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LIBRARY USER BEHAVIOUR AND INFORMATION LITERACY IN THE ERA OF MOBILE-FIRST ACCESS: A SURVEY OF ENGINEERING STUDENTS

Dr. Saravana C G
Associate Professor & Chief Librarian Kuppam Engineering College, Kuppam, Chitoor Dist, A.P.   saravanacg@gmail.com
Dr. M. Anjaiah
Assistant Professor (Rtrd), Dravidian Unviersity, Kuppam, Chittoor Dist, A.P.

ABSTRACT
This research investigates both user behavior and information literacy level(s) of undergraduate engineering students who have access to digital resources in this modern mobile technology-based society where smartphones are commonly used as the device of choice for connecting to the web. The research was conducted with 227 engineering students at several different colleges throughout Chittoor District, India as they completed a structured online survey developed and administered by the authors. The results of our investigation show strong user affinity to smartphones for the convenience of having their devices with them full-time. Additionally, smartphoneusers have a tendency to access e-journals, e-books, course lecture notes, and open educational information (OER). Students displayed weaknesses with regards to their ability to evaluate the veracity of information found online, utilize the proper citation protocols associated with the filtering of an academic document, and properly employ advanced search method(s) when conducting research. The authors of this study recommend the development of mobile-based instruction/intervention(s) designed to enhance undergraduate student information literacy, development of improved access to online resources, and promoting library resource awareness through marketing campaigns utilizing mobile technology.

Keywords: Mobile-first access, information literacy, user behaviour, engineering students, academic libraries, library digital resources.

Introduction

The widespread adoption of smartphones and continuous accessibility of the Internet has completely altered how students in higher education seek, assess and access information. Since the Digital Revolution, and now particularly following the COVID-19 pandemic, there has been an accelerated move from using traditional libraries to access digital resources via mobile devices. As the most frequent users of digital academic tools, engineering students are increasingly utilising mobile devices to conduct research, learn and communicate. Academic institutions worldwide are redesigning their services to reflect the evolving behaviours of information seekers. The implementation of a 'mobile first' strategy enables users to access eBooks, online academic journals, digital repositories, OPAC systems, remote authentication services, and institutional learning platforms from any location using mobile devices with ease. As a consequence, behaviours of users have shifted dramatically from visiting physical libraries to engaging digitally. The growing importance of information literacy (the ability to find, evaluate and use information ethically) has also become a key focus area. In India specifically, and in areas outside major metropolitan cities, the educational institutions are very rapidly embracing the use of mobile and web-based educational tools. However, little research has been conducted into how well engineering students take advantage of this technology. This research addresses that gap by assessing mobile-first user behaviour and levels of information literacy among engineering graduates.

Background and Related Studies

Information Literacy, defined as the ability to locate, critically evaluate, and ethically use information, is globally recognized as essential in technology-driven societies. International organizations, including the Association of College and Research Libraries and UNESCO, have established comprehensive frameworks outlining these competencies. Previous research indicates a growing dependence among students on internet-based resources, particularly search engines and online academic library platforms.

In addition, other studies also suggest that smartphones are quickly becoming the more commonly used way for students to access library services than computers within higher education. Literature from developing regions of the world indicates that students have limited knowledge about the digital resources of their libraries; lack of an effective search strategy; and inability to separate the credible scholarly works from the general content found on the internet. Although several studies have looked specifically at access to library services via mobile

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devices and the concept of Information Literacy independently, the relationship of these two within Engineering Education remains limited. Through the use of empirical investigation, this research will add to what is currently known about how Engineering students use Digital Information Environments and their preparedness to assess Mobile Accessed Academic Resources in a Critical Manner.

Objectives and Methodology of the Study

Objectives:
The present study was designed with the following objectives:

- To examine the user behaviour of engineering students in accessing academic information through mobile devices.

- To assess the level of information literacy skills among engineering students in Chittoor District.

- To identify the preferred digital information resources and platforms used by students.

- To analyse students' perceptions regarding the usefulness of mobile-based library services.

