations and in most cases the findings reported were not validated by statistical tests such as t-test (for equality of means) and chi-square test (for equality of proportions), and assessment of the importance of individual characteristics (age, gender, frequency of use, occupation, distance travelled) in information-seeking behaviour. We have also drawn attention to the importance of more detailed statistical methods such as multiple regression and ordered/unordered probit analysis when the dependent variable is qualitative (eg, satisfaction, awareness, sources of information). Hence, the inferences based on cross-tabulations cannot be accepted at face value. Not surprisingly, many recommendations are common-sensical but not insightful for improving library services. For example, the case for seminars/lectures/workshops is a familiar one but would be more convincing if based on impact analysis.

## 5.3 Findings

Subject to these caveats, a distillation of findings is given as follows.

Beginning with college libraries, there was a strong preference for textbooks and online database in Kadli and Hanchinal<sup>11</sup> (2015) in law colleges; the study by Kumar and Chandrashekara<sup>16</sup> (2015) found that most of the users access information in college library, but they found some problems such as low internet speed, and failure of electricity. A university library case study performed by Pareek and Rana<sup>2</sup> (2013) found that lower shares of respondents used the internet for research (25 %) but the dominant purposes for using the library were to keep updated and prepare for research. Kondamudi, Kumar and Tripathi<sup>13</sup> (2018) found that students are not comfortable with e-books and recommend use both print as well as e-books. Another study by Saikia and Gohain<sup>15</sup> (2013) found that users are not aware about the library services and resources. Sengar and Gautam<sup>17</sup> (2005) found that users are not aware of the resources and services of medical library. The most frequently used search engine was Google. Sethi and Gautam<sup>3</sup> (2013) focused entirely on internet services for seeking information – about 73 % for seeking information and about 70 % through WWW and open access journals.

Given the growing use of internet services in seeking information for different objectives, a major constraint was limited awareness of how to use these services. This is reflected in several studies in varying degrees; high in Krishna Reddy and Karisiddappa<sup>10</sup> (1997); and Pareek and Rana<sup>2</sup> (2013), among others. The inadequacy of both print and online resources and infrastructure was emphasised by several studies. The majority of users drew attention to highly inadequate computer and internet facilities. Although frequency and duration of library visits were not necessarily correlated with the efficiency of information-seeking behaviour, several studies drew attention to the low frequency and duration of visits. Pareek and Rana<sup>2</sup> (2013) found that an appreciable majority of the users visited the library infrequently instead of daily. This is a manifestation

of the inadequacy of information and unproductive information-seeking activities for reasons indicated above.

It is indeed a pity that rich surveys of users of different types of libraries were not subjected to tests of hypotheses. For example, whether information needs and information-seeking behaviours differed; whether there were significant differences between students and whether there was any correlation between the use of library services and academic achievement. This will of course require the use of randomised control trials or quasi-experimental analyses.

A limitation of our review is that while we have argued consistently that the methodologies used—essentially descriptive with a heavy reliance on cross-tabulations without any controls for confounding factors such as age, gender, occupation, education, familiarity with how to use search engines efficiently—are not amenable to robust inferences, we have not demonstrated how some of the seemingly plausible and sensible recommendations might not be empirically valid. The reason lies in lack of access to unit records. All that we get from these studies are grouped data which cannot be analysed statistically. An illustration is helpful. If we examine preference for on-line material between social scientists and engineers, the within-group variation in familiarity with on-line search may vary a great deal among the former and not so much among the latter, the between-group mean differences may not be large enough relative to within-group differences. So comparison of between-group means on its own may mislead. A t-test would be more reliable which takes into account both within-group and between-group differences. Another example is appropriate when awareness levels—say highly aware, moderately aware and hardly aware—follow an ordered sequence. As awareness levels are likely to be associated with age, occupation, education, we may be interested in assessing their relative contributions. In such a case, it is appropriate to use an ordered probit analysis. The marginal effects of each explanatory variable would capture their relative importance. Although these techniques are frequently used in Social Sciences, it is intriguing why the information-seeking behaviour has not been subjected to greater analytical rigour.

## 6. CONCLUSION

From a broader policy perspective, the studies reviewed here were found to lack analytical rigour as strong conclusions are drawn from cross-tabulations. However, some insights emerge that require empirical validation. Although information needs and information-seeking behaviour have undergone extreme changes with the rapid digitisation of information, sources and access through a wide range of search strategies, there is widespread recognition of the inadequacy of relevant print and e-resources and limited infrastructure for more efficient access to the surge of information. In all fairness, we already know that more resources need to be devoted to the acquisition of textbooks, reference material and efficient training of library staff, better computers, and a more conducive congenial work environment. An important feature of computer networks is that an enlarged pool of information can be accessed at negligible cost. So the value addition from the literature review is modest,

if any. Unfortunately, there is hardly any substantive research as it is a top policy priority. Whether teaching could impart greater motivation for acquiring new information among the users and their more frequent and efficient use of such information for academic and professional goals is contingent upon major reforms in academic and professional institution, e.g. recruitment of teachers and promotion on merit, innovative curricula, and stringent grading of students. Last but not least, original and rigorous research could broaden the scope and the methodology of new, on-going research, with more valuable policy insights. Specifically, the emphasis must shift from descriptive analysis to clear formulation of testable hypotheses and their empirical validation. The data exist but are far from fully exploited. This is of course easier said than done but lofty goals often lead to impressive results.

