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Research Article

Digital Literacy and Information Seeking Behaviour in Academic Libraries: A Study

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Abstract

This paper discusses the relationship between digital literacy and the information-seeking behaviour of students in academic libraries, as well as the importance of digital competencies in education and research. The research involved undergraduate and postgraduate students from North Coastal Andhra Pradesh. Data were collected using a Google Form, which was shared with the help of librarians, and participation was entirely voluntary. Using a convenience sampling method, 176 valid responses were collected and analyzed. The analysis shows that respondents are very confident in basic digital skills, including the use of the internet and online communication; however, it also highlights less advanced areas such as coding, cybersecurity, and data analysis. Academic library training programs were perceived positively, but the results indicate that more tailored, user-based, and discipline-specific digital literacy training programs are required. The findings reveal that the majority of participants enrolled in the program to acquire skills and improve their job opportunities, indicating the relevance of these skills to academic performance and future employment. It was also observed that participants showed increasing interest in areas such as AI literacy, internet safety, and awareness of misinformation, reflecting emerging digital issues in academia. Although the National Education Policy 2020 and Sustainable Development Goal 4 (Quality Education) were not directly measured, the research aligns with their vision of creating equitable, technology-enabled education. The results highlight the evolving role of academic libraries as partners in digital empowerment and informed information-seeking behaviour.

I. INTRODUCTION

In the digital age, the ability to find, evaluate, and use information effectively has become essential for academic success. Students currently depend on the internet, databases, and online platforms more than ever for learning and research. Consequently, digital literacy and information-seeking behaviour have developed as two closely interrelated skills that determine academic performance and lifelong learning (Noh, 2016).

Being digitally literate goes beyond the use of a computer or the internet. It involves the capacity to obtain digital information, interpret it, and apply it in a responsible and ethical manner (Makhafola *et al.,* 2025). Research indicates that the more digitally literate an individual is, the more likelythey are to exhibit positiveinformation-seeking behaviour. Digitally literate individuals have greater opportunities to select credible sources, evaluate the quality of information, and integrate content from different platforms. Nevertheless, a significant number of students report confidence in their digital skills but struggle with the application of advanced skills in academic work (Akakpo *et al.,* 2025).

Sustainable Development Goal 4 (SDG 4) emphasizes the need to ensure inclusive and equitable quality education and lifelong learning for all. SDG 4 is one of the foundations of social and sustainable development and is part of the United Nations 2030 Agenda. It highlights the need for higher and technical education to equip individuals with the skills required in an increasingly digital world (The Global Goals, 2024). In this context, digital literacy and information-seeking skills are crucial for providing equal access to

learning opportunities and for fostering informed citizens.India introduced the National Education Policy 2020 to establish a technology-enhanced, adaptable, and inclusive educational system aligned with 21st-century goals. At all educational levels, the policy encourages the use of digital tools, interdisciplinary learning, and open educational resources (Jayamma *et al.,* 2023). It emphasizes digital competency, critical thinking, and responsible information use. By providing students with access to digital literacy programs, electronic information resources, and research support services that enhance their ability to locate and use information effectively, academic libraries can significantly contribute to achieving these objectives. However, although the role of digital literacy and library services has become increasingly critical over the past few years, little is known about the effects of these two strategies on the information-seeking behaviour of students. This gap is addressed by the current research, which aims to examine the contribution of students' digital literacy levels to their information-seeking behaviour in academic libraries. It also discusses how library-based interventions help develop these key skills (Zaremohzzabieh *et al.,* 2016).