- To explore challenges faced in accessing and evaluating digital information.

- To provide recommendations to enhance mobile-based library support and information literacy instruction.

Research Methodology
A descriptive survey research design was adopted to gather quantitative information from undergraduate engineering students, who were selected from different engineering colleges located in Chittoor District. The data were collected via a structured questionnaire that was created through Google Forms and distributed over the Internet. The total number of respondents (227) consisted of undergraduate students from many different engineering colleges in Chittoor District. The self-administered questionnaire consisted of four sections: a demographic section; a mobile usage patterns for academic purposes section; a section measuring the level of information literacy and skills related to mobile technology; and lastly, the section measuring challenges and perceptions related to mobile-enabled means of accessing information. Once the data were gathered, descriptive statistics were applied to the data so that frequencies and percentages could be calculated. The tabulated results reflect the quantitative findings derived from the research and facilitate the interpretation of trend information for this research project.

Data Analysis and Interpretation

A. Demographic Information of Respondents
The demographic distribution of the respondents is presented in Table 1.

Table 1 – Demographic Profile of Respondents (n = 227)

Category	Classification	Frequency	Percentage
Gender	Male	142	62.6%
	Female	85	37.4%
Year of Study	1st Year	48	21.1%
	2nd Year	67	29.5%
	3rd Year	59	26.0%
	4th Year	53	23.3%
Branch of Study	CSE / IT & Allied	102	44.9%
	ECE / EEE	71	31.3%
	Mechanical / Civil	38	16.7%
	Other Engineering	16	7.1%

The above reveals that, total respondents comprised 227 undergraduate engineering students with balanced representation across gender, year, and discipline. Males constituted 62.6% and females 37.4%. Participation was evenly distributed across academic years. Computer Science and allied disciplines dominated (44.9%), followed by Electronics/Electrical (31.3%), Mechanical/Civil (16.7%), and other branches (7.1%).

B. Use of Mobile Devices for Academic and Library Purposes
Table 2 highlights the frequency of mobile usage by respondents for academic and digital library access.

Table 2 – Mobile Usage for Academic Purposes

Usage Purpose	Always	Often	Sometimes	Rarely
Accessing e-books and e-journals	39.2%	32.1%	20.7%	8.0%
Searching academic resources online	45.4%	34.8%	13.7%	6.1%
Accessing digital library portals	28.6%	29.1%	31.3%	11.0%
Participation in online courses / LMS	41.9%	36.6%	15.4%	6.1%
Communication via academic platforms	47.6%	31.7%	15.0%	5.7%

Table 2 presents the usage purpose by the respondents. The data indicate high engagement with mobile devices for academic purposes. Most students reported always or often using smartphones for online academic searches (80.2%), academic communication platforms (79.3%), and participation in online courses or learning management systems (78.5%). Regular access to e-books and e-journals was also common (71.3%). However, usage of digital library portals was comparatively lower, with 57.7% reporting frequent use, suggesting a need to enhance awareness and usability of library-specific platforms.

C. Information Literacy and Usage of Digital Resources
Below Table 3 summarises student responses regarding their perceived information literacy competencies.

Table 3 – Information Literacy Awareness and Skills

Skill Component	High	Moderate	Low
Using search keywords effectively	36.6%	48.0%	15.4%
Evaluating credibility of online information	21.1%	52.0%	26.9%
Understanding plagiarism and citation ethics	28.2%	39.6%	32.2%
Using scholarly databases and journals	27.3%	46.3%	26.4%
Referencing and citation formatting	18.9%	43.6%	37.5%

The findings in the above table reveal moderate information literacy skills among most respondents, particularly in keyword searching and database use. However, advanced competencies were limited, especially in evaluating source credibility and citation practices. Many students showed low awareness of plagiarism and citation ethics, underscoring the need for focused information literacy training.

