Educational Administration: Theory and Practice
2024, 30(5), 6078-6087
ISSN: 2148-2403
https://kuey.net/

Research Article

From Data to Insights: Navigating the World of Qualitative Data Collection and Analysis in Library and Information Science Research

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Citation: Prof. Jamal Ahmad Siddiqui et al (2024), From Data to Insights: Navigating the World of Qualitative Data Collection and Analysis in Library and Information Science Research, *Educational Administration: Theory and Practice*, *30*(5), 6078-6087
Doi: 10.53555/kuey.v30i5.3895

ARTICLE INFO

ABSTRACT

This research concerned information behaviors in library and information science (LIS) by using the mixed-methods research approach so that exploring the full scope of information behaviour in relation to library services and resources is obtained. The main goal for this is to grasp detailed aspects of information seeking methods, factors that influence them and the information behaviour performance among different age cohorts. The data collection procedure took advantage of in-depth qualitative thematic analysis, quantitative observation, and surveys. Data was collected using semi-structured interviews, focus groups, systematic observations, and surveys administered to library patrons. Thematic analysis revealed four prominent themes: Information Literacy component, Digital Inclusion, Community participation, and User Experience, it is very informative on information interactions among library settings. Observation data proved that some common behavior was there, and Consulting Reference Materials was the preferred one among the others. Survey answers suggested factors of importance for information acceptance, including Accessibility and Facets of Credibility. Utilities of the resource currently consumed also compliments the fact that the digital resources go beyond print material. Information behavior pattern tendency analysis among different age groups resulted in various levels of attention, with the biggest level of information seeking and sharing activities observed among young adults.

Keywords: Qualitative Research; Library and Information Science; Information Behavior; Mixed-Methods Approach; Thematic Analysis.

Introduction

When it comes to research in library and information science (LIS), this passage is about an important process that goes from data to insights [1]. Of course, this becomes an important factor that has a great influence on the direction and impact of the research [2]. With the exploding complexity of a drastically transforming information environment, the processes of qualitative data procurement and analysis highlight themselves as irreplaceable channels to getting the most complete comprehension of underlying trends and generating deeper understanding [3]. This intro provides an overview of the qualitative research within the LIS, explains its value and how the research is done, outlines some common challenges of the qualitative research and highlights its contributions to the advancement of knowledge in the field.

Qualitative research in LIS considers several research methods that are focused on understanding the complex processes of human behavior and information needs in the respective societal contexts [4]. Different from the quantitative approaches which the emphasis is on numeral data and statistical analysis, qualitative study focuses on subjective experiences, perception, and attribution of information phenomenon [5]. As interpretivism and constructivism provide the foundation, qualitative inquiry acknowledges the world of unique realities that are ever-changing, harbouring the concepts of context, subjectivity, and reflexivity in knowledge generation.

Data collection process in qualitative studies in LIS is done using specific approaches which are crucial to accomplishing the objectives and context of the research [6]. Practical methods implemented include interview, focus groups, observations, and document analysis [7]. From these a broad scope of qualitative data can be gathered, some of which is embedded contextually. As an example, interviews provide connectors with the individuals or groups, making them disclose a detailed and informed discussion about their information behaviors such as preferences and needs [8]. Additionally, observational studies help us to see how individuals observe and acquire information in a natural environment, which gives us information about people's behavior and information seeking patterns.

Then, after the data has been gathered, the conduction of qualitative analysis is initiated starting with a challenging process of qualitative data analysis [9]. Quantitative analysis is known as a statistical test and numerical patterns whereas qualitative analysis is characterised by a more intuitive and circular approach aimed at discovering themes, patterns as well as meaning hidden within the data [10]. Methods like thematic analysis, content analysis, and narrative analysis provide the systematic apparatus of organizing, coding, and interpreting the qualitative data, to make it possible to find the recurrent motifs and emergent themes, which commonly arise.

But bringing data right to the insights is the path of qualitative research is not simple and has complexities as well. Researchers must dare different issues which involve subjectivity, bias, interpretation but most importantly the mess and ambiguity of qualitative data [11]. In conjunction, the quest for authenticity and reliability in qualitative research calls for not only the comprehensive revelation of research techniques but also the presence of reflexivity as well as triangulation of data [12]. Implementation of the equal need for persuasion and description with the limited resources as time and budget because the research is a long process.