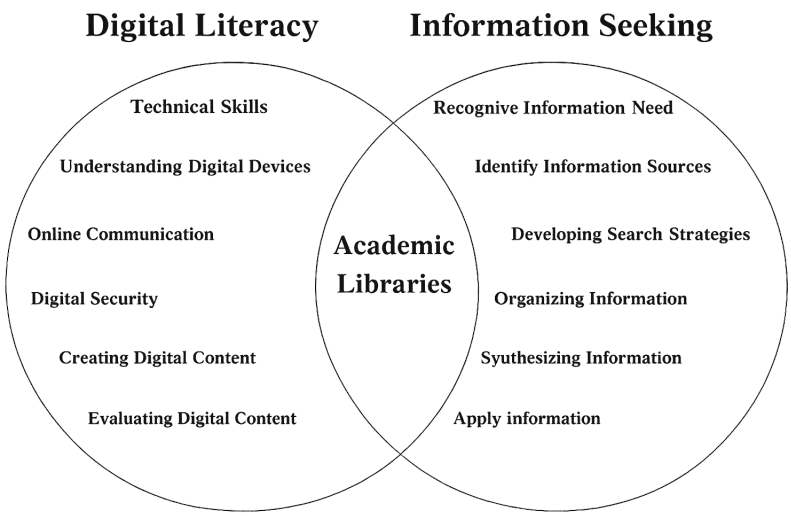

Fig.1 DL and ISB in Academic Libraries

II. LITERATURE REVIEW

The literature review synthesizes existing research on digital literacy (DL) and information-seeking behaviour (ISB) in the digital environment. It examines the relationship between these two areas and how academic libraries have evolved to accommodate them. The research indicates that as institutions of higher learning (HEIs) increasingly adopt digital practices, students and teachers are developing digital skills for learning, research, and communication.

A. Evolution of Digital Literacy in Academic Libraries

Academic libraries are at the center of the teaching, learning, and research missions of their parent institutions. Historically focused on promoting information literacy (IL), libraries have increasingly shifted toward developing digital literacy (DL) in response to emerging technological developments. DL has become a fundamental skill for effective participation in 21st-century knowledge environments (Makhafola *et al.,* 2025).

Nevertheless, the proliferation of digital literacy models has resulted in conceptual overlaps. DL is often combined with IL and referred to as digital information literacy, and it is occasionally confused with digital competence (DC) (Freiman *et al.,* 2017; Sanches, 2022). To clarify these distinctions, researchers have proposed a sequence of skills:

1. *Digital Literacy (DL):* The foundational level, encompassing operational skills such as using digital tools, searching for, evaluating, retrieving, and sharing digital content (Makhafola *et al.,* 2025).
2. *Digital Competence (DC):* Extends beyond DL, emphasizing the practical and contextual application of digital skills to enhance productivity and problem-solving capabilities (Makhafola *et al.,* 2025).
3. *Digital Fluency (DF):* Refers to the intuitive and critical ability to use digital technologies to achieve desired outcomes, with adaptability to new tools and contexts (Sanches, 2022).
4. *Digital Dexterity (DD):*Represents the most advanced level, involving innovative and strategic use of digital tools for diverse professional and academic purposes (O'Sullivan *et al.,* 2019).

Within Library and Information Science (LIS) research, libraries are viewed as central facilitators of digital literacy, providing frameworks, training, and resources that develop essential digital competencies for both students and faculty.

B. Information-Seeking Behaviour (ISB) in Digital Environments

Information-Seeking Behaviour (ISB) is defined as the way people find, obtain, and use information in any context. This behaviour has been radically transformed by the digital era,

which has expanded the range of information sources and altered traditional patterns of information flow. New digital technologies enable access to a wide variety of information sources in a short time and at low cost, thereby reducing geographic and temporal barriers. Nevertheless, this abundance presents its own set of challenges, including information overload and concerns about the credibility of sources, especially for individuals who have not yet developed critical literacy skills. These issues pose challenges to effective information processing and decision-making (Ahmed and Rasheed, 2020).While users, especially students, frequently rely on the internet, search engines, and open-access databases, the volume and variability of digital sources demand greater discernment and literacy (Connaway & Randall, 2013). Consequently, effective ISB in digital settings increasingly depends on an individual's level of digital literacy and critical evaluation skills.

C. Linking Digital Literacy and ISB

Digital literacy (DL) and information literacy (IL) are two interdependent concepts that form the basis of successful information-seeking behaviour (ISB). They are considered vital literacies for functioning in complex digital information environments. Empirical studies show that individuals with more advanced digital literacy competencies are more efficient and accurate in their information-seeking behaviour. DL enhances users' ability to verify sources, interpret online information, and make effective decisions regarding the applicability and trustworthiness of information. In turn, these behaviours promote academic success, professional growth, and innovation (Ondari-Okemwa, 2016). Studies have also noted that theories of ISB need to consider digital literacy as a determinant of user behaviour. Enhanced DL can lead to increased use of digital resources and more strategic information use in the contexts of entrepreneurship and education, resulting in competitive and academic advantages (Ahmed and Rasheed, 2020).