Table 4 – Time Spent Daily on Mobile for Academic Purposes

Duration	Frequency	Percentage
Less than 1 hour	29	12.8%
1–2 hours	74	32.6%
2–3 hours	68	30.0%
More than 3 hours	56	24.6%

Fig. 1 Time Spent Daily

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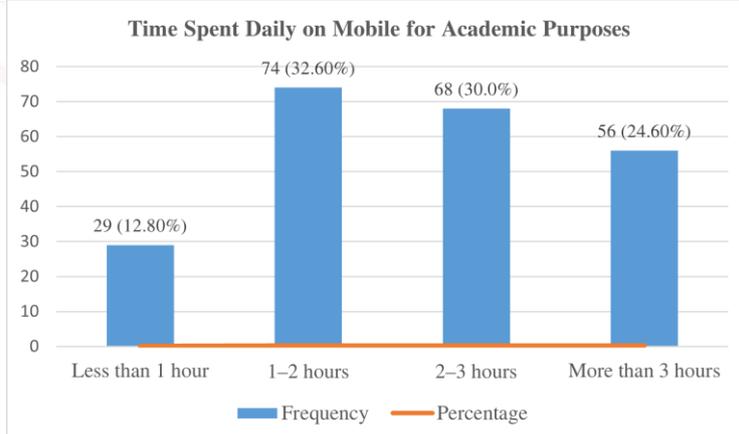
The above table 4 and Figure 1 shows the distribution of daily mobile usage duration shows that most students spend considerable time on mobile devices for academic purposes. About one-third of respondents use mobiles for one to two hours (32.6%), followed by two to three hours (30.0%). A smaller proportion reported usage of less than one hour (12.8%), while 24.6% spend more than three hours daily.

Table 5 – Preferred Types of Academic Digital Resources

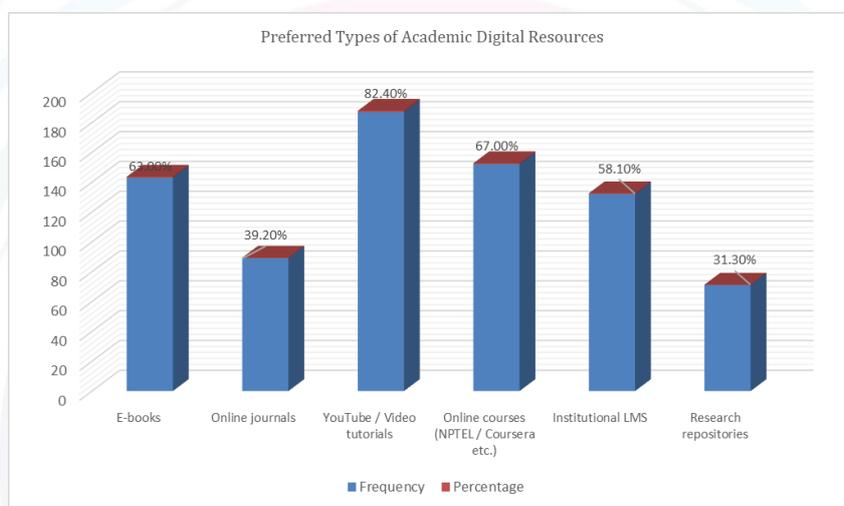| Resource Type	Frequency	Percentage
E-books	143	63.0%
Online journals	89	39.2%
YouTube / Video tutorials	187	82.4%
Online courses (NPTEL / Coursera etc.)	152	67.0%
Institutional LMS	132	58.1%
Research repositories	71	31.3%

Fig. 2 Preferred Types of Academic Digital Resources

The data of Figure 2 indicate a strong preference for multimedia and online learning resources among the respondents. YouTube and video tutorials were the most frequently used resources (82.4%), highlighting students' inclination toward visual and easily accessible content. Online courses such as NPTEL and Coursera were also widely used (67.0%), followed by e-books (63.0%) and institutional learning management systems (58.1%). Online journals were accessed by 39.2% of students, while research repositories recorded comparatively lower usage (31.3%). These findings suggest a preference for flexible, user-friendly digital resources over traditional scholarly platforms, emphasizing the need for improved awareness and training in using academic research tools.