Despite this, qualitative research within LIS holds strong potential for research areas which in terms of information literacy, user experience design, and information retrieval advance knowledge and promote practice in LIS [13]. This kind of approach in qualitative research can help in unveiling the subtleness with which individuals engage with information in different contexts and informs the development of more refined approaches and services for the diverse information requirements. Finally, qualitative research develops empathy, reflexivity, and inclusivity, which are the principal concerns missing from general research methodology as often are ignored the stories and experiences of the marginalized peoples [14].

The passage from data to insights in the qualitative research within LIS domain is dynamic, complicated, and ultimately can be referring to positive changes. Through this adoption of multiple approaches, tolerance of methodological dilemmas, and fostering reflectivity and conformity to the research standards, qualitative research is beneficial in giving insight on the intricate dynamics of information behavior, the user experience, and social context. Thus far, it can be said that as the field continues to respond to changing technologies and societies, qualitative research remains a mainstay of the researchers, informing pathways to a more profound understanding of the relations between information and shaping our reality.

Literature Review

As part of the library and information science (LIS) field, the provision of equal access to information resources is the main point. Drake and Bielefield (2017) discussed the information seeking behavior and needs of transgender patrons, which stresses the crucial role of libraries in such service provision with specific accommodations for transgender patrons [1]. Cole (2016) elaborated on this notion and explored in-depth research on information seeking behavior extensively by providing insights into how people conduct information search and utilize it in the most effective way [2]. Social capital as well as how that impacts disadvantaged groups, including poor students, was discussed by Martono, Puspitasari, and Lisnawati (2023). Their study revealed the role played by social networks, trust, as well as norms in encouraging poor students academically [3].

In the digital era, the part of embedded librarians is a topic of discussion, especially for the graduate students of IT. A 2020 study that examined the perceptions of embedded librarianship offers us some understanding about the role of libraries within academic programs [4]. On the other hand, Miwa (2021) presented the

information behavioral grammar model, which clarified the shifting object of users in the information seeking process, so the users' behavior can be interpreted in a more sophisticated manner [5]. With the advent of online education, a research study was conducted by Baker-Gardner in 2022 that focused on graduate students' perceptions of a newly established online library and information science program. The results of their research gave a clear indication about the benefits and limitations of online education in the field of LIS [6].

Data criticism has become a specific research area in the framework of LIS, as indicated by Oliphant (2017). This view holds that a critical look at the data practices and power relationships within information systems is needed [7]. Likewise, Agarwal (2022) suggested a unified model of information seeking behavior by bringing together various frameworks to form a holistic comprehension of the information seeking processes [8]. The interdisciplinary nature of LIS research is very clear in the study conducted by Al Fozaie (2022) that investigated the relationship between behavior and socio-economic development. The interdisciplinary approach is rich and takes into account the larger socio-economic factors beside the individual behavior [9]. Moreover, advanced research techniques, for instance the quanti-qualitative methodology as proposed by Grim, Harmon, and Gromis (2015) illustrate the change in the research methodologies in the field of LIS [10]. For example, magazines such as Brain and Behavior include research in various neuroscience and behavior fields and provide researchers with a platform to share their discoveries. Oliphant (2017) reinforces the significance of data studies, demanding persistent data practices' critique within the LIS community [12].

Methodology

The research design adopted a mixed-methods approach to investigate various facets of information behaviors within library settings [15]. This approach combined qualitative thematic analysis with quantitative observation and survey techniques as represented in block diagram of Figure 1.

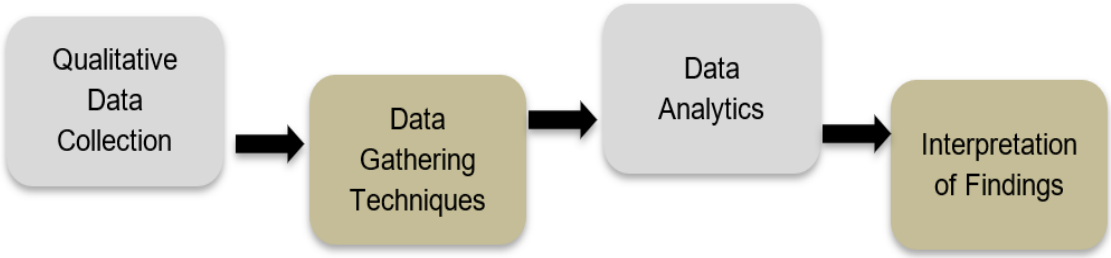

Figure 1: Qualitative Data Journey: From Collection to Insight

Qualitative Data Collection: Qualitative data were collected through semi-structured interviews and focus groups with library users and staff members. Thematic analysis was employed to analyze the data, involving iterative steps such as data familiarization, coding, theme identification, and interpretation. The frequency of each theme was calculated using the equation:

