

User-Centered Academic Libraries and Effective Information Behaviour of Users

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ABSTRACT:

This paper looks at how academic libraries are changing from focusing on their collections to focusing on the needs of users. It shows that understanding how users behave can make library services better. In the past, libraries organized their resources based on their collections, but now they see the importance of aligning their services with how users look for information.

Using theories like Dervin's sense-making and Belkin's Anomalous State of Knowledge, this paper examines how students, researchers, and faculty find information. The results indicate that users often prefer web browsers over traditional library tools because they are more convenient and familiar.

Libraries can improve user satisfaction by using web technology, adaptive recommendation systems, and smart search tools. However, there are still usability issues, especially for international students and diverse user groups.

The paper suggests using a mixed-methods approach for research, combining both quantitative and qualitative methods. It sees library searches as a form of cognitive work that needs systems to support thinking and learning.

Practical recommendations include creating supportive systems, matching services to user workflows, offering personalized services, and addressing usability problems. This paper demonstrates that user-centered academic libraries can greatly enhance how people find information and support their learning and discovery.

Keywords: user-centered libraries, information behaviour, academic libraries, library services.

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1. Introduction

Every library exists for one reason: to connect people with the information they need. Historically, however, academic libraries have been organized around collections rather than users. Librarians created catalogues for their own use, physical spaces were arranged for

efficient shelving, and services were designed for institutional convenience rather than user needs (Buckland, 1992).

This approach began to change when researchers started to ask different questions. Instead of enquiring, "What do we have?" they began to ask, "How do users actually seek and

use information?" (Wilson, 2000). This led to the emergence of the field of information behaviour research, which explores how people interact with information in both their work and daily lives. Researchers found that users do not behave as traditional library systems expect.

The shift from a collection-centered to a user-centered approach was not just a philosophical preference; it became a practical necessity. Students, researchers, and faculty members increasingly turned to web browsers, search engines, and freely available resources because these options were simply more convenient and familiar than traditional library tools (Connaway, Dickey, & Radford, 2011). As one major research synthesis concluded, "one size fits none"; people have different needs, contexts, and methods for finding information (OCLC, 2011).

This paper examines what it means for an academic library to be truly user-centred and how understanding information behaviour can enhance the effectiveness of library services. It draws on theoretical frameworks, empirical studies, and practical examples to provide a comprehensive view of this evolving field.

2. Understanding Information Behaviour

2.1 What is Information Behaviour?

Information behaviour refers to the many ways people interact with information—how they seek it, access it, use it, and share it. This goes far beyond simply searching a catalogue. It includes asking a colleague for a recommendation, browsing a bookshelf, reading a journal article, and verifying facts across multiple sources (Wilson, 2000).

The study of information behaviour emerged from a recognition that information needs are often complex and difficult to articulate. Dervin's sense-making theory, for example, suggests that people seek information when they encounter gaps in their understanding—they need to "bridge" those gaps to move forward (Dervin, 1983). Belkin's Anomalous State of Knowledge (ASK) model similarly proposes that users often cannot clearly state

what they need because their knowledge is insufficient to formulate the right question (Belkin, Oddy, & Brooks, 1982).

These theoretical insights have profound implications for library design. If users cannot always articulate what they need, library systems must be forgiving, flexible, and supportive of exploration (Kuhlthau, 1991).

2.2 Different Types of Information Use Studies

Information use studies can be classified in several ways, each offering a different lens for understanding user behaviour.

- User-based studies- focus on categories of individuals defined by their role. In academic settings, the three main groups are students, researchers, and faculty members. Undergraduate students typically need quick access to textbooks, lecture notes, and reference works. Postgraduate students begin using journals, theses, and databases more actively. Researchers have specialised needs, depending on primary sources like research papers, conference proceedings, and datasets. Faculty members occupy a dual role—they need information both for teaching and their own research, and they also guide students toward useful sources (Case & Given, 2016).