Table 6 – Platforms Used for Mobile-based Learning

Platform	Frequency	Percentage
Google / Web search	216	95.2%
Google Scholar	129	56.8%
NPTEL / SWAYAM	118	52.0%
Coursera / Udemy	94	41.4%
College Digital Library Portal	88	38.8%
Social learning groups	176	77.5%

The findings from table 6 reveal that general web search platforms are the most widely used sources for academic information, with 95.2% of students relying on Google and other web search engines. Social learning groups are also heavily utilized (77.5%), reflecting collaborative learning practices. More academic-focused platforms such as Google Scholar (56.8%) and NPTEL/SWAYAM (52.0%) show moderate usage. Commercial learning platforms like Coursera and Udemy are accessed by 41.4% of respondents. In contrast, college digital

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library portals are used by only 38.8% of students, indicating a need to improve awareness, accessibility, and usability of institutional library platforms.

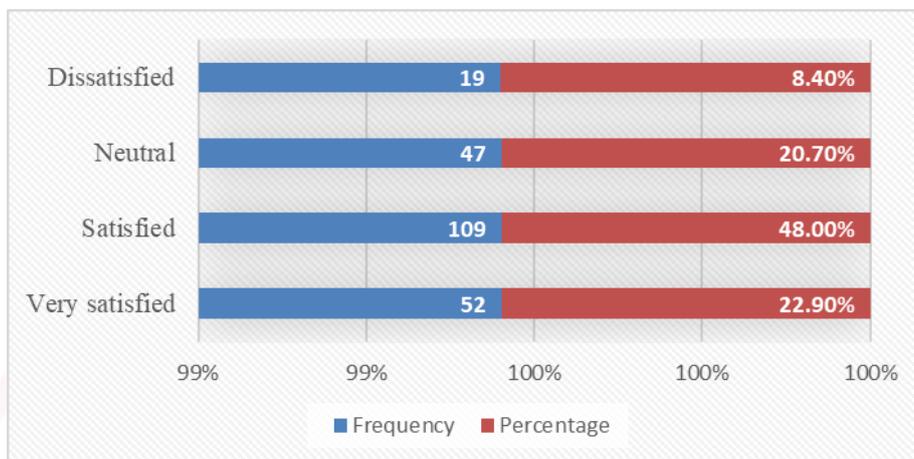**Table 7 – Satisfaction with Mobile-based Academic Access**

Fig. 3 Satisfaction with Mobile-based Academic Access

The results in the above indicate an overall positive level of satisfaction with mobile-based library and information services. Nearly half of the respondents (48.0%) reported being satisfied, while 22.9% were very satisfied. About one-fifth (20.7%) expressed a neutral opinion, whereas a small proportion (8.4%) reported dissatisfaction, suggesting scope for further service improvement.

D. Challenges Faced by Respondents
The respondents encountered several obstacles in using mobile-based library services. Key challenges included limited awareness of digital resources, insufficient digital literacy training, internet connectivity issues, difficulties in evaluating online information, and low familiarity with citation tools. These issues highlight the need for improved training and resource accessibility.
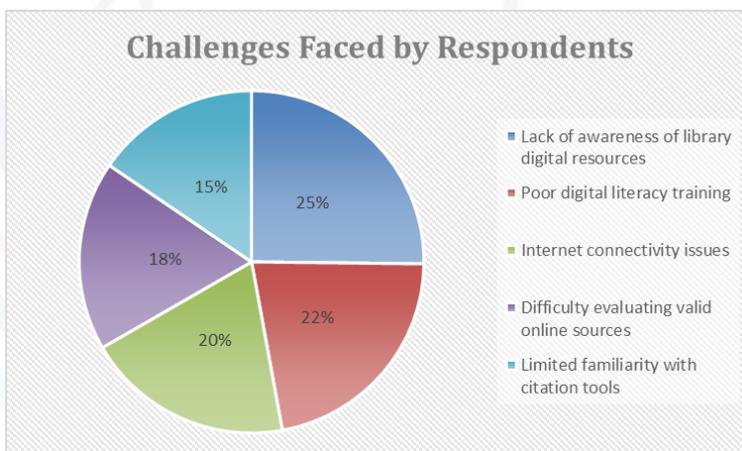