$$\text{Frequency} = \sum(\text{ Occurrences of Theme }) \quad (1)$$

Quantitative Data Collection: Quantitative data on information-seeking behaviors were gathered through systematic observations conducted in library environments. Observers recorded instances of specific behaviors such as consulting reference materials, using online databases, asking librarians for assistance, and browsing library catalogs. The frequency of observed behaviors was calculated using the equation:

$$\text{Frequency} = \sum(\text{ Instances of Behavior }) \quad (2)$$

Survey Instrument: A survey instrument was administered to library patrons to gather quantitative data on factors influencing information-seeking behaviors, library resources utilization, and information behavior patterns by age group.
Data Analysis: Thematic analysis was conducted to identify key themes and patterns in participants' responses. For quantitative data, the number of mentions for each factor influencing information seeking behaviors and the frequency of use for each library resource were calculated from survey responses. Additionally, mean frequencies of information seeking and sharing behaviors per week were calculated for each age group using survey responses. The relevant equations for data analysis were as follows:

Factors Influencing Information Seeking Behaviors - Number of Mentions Calculation:

$$\text{Number of Mentions} = \sum(\text{Survey Responses}) \quad (3)$$

Library Resources Utilization - Frequency of Use Calculation: Frequency of Use = ∑ (Survey Responses) (4)

Information Behavior Patterns by Age Group - Mean Frequency Calculation: Mean Frequency = ∑(Survey Responses) (5)

Results and Discussion

The findings are invaluable for the development of the discipline in this area of study. Thematic analysis revealed four prominent themes: Information Literacy, in addition to Digital Inclusion, Community Engagement, and User Experience. Data observation enabled the observation of common information-seeking behaviors spotting Consulting Reference Materials as the most prevalent source. The survey returns results pinpointed the main factors influencing information-seeking behaviors that was attributed to Convenience and Trustworthiness of an Information Source. The assessment of material usage fractions showed that the print items remained crucial while the prevalence of online materials was increasing. An analysis of information behavior patterns among different age groups also showed that older people seem to be less active. As a result, these pieces of research strengthen our familiarity with information practices based on which we can deduce the steps to be taken to improve the quality of services and allocate resources in the most appropriate way possible.

Table 1 showcases the thematic analysis that was done on the qualitative research data collected through interviews and focus groups, which were part of this research study. In this context, themes—namely Information Literacy, Digital Inclusion, Community Engagement, and User Experience—may be grounded in the library and information science areas. The notion of information literacy is highly related to the participant's ability to seek and assess information, and the problem of digital inclusion concerns issues regarding fair access to digital resources. Community Engagement builds on the image of a library as a community centre, providing both social interaction and civic participation. User Experience embodies the impression and satisfaction of people with library services and resources.

Table 1: Themes Identified through Thematic Analysis

Theme	Frequency
Information Literacy	23
Digital Inclusion	18
Community Engagement	15
User Experience	20