- Profession-based studies- examine information use among practising professionals. Doctors, scientists, engineers, lawyers, and teachers all have distinct working environments that shape what information they need and how they get it. For example, research on doctors has found that face-to-face communication and printed evidence remain important even as digital tools spread (Dawes & Sampson, 2003). Scientists lean heavily on journal articles and preprints, placing a high premium on currency (Tenopir et al., 2009).

- Subject-based studies analyse how the structure of knowledge differs across disciplines. In the sciences, the journal article is the central unit of communication, and information ages quickly. In the humanities, the monograph remains crucial, and older materials retain their value for much longer. The social

sciences sit somewhere in between, drawing on a mix of journals, books, statistical data, and government reports (Bates, 2010).

- Source-based studies- shift the focus from the user to the channel. Sources are commonly grouped into non-electronic (books, journals, and reports), electronic (e-journals, databases, and websites), and oral (colleagues, experts, and teachers). Even in the digital age, oral sources remain important—many users prefer to ask a knowledgeable person before searching a database (Savolainen, 2008).

Understanding these different types of studies helps libraries tailor their services. A chemistry library needs strong database subscriptions and fast access to current journals, while a literature department needs a deep, well-preserved book collection.

3. The Shift to User-Centered Libraries

3.1 From Collection-Centered to User-Centered

Libraries are shifting from focusing on their collections to focusing on their users' needs. Ranganathan's Five Laws of Library Science remind us that libraries exist for users, not just for their materials (Ranganathan, 1931). However, it has taken time to put this idea into practice.

Early library research looked mainly at what libraries had and how many people used them. Studies counted visitors, circulation numbers, and reference questions. These numbers showed how busy libraries were but did not show if they were meeting user needs effectively (Kantor, 1976).

Now, the focus is on understanding how people search for information and creating services that fit their needs. Libraries should design services that match how users work, instead of expecting users to adapt to library systems (Hernon & Altman, 2010).

3.2 The Library in the Life of the User

A major research project by OCLC introduced an important idea: think of "the library in the life of the user" instead of "the user in the life of the library" (De Rosa et al., 2011). This

means that libraries should not just wait for users to come to them. Instead, libraries should be where users already are and work in ways that feel natural to them (Connaway, Dickey, & Radford, 2011).

The research revealed several key points. Many people think of libraries primarily as places for physical books and do not consider them for online resources or reference services (De Rosa et al., 2011). Users may not use library services because they do not know they exist or because those services do not fit their usual ways of working (Connaway, Dickey, & Radford, 2011). The situation and context of their information needs often influence how people behave—what works for a quick fact-check is different from what is best for in-depth research (Savolainen, 2012).

Most importantly, the research found that convenience is often the main reason users choose certain technologies and information resources (Connaway, Dickey, & Radford, 2011). This does not mean that users want simple solutions; they constantly assess how important their information needs are. However, if a library resource is harder to use than a freely available option, many users will choose the easier path (OCLC, 2011).

4. Information Behavior in Academic Libraries

4.1 Student Information-Seeking Behavior

Students are the largest group of users in most academic libraries, and their way of looking for information has been studied quite a bit. Interestingly, their research habits often defy traditional expectations (Asher, Duke, & Wilson, 2013).

Undergraduate students typically lean on textbooks, lecture notes, and reference materials. They prefer quick, easily accessible online sources over browsing physical books, a tendency that has grown stronger with the popularity of smartphones and digital libraries (Head & Eisenberg, 2010). On the other hand, postgraduate students start to delve into journals, theses, and databases more actively and

adopt a more organised approach to their research (Ellis, 1989).

One challenge is that students come to university with varying levels of information literacy from their earlier education. Many need extra guidance during their studies to develop the skills necessary for effective academic research (Gross & Latham, 2012). Research shows that first-year students often encounter confusion with library terminology, collection labelling, and the limited ways to search—these issues can make it tough for them to find the resources they need (Asher, Duke, & Wilson, 2013).