Fig. 4 Challenges Faced by Respondents

The findings from the above figure 4 highlight several challenges faced by students in using mobile-based library and information services. The most prominent issue is the lack of awareness of library digital resources (54.6%), indicating insufficient promotion of available services. Poor digital literacy training (47.6%) and internet connectivity issues (42.3%) further hinder effective information access. Additionally, many students experience difficulty in evaluating credible online sources (38.8%) and show limited familiarity with citation and referencing tools (33.5%). These challenges underscore the need for systematic information literacy training, improved infrastructure, and enhanced library outreach initiatives.

Summary of Trends
- Mobile-first usage is dominant, with more than 75% of students frequently using smartphones for academic access.

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- Engineering students show moderate information literacy levels, with weaknesses in scholarly evaluation and citation ethics.
- Awareness and training remain key barriers to effective use of digital library resources.

Discussion

The findings of this study demonstrate that mobile-first access has become a dominant mode of information seeking among engineering students in Chittoor District. The high frequency of smartphone usage for accessing academic content reflects the increasing dependence on portable digital technologies and aligns with global research trends highlighting the shift from desktop-based to mobile-enabled learning environments. Despite strong mobile usage levels, the results reveal moderate information literacy competencies among respondents, especially in areas related to evaluating online information credibility and applying citation ethics.

These results suggest that while students possess technological readiness, they lack essential academic skills required for scholarly research and ethical information practices. Engineering students demonstrated greater proficiency in basic search abilities but struggled significantly with understanding plagiarism, authenticating scholarly sources, and referencing. This indicates that mobile access alone is insufficient without structured information literacy instruction. Availability of digital library services, without adequate awareness and training, fails to ensure effective utilisation.

Further, challenges such as poor awareness of digital resources and limited training opportunities indicate a gap between library service provision and student engagement. Many students were unaware of institutional repositories, subscription journals, and advanced academic search tools, which points to the need for improved user education and promotional strategies.

Major Findings

The key findings based on responses from 227 engineering students are summarised below:

1. Smartphones are the primary tool for academic information access for over 75% of the respondents.

2. Online searching and participation in digital learning platforms are the most frequent academic activities performed on mobile devices.

3. More than half of the students lack adequate awareness of digital library resources available through their institutions.

4. Information literacy levels are moderate overall, with particularly low skills in evaluating information sources and applying citations.

5. Internet accessibility, training limitations, and lack of familiarity with academic support tools hinder effective digital information use.

6. Students expressed interest in structured training programs to enhance their academic search and research capabilities.

Recommendations

Based on the study findings, the following recommendations are proposed: 1. Academic libraries should implement systematic mobile-based information literacy training programs, focusing on search strategies, citation tools, and plagiarism awareness. 2. Institutions should enhance awareness campaigns for digital library services through orientations, workshops, online tutorials, and mobile app notifications. 3. Libraries should improve mobile interface access to OPAC, institutional repositories, and subscribed databases to promote ease of use. 4. Engineering programs should integrate information literacy modules into the curriculum across semesters. 5. Technological support such as improving Wi-Fi coverage and device compatibility should be prioritized. 6. Collaboration between faculty and librarians should be strengthened to build research skill development initiatives.

Conclusion

The study concludes that mobile-first access has significantly transformed academic information-seeking behaviour among engineering students in Chittoor District. Although students actively utilize mobile devices for academic search, online learning, and digital communication, moderate levels of information literacy and limited awareness of institutional digital resources remain major concerns. Bridging the gap between technology

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adoption and academic information skills requires targeted literacy training, resource promotion, and institutional support. Enhancing student competency in evaluating, using, and citing scholarly information is essential for building future-ready engineering graduates.

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