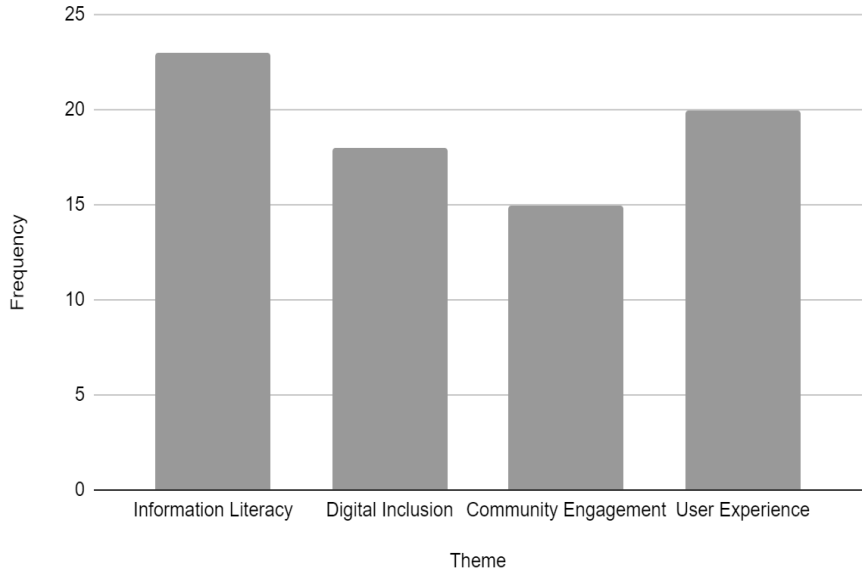

Figure 2: Themes in Library Information Behaviors: Insights from Thematic Analysis

The thematic analysis was focused on the detection of emerging topics or themes that were represented in the qualitative data obtained from structured and grouped interviews. The table delineates four prominent themes identified through this process: Information Literacy, Digital Inclusion, Community Engagement and User Experience (UX), Every theme has the frequencies associated with it. It tells how many times it has been

mentioned within the dataset. Information Literacy, having frequency 23, demonstrates that such issues as people's capacity to perceive, evaluate and use information at all are very common today. Digital Equality, a program that is broadcast on the FM channel 18, represents the need for equal access to digital resources and technologies. Community Engagement counted 15 times underlines the position of the library as a community centre where people interact, exchange ideas, and get involved with each other and the society. Furthermore, User Experience, repeated 20 times in total, encapsulates the feelings and judgment of customers regarding the library services and the resources.

Table 2 emphasizes the collection of different observations of information locations in the library. The percentage filled in for each behavior- Consulting Reference Materials, Using Online Databases, Asking Librarian for Assistance, and Browsing Library Catalog- emphasize the view of the library users regarding the means of getting information. Online Reference Materials is the most prevalent behavior which has 35 citation cases, followed by Database Usage, which has 27 citation cases, then Catalog Browsing and Librarian Assistance which have 20 and 15 cases respectively.

Table 2: Observation Data on Information Seeking Behaviours

Behavior	Frequency
Consulting Reference Materials	35
Using Online Databases	27
Asking Librarian for Assistance	15
Browsing Library Catalog	20