## REFERENCES

1. Ellis, David. A behavioural approach to information retrieval design. *J. Doc.*, 1989, **45** (3), 171–221.
2. Pareek, A.K. & Rana, M.S. Study of information seeking behaviour and library use pattern of researchers in Banasthali University. *Libr. Philos. Pract.* (e-journal), 2013, 887.  
<https://digitalcommons.unl.edu/cgi/viewcontent.cgi?referer=&httpsredir=1&article=2225&context=libphilprac> (Accessed on 4 January, 2020)
3. Sethi, S. & Gautam. Information seeking pattern in digital environment: A case study of the Department of Administrative Reforms and Public Grievances, New Delhi. In 16<sup>th</sup> NACLIN 2013 : Emerging technologies and innovations in library practices, 10-12 December 2013, Jaipur, 2013, pp. 149-163.
4. Ellis, D. & Haugan, M. Modelling the information seeking patterns of engineers and research scientists in an industrial environment. *J. Doc.*, **53**(4), pp. 384-403.  
doi: 10.1108/EUM0000000007204
5. Reddy, B.S.; Krishnamurthy, M. & Asundi, A.Y. Information use, user, user needs and seeking behaviour: A review. *DESIDOC J. Libr. Inf. Technol.*, 2018, **38**(2), 85-87.  
doi: 10.14429/djlit.38.2.12098
6. Fatima, N. & Ahmad, N. Information seeking behaviour of the students at Ajmal Khan Tibbiya college, Aligarh Muslim university: A survey. *Ann. Libr. Inf. Stud.*, 2008, **55**(2), 141-144.
7. Thindwa, T.; Chawingra, W. & Dube, G. Information-seeking behaviour of security students: A case study. *S. Afr. J. Inf. Manage.*, 2019, **21**(1), a1048.  
doi: 10.4102/sajim.v21i1.1048.
8. Singh, K. & Satija, M.P. Information seeking strategies of Agricultural Scientists working in the ICAR institutions in India. *DESIDOC J. Libr. Inf. Technol.*, 2008, **28**(3), 37-45.  
doi: 10.14429/djlit.28.3.175
9. Sinha, M.K. & Das, P. A study of information needs and information seeking behaviour of rural population with special reference to Barak Valley, South Assam (North East India): A survey. In the 60<sup>th</sup> ILA International (Diamond Jubilee) Conference: Embedded Librarianship and Technological Challenges of the Digital Age, Chandigarh during 8 -10 April, 2015, Delhi, 2015 pp. 259-268.
10. Krishna Reddy, S. Hari & Karisiddappa, C.R. Information seeking behaviour of the professionals in the field of disabilities with special reference to mental handicap in India. *Ann. Libr. Sci. Doc.*, 1997, **44** (2), 54-64.
11. Kadli, J.H. & Hanchinal, V.B. Information seeking behaviour of law students in the changing digital environment. *DESIDOC J. Libr. Inf. Technol.*, 2015, **35**(1), 61-68  
doi: 10.14429/djlit.35.1.8099.
12. Ramaiah, C.K. & Shimray, S.R. Information seeking behaviour of Engineering College students : A case study. *DESIDOC J. Libr. Inf. Technol.*, 2018, **38**(2), 110-116.  
doi: 10.14429/djlit.38.2.11195
13. Kondamudi, N.R.; Kumar, S. & Tripathi, M. User's perceptions of E-books at Jawaharlal Nehru University, New Delhi : A case study. *DESIDOC J. Libr. Inf. Technol.*, 2018, **38**(4), 231-237.  
doi: 10.14429/djlit.38.4.12993
14. Maheshkumar, R. & Jayaraman,, S. A study on users information needs and information seeking behaviour with special reference to academic librarian in Coimbatore. *Int. J. Inf. Sci. Manage.*, 2014, **3**(1), 53-59.
15. Saikia, Mukesh & Gohain, Anjan. Use and user's satisfaction on Library resources and services in Tezpur University : A survey. *Libr. Philos. Pract. (e-journal)*, 2013, **972**.
16. Kumar, K. & Chandrashekara, G.S. Information seeking behaviour of library users at government first grade college, Kushal Nagar Karnataka : A survey. *AJIST*, 2015, **1**, 3-4, 10-10. <http://www.escienceworld.in/index.php/ajlis/article/view/118/112>. (Access on 15-01-2021).
17. Sengar, K.P. Singh & Gautam, J.N. Information seeking behaviour of medical professionals working with public sector institute/hospital (PGIMER, Chandigarh) and private sector institute/hospital (EHIRC), New Delhi: A comparative study with reference to their library use. *Libr. Herald*, **43**(2), 92-108.

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In the current study, she collected, analysed the available literature on the selected topic and highlighted the gaps.

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