D. Role of Academic Libraries as Mediators of ISB

Modern academic libraries have developed into dynamic learning spaces, providing access to digital resources as well as support in their use. They facilitate information-seeking behaviour (ISB) and digital literacy (DL) through instructional, technological, and equity-based roles:

1. *Instructional Support:* Librarians serve as educators, equipping users with the skills necessary to search for, evaluate, organize, and ethically use digital information. Workshops and tutorials on database searching, citation tools, and source evaluation are key examples (Akakpo, Ahardy, & Kumankumah, 2025).
2. *Combating Misinformation:* Libraries actively counter misinformation and fake news by teaching users to assess the accuracy and credibility of online information (De Paor & Heravi, 2020).
3. *Digital Resource Provision:* Through e-libraries, databases, and digital repositories, libraries offer 24/7 access to vast scholarly content, democratizing knowledge and supporting research (Connaway & Randall, 2013).
4. *Bridging the Digital Divide:* By providing free digital access, technology training, and inclusive programs, libraries address disparities in access and skills, empowering underserved groups (Makhafola *et al.,* 2025).

These roles illustrate how libraries remain intermediaries between technology and user competency and promote informed and ethical information practices.

E. Key Implications for Practice

The literature presents several implications for educators, policymakers, and academic institutions:

1. *Targeted Digital Literacy Interventions:* Interventions must target the most affected areas related to academic performance, including information evaluation and digital collaboration, using diagnostic self-assessment tools to identify learning needs (Sanches, 2022).
2. *Skill Development Beyond Basics:* Training should progress from DL to DC, DF, and ultimately DD, nurturing learners who evolve from digital consumers to digital creators (Makhafola *et al.,* 2025).
3. *Comprehensive Educational Frameworks:* Institutions should adopt holistic models, such as the South Pacific Digital Literacy Framework (SPDLF), which encompasses multiple literacies (media, technology, information, and communication), to bridge skills gaps (Reddy, Chaudhary, & Hussein, 2023).
4. *Inter-institutional Collaboration:*Partnerships among institutional libraries can strengthen lifelong digital literacy education. Libraries should continue investing in user-friendly digital platforms to enhance engagement (Sanches, 2022).
5. *Professional Development:* Continuous training for educators, researchers, and entrepreneurs is essential to adapt to emerging technologies and mitigate risks such as misinformation and information overload (De Paor & Heravi, 2020).

F. Identified Research Gaps and Future Directions

Despite significant progress, several gaps persist in DL and ISB research:

1. *Conceptual Ambiguity:* Ongoing overlap among DL, DC, DF, and DD necessitates more precise definitions and measurement frameworks (Connaway & Randall, 2013; Zerehsaz, Fattahi, & Sanatjoo, 2023).
2. *Underexplored Advanced Literacies:* Digital fluency and digital dexterity remain understudied, particularly in the context of academic libraries (Alhoori, Samaka, Furuta, & Fox, 2018).
3. *Empirical Evidence:* Few large-scale quantitative studies have examined the direct influence of digital literacy on technology use and academic or professional outcomes (Salim *et al.,* 2016).
4. *Entrepreneurial Contexts:* Limited research explores how DL and ISB interact to influence innovation,

competitiveness, and resource management (Afzal, 2023).

5. *Methodological Consistency:* Many studies rely on small samples and self-assessment surveys; future work should incorporate objective skills testing (Salim *et al.,* 2016).
6. *Contextual Variables:* Socio-economic, psychological, and disciplinary factors influencing DL development are not sufficiently examined (Khan & Khan, 2020).

The current information environment can be described as a vast digital ocean in which digital literacy serves as a navigation tool, guiding users in their quest for information toward knowledge, competence, and growth. However, the map remains incomplete, and future studies must chart the evolving landscape of digital fluency and dexterity. Academic libraries should continue to act as sources of guidance and equity in this rapidly changing digital world (Yang, Yao, Ren, and Guo, 2025).

III. OBJECTIVES OF THE STUDY

This study aims to examine the relationship between digital literacy and information-seeking practices among students in academic libraries. The specific objectives are to:

1. Evaluate the digital literacy levels and digital confidence of students in higher education.
2. Identify the digital tools, technologies, and information sources commonly used for academic work.
3. Investigate how academic libraries contribute to the development of digital literacy and effective information searching through education and training.
4. Understand students' expectations and preferences regarding future digital literacy programs.

IV. RESEARCH METHODOLOGY

A. Research Design

The research design used in this study was quantitative and descriptive, intended to examine the relationship between digital literacy and information-seeking behaviour among bachelor's and master's students. Data were gathered through a survey using a structured questionnaire distributed via Google Forms. The data were interpreted using statistical and descriptive analysis.