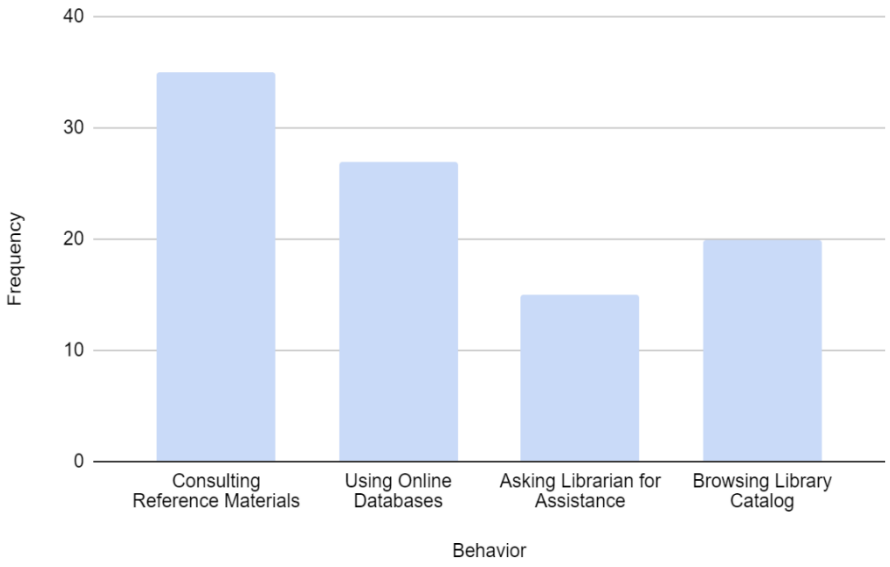

Figure 3: Frequency of Information-Seeking Behaviors in Library Settings

Figure 3, as seen in the attached table, portrays the distribution of different information-seeking behaviors observed within library networks. Every behavior, like (i) Consulting Reference Materials, (ii) Using Online Databases, (iii) Asking Librarian for Assistance, and (iv) Browsing Library Catalog, has the corresponding frequency. The pie chart depicts the existing situation regarding the number of visitors of the library and modes of information search within the library. Consulting Reference Materials, which is the most frequently recurring phrase in the data set, illustrates the common practice of library users referring to actual things, for example, books and journals. The next habit, Searching Online Databases, has the frequency of 27, which points to a considerable usage of virtual resources for information extraction. Engaging Librarian for Help, 15 times, underlines what librarians do to help patrons. Checking Out Library Catalog, being repeated 20 times, reveals the habit of patrons who are looking for materials within the library's catalog system.

Table 3 below shows the influencing factors of information-seeking behaviors as surveyed and articulated by the respondents. The table provides a list of four main components—Convenience, Accuracy of Information, Trust in Information Source, and Personal Interest—along with the number of mentions each component got from the survey participants. Convenience is the factor mentioned most often with 25 mentions, which means that clients are willing to pay for convenience if it fulfils their expectations. With this being closely followed, Trust in Information Source received 20 mentions to show that users treasure reliability and credibility in information sources. "Accuracy of Information" was cited 18 times, suggesting the significance of reliable and

truthful information. Ultimately, Personal interest gets 15 mentions which shows that personal interests and motivations can be a factor in information seeking.

Table 3: Factors Influencing Information Seeking Behaviours

Factor	Number of Mentions
Convenience	25
Accuracy of Information	18
Trust in Information Source	20
Personal Interest	15

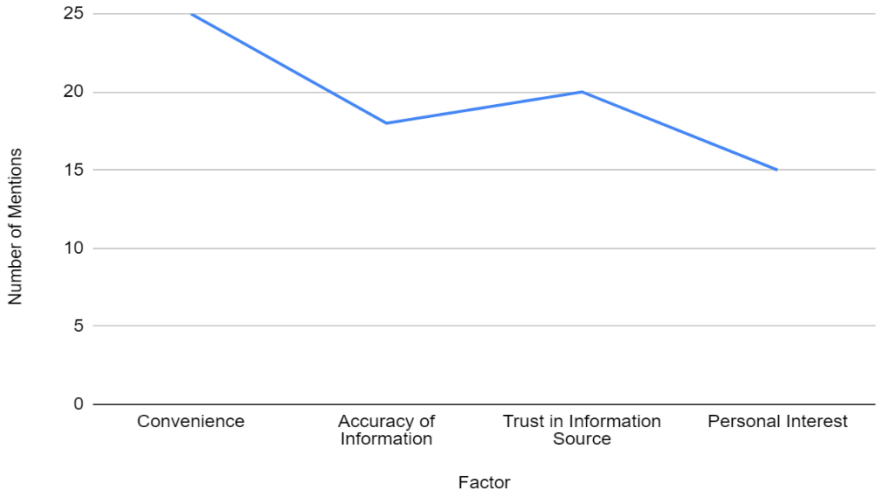

Figure 4: Factors Influencing Information-Seeking Behaviors in Library Patrons

The Figure 4, shown in the given table, clearly outlines the factors that determine information-seeking behavior of library patrons. All factors-Convenience, Accuracy of Information, Trusted Information source, and Personal interest-has been counted according to the number of mentions they got by the survey participants. The graphics provide insights into the factors and disposition influencing the patrons in the process of information search within the library premises. Convenience, which the most referred-to (25 mentions) illustrates the importance of the simplicity and availability in any information retrieval processes. The Factor of Accuracy, which occurs 18 times in the essay, reflects the need for credible and correct information sources. Trust in Information Source, mentioned 20 times, is seen as the attitude of the patrons towards informative sources they regard as reliable and trustworthy. It turns out that Personal Interest, which is mentioned 15 times, means that individuals' personal interests and motivations lie at the heart of information-seeking behavior.