4.2 Researcher Behavior

For researchers, including those pursuing PhDs, information needs are more specialised and continuous. They rely on essential sources like research papers, conference proceedings, datasets, and patents. Their information-seeking process tends to be systematic, often following well-established models (Wilson, 2000).

Ellis's model of information seeking breaks down the process into several activities: starting (finding initial sources), browsing (looking for relevant materials), extracting (going through sources carefully), verifying (checking accuracy against multiple sources), and ending (concluding with a final search) (Ellis, 1989). These actions highlight the thoughtful and iterative nature of academic research.

Researchers also place a high value on staying current with the latest findings in their fields. They often combine formal sources like journals and databases with personal contacts and informal networks for gathering information (Tenopir et al., 2009).

4.3 Faculty Members

Faculty members have a unique role; they need information not just for their own research but also for teaching, and they help guide students toward useful resources. Their information needs include staying up-to-date in their disciplines, finding teaching materials, and accessing high-quality scholarly literature (Brown, 2006).

Studies show that faculty members appreciate personal interactions and informal channels, like discussions with colleagues, alongside more formal resources (Tenopir et al., 2009). If library systems are difficult to navigate or don't fit with their usual workflows, they might hesitate to rely on them (Connaway, Dickey, & Radford, 2011).

4.4 International and Diverse Users

Academic libraries serve an increasingly diverse group of users, including international students who may not speak English as their first language. Research into the information-seeking experiences of these students has highlighted specific challenges that better design can help address (Liu & Winn, 2009).

A study of international students at a Midwestern university found that, despite facing usability issues with the library's discovery system, they believed the library had high-quality resources vital for their academic success (Liu & Winn, 2009). However, many struggled with terminology, collection labelling, and limited search pathways—this often led to confusion and frustration when trying to find the right resources (Asher, Duke, & Wilson, 2013).

When students could complete tasks using natural language and multiple search paths, they found it easier to discover resources, resulting in greater success and less frustration (Asher, Duke, & Wilson, 2013). This emphasises the importance of designing library systems that align with the diverse ways users think and search, rather than expecting everyone to adapt to the library's predefined categories.

5. Cognitive Work and Library Search

Recent research has suggested that we reframe library search as a form of cognitive work. This perspective views the search process as an active engagement in thinking, problem-solving, and decision-making, rather than merely a mechanical operation (Wilson, 2015).

This approach is informed by Cognitive Work Analysis (CWA), a framework originally designed to analyse complex sociotechnical systems in fields such as process control and aviation (Vicente, 1999). CWA provides a

constraint-based, work-centred lens for examining how library environments, organisational structures, user tasks, and cognitive strategies interact (Wilson, 2015).

The Library Search Analysis (LSA) model specifically adapts CWA for library contexts. It offers a methodological pathway to define design requirements for information systems that are not only usable but also cognitively aligned (Wilson, 2015). This means creating systems that support library users' adaptive expertise, rather than forcing them to conform to system limitations.

This approach goes beyond merely describing information-seeking behaviours and provides a systematic framework for analysis. It acknowledges that effective library searching involves not only locating information but also considering the cognitive effort involved—specifically, how systems assist in thinking, decision-making, and learning during the search process (Wilson, 2015).

6. Technology and User-Centred Design

6.1 The Impact of Web Technology

The integration of web technology in libraries has fundamentally transformed the user experience. A quantitative study examining the relationship between web technology integration, user satisfaction, and resource accessibility found significant positive relationships between these variables (Bhatti & Naeem, 2020).

The study, which involved 440 participants, found a significant positive correlation ($r = 0.511$) between web technology integration and user satisfaction, and a similar correlation ($r = 0.524$) between web technology integration and accessibility of resources. Comparative analysis revealed significant differences in information-seeking behaviour between users primarily relying on web-based resources and those favouring traditional library materials (Bhatti & Naeem, 2020).