B. Sample Selection

The research was conducted in the North Coastal region of Andhra Pradesh among undergraduate and postgraduate students. A convenience sampling method was employed to select participants, and college librarians assisted in administering the questionnaire. A total of 189 responses were received, of which 176 were included for analysis after careful verification and data cleaning. The survey questionnaire was distributed through WhatsApp groups and institutional networks to represent all relevant programs.

C. Validity and Reliability

1. *Validity:*To ensure content validity, the questionnaire was developed based on a thorough literature review and professional consultation with academic librarians. The questions were constructed to measure key constructs related to digital literacy and information-seeking behaviour.
2. *Reliability:*A pilot study was conducted with a small sample of respondents to test clarity, consistency, and comprehension. The pilot phase provided feedback that led to minor revisions in question wording and structure to ensure the reliability and internal consistency of the instrument.

D. Data Cleaning and Analysis

1. *Data Cleaning Procedures:* The collected data were carefully reviewed and cleaned before analysis. Duplicate, incomplete, and irrelevant responses were removed. After cleaning, 176 valid responses were retained for analysis. The dataset was verified for accuracy and completeness using Microsoft Excel.
2. *Data Analysis:*The cleaned data were analyzed using descriptive statistics, including frequency and percentage distributions. The results were presented exclusively in tabular format for clarity and precision. No figures or graphical representations were used in the analysis.

E. Ethical Considerations

Prior to participation, participants were clearly informed about the purpose of the study. They were assured that their responses would remain confidential. No individual details were collected, and all responses were kept anonymous throughout the study.

V. RESULTS

A. Demographics

TABLE I PARTICIPANT DEMOGRAPHICS

Variable	Category	Frequency (n=176)	Percentage (%)
Gender	Male	63	35.80
	Female	113	64.20
Age	Under 25	144	81.82
	Above 25	32	18.18
Education	Bachelor's	140	79.55
	Master's	36	20.45

Table I shows the demographic profile of the respondents (n = 176). Most participants were female, accounting for 64.20% of the sample, while males made up 35.80%. A majority of respondents were under 25 years of age. Most participants held a bachelor's degree, and a smaller proportion had completed a master's degree.

B. Digital Literacy Confidence

Table II presents the confidence levels of respondents (n = 176) in using digital tools. Almost half of the participants

rated their level of confidence as four out of five. Approximately 25% chose a rating of three.Nearly one-fifth selected five, indicating extremely high confidence. Only a small percentage of respondents chose ratings of one or two, reflecting low confidence. Overall, the results indicate that the majority of participants felt at ease using digital technologies.

TABLE II CONFIDENCE IN USING DIGITAL TOOLS

Confidence Level	Frequency (n=176)	Percentage (%)
1 (Low)	3	1.70
2	8	4.55
3	49	27.84
4	83	47.16
5 (High)	33	18.75

C. Specific Digital Skills

TABLE III DIGITAL SKILLS PROFICIENCY

Digital Skills Proficiency	Resp.(n=176)	Percentage (%)
Adaptability to New Technologies	33	18.75
Augmented and Virtual Reality	19	10.80
Basic Computer Literacy	108	61.36
Coding and Programming	64	36.36
Cybersecurity Awareness	56	31.82
Data Literacy	44	25.00
Digital Citizenship	22	12.50
Digital Communication	76	43.18
Digital Content Creation	55	31.25
Digital Marketing Skills	36	20.45
Digital Project Management	31	17.61
E-learning Skills	79	44.89
Email Management	72	40.91
Financial Management Online	34	19.32
Health Information Literacy	39	22.16
Internet Navigation	113	64.20
Online Collaboration	37	21.02
Problem-Solving in a Digital Environment	36	20.45
Remote Work Competence	24	13.64
Social Media Proficiency	55	21.25

Table III shows the proficiency levels of respondents (n = 176) in various digital skills. The data indicate the number and percentage of individuals who are competent in each area. The strongest skills were basic computer literacy and internet navigation, with over 60% of respondents demonstrating proficiency. Digital communication and e-learning skills were also relatively common, with approximately 40–45% of respondents reporting competence. Coding, cybersecurity awareness, and digital content creation were reported at a moderate level, with around one-third of respondents indicating proficiency. Conversely, fewer respondents reported proficiency in adapting to new technologies, digital marketing, online problem-solving, and online collaboration, with the majority rating below 25%. Extremely low levels of proficiency were observed in areas such as virtual and augmented reality, digital citizenship, remote work skills, and online financial management, with less than 14% of respondents reporting competence.