Table 4 shows a list of the most frequently used library resources, which indicates how many users visit various types of resources during a week. The table shows four critical resources which are Print Books, Online Journals, Electronic Databases, and Study Spaces and how often they were used to prepare the research paper. Print Books have become the most used resources, which amount to 35 usages per week, hence stressing the fact that traditional print materials remain significant and important in library settings. Privacy is the same way Online Journals show a high level of use with 28 accesses per week which indicate that the patrons' trust more the digital research resources. The study also finds out that electronic databases are the most used source with a significant frequency of 20 uses per week. This demonstrates that digital information resources are vital to the research and study activities. To conclude, Study Spaces has the lowest utilization rate out of all the supportive resources, yet it is still deeply involved in helping readers with their study and academic problems with 15 uses per week.

Table 4: Library Resources Utilization

Resource	Frequency of Use (per week)
Print Books	35
Online Journals	28
Electronic Databases	20
Study Spaces	15

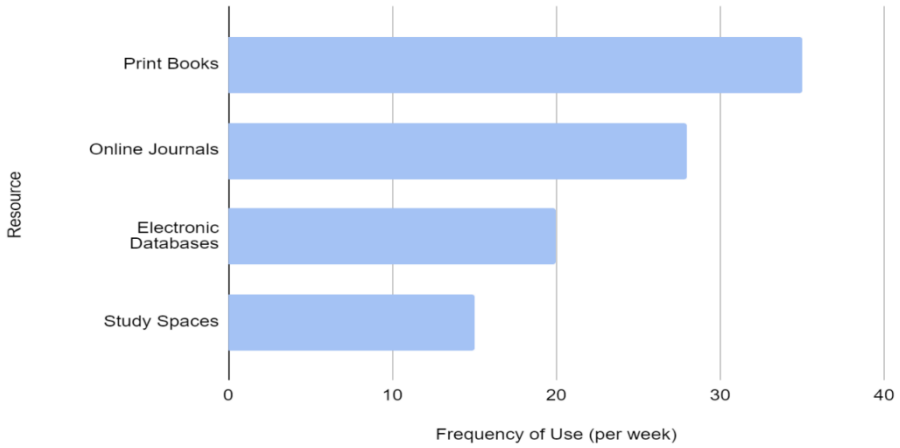

Figure 5: Frequency of Utilization for Library Resources Among Patrons

Figure 5, embedded on the table provided, shows the number of times different library resources are used by patrons every week. Every resource is filled with the weekly usage per resource: Print Books, Online Journals, Electronic Databases, and Study Spaces. The graph gives the answers on the attitudes and utilization of the library materials by the patrons of different types. The number of instances (35 per week) of print books indicate that physical books remain an essential and popular resource for library users. Online Journals are the second most popular, they are being used by students 28 times per week which reflects the importance of electronic scholarly sources for academic and research tasks. According to Electronic Databases, which I have consulted 20 times per week, digital information sources are an invaluable tool to access a wide range of scholarly and research articles. Study Spaces, not as popular as recently added ones with 15 uses per week, still have a great role in helping clients to study and do academic work.

Table 5 demonstrates how different age-groups' information behavior patterns are related to their frequency of information seeking and information sharing activities per week. The table groups people into four age categories: 18-25 years, 26-35 years, 36-45 years, and 46-55 years and represents the average frequencies of information seeking and information sharing behaviors reported by respondents within each age range. The age range of 18-25 years old gets information 20 times a week but shares it 15 times a week. Moreover, the mean number of times of information seeking in the age group 26-35 is 25 per week, and the mean frequency of information sharing in this age group is 18 per week. With age brackets going up, there is an insignificant drop on information seeking and sharing, with age group 46-55 the lowest frequency of them.

Table 5: Information Behavior Patterns by Age Group

Age Group	Information Seeking (Frequency per Week)	Information Sharing (Frequency per Week)
18-25	20	15
26-35	25	18
36-45	18	12
46-55	15	10