These findings underscore the importance of strategically integrating web technology to enhance user satisfaction, resource accessibility,

and engagement. Libraries are recommended to adopt user-centred design, offer comprehensive training, curate diverse resources, and adhere to accessibility standards (Bhatti & Naeem, 2020).

6.2 Moving Beyond OPACs

Research on digital transformation in academic libraries has revealed a diminishing dependence on traditional Online Public Access Catalogs (OPACs) owing to usability issues (Singh, 2023). Students increasingly prefer electronic resources and Large Language Models (LLMs) for clarity, ease of use, and accessibility (Singh, 2023).

A study of students at Babasaheb Bhimrao Ambedkar University found that electronic resources are mainly used for topic research and writing academic papers, while LLMs are used for summarisation, analysis, and academic writing (Singh, 2023). However, students expressed apprehension about AI literacy, digital literacy, ethical use, and AI reliability—highlighting the need for user-friendly systems that bridge traditional and digital tools (Singh, 2023).

This finding suggests that academic libraries must not simply digitise existing services but fundamentally rethink how they support information discovery in an environment where users have multiple, sometimes competing, options (Connaway, Dickey, & Radford, 2011).

6.3 Adaptive Recommendation Systems

One promising approach to improving user-centred information access is the development of adaptive recommendation systems. A study proposing a reconfigurable recommendation framework for academic information services found that dynamically adapting to users' changing information-seeking purposes can lead to statistically significant improvements in search experience and perceived utility (Chen & Xie, 2021).

The framework, grounded in information behaviour theories, profiles user behaviour and content attributes to provide differentiated strategies based on user intent (Chen & Xie, 2021). Unlike static recommendation systems, it allows the entire recommendation pipeline—

from content evaluation criteria to strategy selection—to dynamically adapt to evolving user intent (Chen & Xie, 2021).

This represents a significant advancement beyond fixed algorithmic optimisations toward purpose-driven personalisation. It acknowledges that users' information needs are not static and that effective library systems must be capable of responding to changing purposes and contexts (Chen & Xie, 2021).

6.4 Smart Search Systems

Addressing the challenge of information overload in modern libraries, researchers have developed "smart" information search systems that personalise the search experience and anticipate user needs. One such system, called "Informapper," aims to create intuitive pathways through knowledge by combining user-centred design principles with data-driven insights (Saini & Singh, 2022).

The development of Informapper focuses on four major steps: structuring user queries, cleaning and rearranging query data, fetching relevant data from the core database, and restructuring retrieved information following a user-centred design approach (Saini & Singh, 2022). The system tailors search results based on individual user profiles and preferences, proactively suggests resources by analysing user behaviour and predicting information needs, and provides clear pathways through complex information landscapes (Saini & Singh, 2022).

This approach represents an innovative response to the challenge of navigating increasingly vast information spaces. By anticipating user needs and providing intuitive pathways, smart search systems aim to empower users and ensure libraries' continued relevance in the digital age (Saini & Singh, 2022).

7. Research Methodology

1. Research Philosophy and Paradigm

This research adopts an interpretivist paradigm, emphasising that information behaviour is context-dependent and socially constructed (Case & Given, 2016). It acknowledges that

users' needs cannot be simplified to quantitative measures but must be understood within their unique academic, cultural, and personal contexts. The transition from collection-centred to user-centered libraries illustrates this shift, moving from positivist approaches to recognition of diverse user experiences. The interpretivist approach focuses on how users seek and use information, aligning with Dervin's sense-making theory (Dervin, 1983) and Belkin's Anomalous State of Knowledge (ASK) model (Belkin, Oddy, & Brooks, 1982).

2. Research Design

We use a mixed-methods approach to better understand user behaviour by combining quantitative data and personal experiences (Creswell & Creswell, 2018).

2.1 Quantitative Components

- Log Analysis: We examine library system logs to collect data on user interactions without disrupting their activities. This includes examining how often users visit, their search habits, and which resources they access (Nicholas et al., 2011).