D. Library Program Awareness and Participation

TABLE IV LIBRARY DIGITAL LITERACY PROGRAMS

DL Program Effectiveness	1 (Low Confidence)	2	3	4	5 (High Confidence)
Respondents (n=176)	19	11	38	51	57
Percentage(%)	10.79	6.25	21.59	28.98	32.39

Table IV presents respondents' ratings (n = 176) of how effective they found their library's digital literacy programs. About one-third (32.39%) felt very confident, giving the highest rating of five. Another 28.98% rated the programs a four, indicating a high level of satisfaction. Some participants gave moderate ratings, while only a small proportion (10.79%) expressed very low confidence in the programs. Overall, most respondents felt that the library's digital literacy programs were useful and helped them develop practical digital skills.

E. Motivations & Future Initiatives

TABLE V MOTIVATIONS FOR PARTICIPATION

Motivations	Resp. (n=176)	Percentage (%)
Access to Resources	52	29.55
Education and Training	90	51.14
Skill Development	128	72.73
Job Opportunities	126	71.59
Social Inclusion	63	35.80
Community Engagement	41	23.30
Digital Citizenship	41	23.30
Personal empowerment	69	39.20
Research and Information Literacy	52	29.55
Digital Inclusion	34	19.32
Professional Development	37	21.02
Support for Academic Success	50	28.41

Table V presents the various reasons why respondents (n = 176) chose to participate in the program. The most common motivations were skill development (72.73%) and job opportunities (71.59%), suggesting that most participants were interested in improving their abilities and career prospects. Education and training were also significant motivations, cited by just over half of the respondents (51.14%).

Other notable reasons included personal empowerment (39.20%) and social inclusion (35.80%). Less frequently mentioned motivations were access to resources (29.55%), research and information literacy (29.55%), community engagement (23.30%), digital citizenship (23.30%), continued professional development (21.02%), and digital inclusion (19.32%). Overall, the results indicate that participants were primarily motivated by opportunities for learning, growth, and employment.

F.Digital Tools and Platforms Used for Information Seeking and Learning

Table VI presents the types and usage rates of digital tools and platforms used by respondents (n = 176) for information seeking and learning. These resources are grouped into different categories in the table, such as online learning platforms, cloud computing, data analysis and visualization, version control systems, research databases, and collaboration platforms, among others.

Under each category, the table lists the number of respondents who used each tool and the corresponding percentage of the total sample.The most commonly used tools were data analysis and visualization tools (38.64%), research databases (38.07%), online learning platforms (35.23%), and collaboration platforms (33.52%). The least frequently used tools included blockchain in research (9.66%) and citizen science platforms (6.25%). This distribution highlights the diverse digital ecosystems that participants use to support their academic and learning activities.

TABLE VI DIGITAL TOOLS AND PLATFORMS USED FOR INFORMATION SEEKING AND LEARNING

Type of Digital Resource/Tool	Resp. (n=176)	Percentage (%)
Online Learning Platforms (Coursera, edX, Swayam)	62	35.23
Cloud Computing (Amazon Web Services, Microsoft Azure, Google Cloud Platform)	48	27.27
Data Analysis and Visualization (R, Python, MATLAB, Tableau, Power BI, SPSS)	68	38.64
Version Control (Git, GitHub, GitLab)	31	17.61
Research Databases (PubMed, IEEE, JSTOR)	67	38.07
Project Management (Trello, Asana, Jira)	34	19.32
Reference Management (EndNote, Zotero, Mendeley)	35	19.89
Virtual Research Environments (Cyberinfrastructure, Research Data Alliance)	25	14.20
Electronic Lab Notebooks (Labguru, Benchling, LabArchives)	18	10.23
Simulation and Modelling (COMSOL Multiphysics, MATLAB Simulink)	14	7.95
Literature Review and Collaboration (Covidence, Rayyan)	20	11.36
Open Science Platforms (Open Science Framework, Figshare, Zenodo)	22	12.50
Citizen Science Platforms (Zooniverse, Foldit)	11	6.25
Virtual Reality and Augmented Reality	24	13.64
Blockchain for Research (Orvium, ResearchHub)	17	9.66
Collaboration Platforms(Microsoft Teams, Zoom)	59	33.52