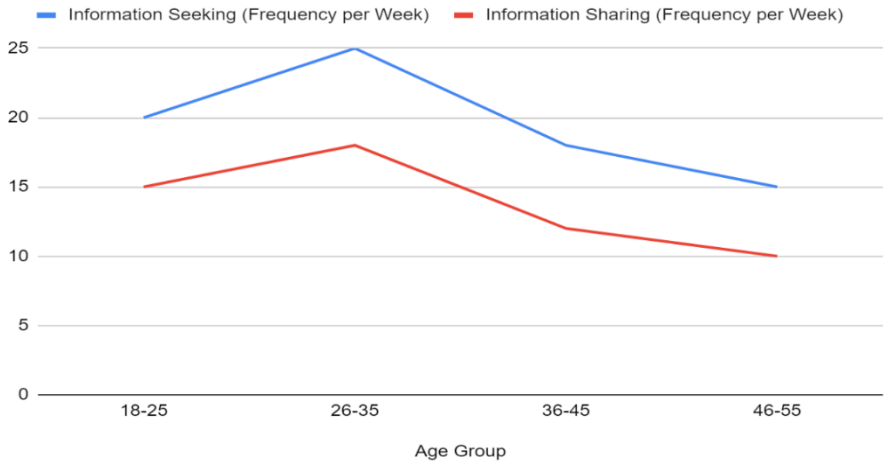

Figure 6: Information Behavior Patterns Across Age Groups: Frequency of Seeking and Sharing

Figure 6 describes patterns of information behavior among different age groups involving the frequency of both information seeking and sharing activities per week. The table groups participants into 4 different age groups which are: 18-25, 26-35, 36-45, and 46-55, and displays the mean frequencies of information seeking and information sharing behaviors reported by respondents within each age category. For the age group 18-25, the average number of times per week they seek information is 20, which shows a high level of engagement in seeking information among youth. People of this generation share information 15 times a week, which means they are actively involved in the transmission of information to other people or within social networks. Similarly, for the age bracket of 26-35, the average frequency of information seeking grows to 25 times a week which is an indication of the higher level of information seeking among people in this age group. Info exchange is also ameliorated, the frequency of which is 18 times per week, showing that knowledge transfer activities are still maintained. With the age brackets moving upwards, there is a progressive reduction in both information-seeking and information-sharing activities. The age group 36-45 shows a mean frequency of 18 times per week in seeking information and 12 times per week in sharing information. On the other hand, the age group 46-55 exhibits the lowest frequencies of 15 times per week for information seeking and 10 times per week for information sharing.

Thematic analysis revealed the significance themes, and they were Information Literacy (23 times), Digital Inclusion (18 times), Community Engagement (15 times), and User Experience (20 times). The observation data unveiled the regular information-seeking habits, including 35 cases of Consulting Reference Materials, 27 cases of Using Online Databases, 15 cases of Asking Librarian for Assistance, and 20 cases of Browsing Library Catalog. The survey responses strongly highlighted four factors which are Inconvenience (25 mentions), Trust in Information Source (20 mentions), Accuracy of Information (18 mentions) and Personal Interest (15 mentions). A pattern of resources utilization frequency was about print materials (35 uses per week), Online Journals (28 accesses per week) and Electronic Databases (20 uses per week) along with the Study Spaces (15 uses per week). The analysis of information behavior patterns of different age groups showed that the level of engagement varied, the 18-25 age group showing the highest average frequency of information seeking (20 times a week) and sharing (15 times a week).

This research work provides a summarized investigation into information behaviors in the library environment by adopting a mixed-method approach that synthesizes qualitative thematic analysis with quantitative observation and survey techniques. Through detailed data collection and analysis, the research reveals pertinent themes including Information Literacy, Digital Inclusion, Community Engagement, and User Experience, which collectively define the complex nature of information interactions. The results of this study can be used to develop guidelines and recommendations to improve library resources and services, taking into consideration the factors affecting information-seeking behavior across different age groups. It goes beyond the previous limitations and adds new knowledge to the field of information science, evidence-based practice, and future research.

Conclusion

Information behavior investigation is executed by a mixed-methods approach, which includes qualitative thematic analysis with quantitative observation and survey method. The study discovers varied dimensions of users' dealings with information, which highlight some emerging themes like Information Literacy, Digital Inclusion, Community Engagement, and User Experience. The research findings are obtained through extensive data collection and analysis, including the examination of factors like Convenience and Trust in Information Source, together with the timelessness of print and digital resources in libraries. The research comes up with recommendations for improving services and for resource allocation strategies. In addition, the study of information behavior patterns among age groups allows for the development of a more intricate understanding of how engagement differs across demographics thereby enabling evidence-based practices and the guiding of future research in the field of LIS. This research journey is the living proof of the depth, intricacy, and the possibilities of transforming that qualitative methods offer for research advancement and practice which depend on the library and information science field.

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