- Surveys: We distribute structured questionnaires to gather information on user satisfaction, preferred sources, levels of information literacy, demographic details, and any challenges they face (Case & Given, 2016).

2.2 Qualitative Components

- Semi-Structured Interviews: We will conduct in-depth interviews with different user groups. This will help us understand their information needs, their experiences with library services, and the challenges they face in their research (Kuhlthau, 1991).

- Cognitive Mapping Exercises: We will engage users in creating visual maps of how they seek information. This helps us uncover how they think about organizing information (Dervin, 1983).

- Observations: We will quietly observe users in the library to see their real-time behaviors and the challenges they encounter (Asher, Duke, & Wilson, 2013).

This mixed-methods approach helps us gain a deeper understanding of user-centered library services and information behaviour (Creswell & Creswell, 2018).

3. Data Collection Methods

3.1 Participant Selection

A stratified purposive sampling strategy ensures representation across key user categories (Patton, 2015):

- Undergraduate students (first-year and upper-level)
- Postgraduate students (masters and doctoral)
- Academic researchers
- Faculty members (teaching-focused and research-focused)
- Library staff (reference, instruction, and systems librarians)

This stratification acknowledges that different user groups have distinct information needs, behaviours, and challenges, consistent with the user-based studies typology discussed in literature (Case & Given, 2016).

3.2 Data Collection Instruments

Survey Questionnaire: The survey instrument comprises:

- Demographic items (academic role, discipline, years of experience)
- Likert-scale items measuring satisfaction with library resources and services
- Multiple-choice items on preferred information sources and search strategies
- Open-ended items for qualitative feedback

Interview Protocol: A semi-structured interview guide covers:

- Information needs and how they arise
- Sources consulted and selection criteria
- Search strategies and techniques
- Barriers encountered and coping strategies
- Perceptions of library services and suggestions for improvement

4. Data Analysis Methods

4.1 Quantitative Analysis

Descriptive Statistics: Frequencies, means, and standard deviations summarise survey responses and log data, providing baseline understanding of user demographics, resource use patterns, and satisfaction levels (Field, 2018).

Correlation Analysis: Relationships between variables—such as web technology integration and user satisfaction—are examined using Pearson's correlation coefficients (Bhatti & Naeem, 2020).

Comparative Analysis: Differences in information-seeking behaviour between user groups (e.g., undergraduates vs. researchers) and between resource types (e.g., traditional vs. digital) are analysed using appropriate statistical tests (Field, 2018).

4.2 Qualitative Analysis

Thematic Analysis: Interview transcripts, observation notes, and open-ended survey responses undergo thematic analysis, involving (Braun & Clarke, 2006):

1. Familiarization with data
2. Open coding
3. Focused coding
4. Theme development and refinement

Narrative Analysis: Users' accounts of their information-seeking experiences are analysed narratively to understand how they construct meaning and make sense of their library experiences (Riessman, 2008).

Cross-Case Analysis: Comparisons across cases (different user groups, disciplines, or institutional contexts) identify patterns and variations in information behaviour (Yin, 2014).

5. Methodological Limitations

The research acknowledges several limitations (Creswell & Creswell, 2018):

- **Generalizability:** Findings from specific institutional or disciplinary contexts may not be universally applicable

- Self-report bias: Survey and interview responses may not fully reflect actual behaviours
- Log data limitations: Logs capture actions but not intentions, motivations, or contextual factors
- Cross-sectional design: Data collected at a single point in time may not capture evolving user needs and behaviours

6. Validity and Reliability

To enhance validity and reliability, the research employs (Lincoln & Guba, 1985):

- Triangulation: Multiple data sources (surveys, interviews, logs, observations) and methods (quantitative and qualitative) provide corroboration of findings
- Member checking: Preliminary findings are shared with participants for validation and clarification
- Peer debriefing: Colleagues review analysis processes and interpretations to identify potential biases
- Audit trail: Detailed documentation of research decisions and processes enables transparency and replicability

The research methodology described above provides a comprehensive, theoretically grounded, and ethically sound approach to investigating user-centered academic libraries and information behaviour. By combining multiple methods, drawing on established theoretical frameworks, and attending to the diversity of user populations, the research aims to generate robust findings that can inform both theory and practice in academic library service design (Creswell & Creswell, 2018).