G. Future Digital Literacy Initiatives Desired

TABLE VII FUTURE DIGITAL LITERACY INITIATIVES DESIRED

Initiative	Frequency (n=176)	Percentage (%)
Information Resources & Literature Searching	101	57.39
Guidance on Online Safety, Privacy, and Cybersecurity Awareness	95	53.98
AI Literacy Programs	85	48.30
Green Digital Literacy	60	34.09
Online Communication and Collaboration Skills	62	35.23
Misinformation and Deepfake Awareness	75	42.61
Social Media for Professional Networking	47	26.70

Table VII shows the digital literacy issues that respondents (n = 176) would prefer libraries to emphasize in the future. The most requested area was assistance with finding information and searching the literature, selected by 57.39% of respondents. A large proportion of respondents were also interested in learning how to stay safe, private, and secure online (53.98%), as well as developing AI literacy skills (48.30%). Other significant areas of interest included understanding misinformation and deepfakes (42.61%), online communication and collaboration skills (35.23%), and green digital literacy (34.09%). A smaller proportion of respondents (26.70%) expressed interest in using social media for professional networking. Overall, the findings indicate key areas in which libraries can expand their digital literacy programs to better meet users' needs.

VI. DATA ANALYSIS AND DISCUSSION

The demographic data show that most respondents are young undergraduate students, predominantly female, belonging to a generation that is comfortable with the digital world but still acquiring advanced skills in digital environments. This demographic background provides important context for interpreting their digital literacy and information-seeking behaviour. Respondents demonstrated a strong level of confidence in using digital tools and platforms. Basic digital skills, including navigation, document creation, and the use of the internet for communication, were widely practiced. However, proficiency declined when tasks required more advanced skills, such as information management, coding, cybersecurity knowledge, and responsible online citizenship. These differences reveal a gap between perceived digital confidence and the depth of skill acquisition, aligning with previous research that emphasizes the need for systematic development of digital skills within academic ecosystems.

Academic library digital literacy programs were rated positively, indicating that they are relevant and useful. However, the presence of a small proportion of dissatisfied participants suggests the need for improvement, particularly

through more specialized, discipline-oriented, and practical training. This aligns with the National Education Policy 2020, which promotes holistic and multidisciplinary learning, and Sustainable Development Goal 4, which emphasizes equitable access to quality education and lifelong learning. The primary motivation for respondents' participation in digital literacy programs was to enhance employability and acquire practical skills, underscoring the growing importance of integrating digital literacy with career-oriented objectives. This demonstrates that digital literacy initiatives extend beyond academic development and serve as key drivers of socio-economic empowerment and workforce readiness.Trends in digital tool usage indicate that participants frequently engage with academic databases, e-journals, and information management tools in their studies. However, they reported limited use of more advanced or emerging technologies, such as artificial intelligence tools, data analytics platforms, and augmented or virtual reality resources. This pattern highlights the need to broaden digital exposure within library-based programs to support more diverse and innovative learning behaviours.

Furthermore, respondents expressed a strong desire for additional training in information retrieval, online safety, AI literacy, and awareness of misinformation. This awareness reflects a growing recognition of challenges in the digital environment, particularly the need to distinguish credible information from misinformation and deepfakes. It also reinforces the evolving role of academic libraries as spaces for cultivating critical thinking and digital resilience. Overall, the findings reveal an increasingly digitally aware but evolving user base. While foundational digital skills are well established, ongoing, dynamic, and progressive digital literacy education remains essential. Through innovative programs and collaborations, academic libraries can bridge these gaps and prepare students to become confident, ethical, and competent digital citizens capable of navigating today's rapidly evolving information landscape.

VII. CONCLUSION

This study demonstrates that despite the high levels of confidence displayed by many students in performing basic digital tasks, their mastery of more advanced skills-such as data analysis, cybersecurity, coding, and critical evaluation of online information-remains limited. This gap clearly indicates the need for structured and targeted digital literacy education in higher education. In this regard, academic libraries can play a significant role, both as information hubs and as learning spaces that support students through workshops, organized programs, and research guidance.Students' positive attitudes toward existing training programs, along with their growing interest in areas such as AI literacy, online safety, and misinformation awareness, reflect a strong readiness to acquire these competencies. These findings align with the objectives of India's National Education Policy (NEP) 2020 and the United Nations Sustainable Development Goal 4 (Quality Education), both of which emphasize digital competence, equitable access, and lifelong learning. Ultimately, strengthened digital literacy supported by library initiatives contributes to academic success and fosters informed, ethical, and future-ready digital citizens.

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