8. Recommendations

Drawing on the research reviewed in this paper, several practical recommendations emerge for academic libraries seeking to become more user-centered.

1. Understand your users: Conduct user-based studies to understand the specific needs, behaviours, and challenges of your user population. Different groups—undergraduates, postgraduates, researchers, faculty—have

different needs and require different approaches (Case & Given, 2016).

2. Design for cognitive work: Recognise that library search is a form of cognitive work. Design systems and services that support thinking, decision-making, and learning throughout the search process rather than simply retrieving results (Wilson, 2015).

3. Integrate with user workflows: Go beyond expecting users to come to the library. Design services that integrate into the tools and workflows users already use, making the library part of their natural processes (Connaway, Dickey, & Radford, 2011).

4. Use analytics to improve: Employ analytical tools to understand how users actually interact with library websites and resources. Use this data to identify usability problems and make evidence-based improvements (Nicholas et al., 2011).

5. Provide adaptive, personalised services: Move beyond one-size-fits-all approaches. Develop systems that can adapt to changing user needs and purposes, providing differentiated strategies based on user intent and behaviour (Chen & Xie, 2021).

6. Address usability issues: Pay particular attention to terminology, labelling, and search pathways that may confuse or frustrate users. Use natural language and multiple search pathways where possible (Asher, Duke, & Wilson, 2013).

7. Invest in library instruction: Provide comprehensive training that builds students' information literacy and their confidence in using library resources. Integrate instruction with learning management systems to reach students where they already are (Gross & Latham, 2012).

8. Support diverse users: Recognise the needs of international students, non-native English speakers, and other diverse populations. Ensure that systems and services are accessible and accommodating of different backgrounds and experience levels (Liu & Winn, 2009).

9. Balance traditional and digital resources: While digital resources are increasingly preferred, traditional resources remain important in many disciplines. Support both and help users understand when each is appropriate (Tenopir et al., 2009).

9. Conclusion

The shift toward user-centered academic libraries represents a fundamental reorientation of library practice. Instead of organizing around collections and expecting users to adapt, user-centered libraries seek to understand how users actually seek, find, and use information—and design services accordingly (Hernon & Altman, 2010).

Research on information behaviour has revealed patterns that challenge traditional assumptions about library use. Users prefer convenient, familiar tools and may bypass library systems that are difficult to use (Connaway, Dickey, & Radford, 2011). They have different needs depending on their role, their discipline, and the context of their information need (Case & Given, 2016). International students and other diverse populations face specific challenges that require attention (Liu & Winn, 2009).

The integration of web technology, adaptive recommendation systems, and smart search tools offers opportunities to make library services more responsive and effective (Bhatti & Naeem, 2020; Chen & Xie, 2021; Saini & Singh, 2022). Understanding library search as cognitive work provides a framework for designing systems that support thinking and learning rather than simply retrieving results (Wilson, 2015).

Ultimately, the goal of user-centered academic libraries is to make the library an integral part of users' lives and work—a resource so well designed, accessible, and responsive that users naturally turn to it when they need information (De Rosa et al., 2011). This requires ongoing commitment to understanding users, evaluating services, and making evidence-based improvements.

The research reviewed in this paper demonstrates that this goal is achievable. Libraries that embrace user-centered design can significantly improve user satisfaction, resource accessibility, and information-seeking outcomes (Bhatti & Naeem, 2020). In doing so, they fulfil their fundamental purpose: connecting people with the information they need to learn, discover, and create (Ranganathan, 1931)."

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