Embedded Selforganizing Systems

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What Students and Researchers Think of the Relevance of Academic Libraries in the Age of AI: A Survey Based Study

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Abstract—Post the introduction of Large Language Models as better substitutes for traditional search engines and as great support for researchers, many critics began to question the very purpose of the continuation of academic libraries in Higher Education Institutions. Certainly, academic libraries have lost the sheen of their yesteryears, where the resources they hosted in the form of printed books and periodicals were considered indispensable for academic pursuits—education and research—thanks to the advent of revolution in information and communication technologies since the 1990s. Search engines, digital databases, institutional repositories, online translation services, etc., have opened access to resources that were once beyond the reach of learners or researchers. But setting aside the critics, what do major, influential organizations around the world think about the future of academic libraries in the AI age? And how do students and researchers look at the usefulness of academic libraries in the digital age? This paper presents a review of the perspectives of major global organizations and the results of a ground survey of postgraduates and doctoral researchers to understand the future of academic libraries in higher education.

Keywords—Academic libraries, Artificial Intelligence, research, reference service, Higher Education Institutions.

I. INTRODUCTION

Academic libraries are touted as the heart of Higher Education Institutions (HEIs) [1], [2]. Libraries play a vital role in supporting classroom teaching by making available the necessary educational resources for students and faculty. Most academic libraries still provide print media such as books and journals as the primary resources for their users, though many are also offering e-books and subscriptions to e-journals. Over the last few decades, most academic libraries worldwide have been reporting a substantial drop in their footfalls or the gate-counts [3], [4]. For example, data compiled by the Association of College & Research Libraries (ACRL) shows a consistent multi-decade decline in physical metrics like gate count and reference desk transactions across major U.S. academic libraries [5], [6].This downward trajectory is attributable mainly to the easy availability of online information resources, searchable through Google and other search engines, which saved a lot of time and effort on part of information seekers. Added to this was the currency of online information over relatively old printed materials in the libraries, which enticed them to drift towards online resources. Realizing the superior features of online resources, academic libraries began to subscribe more and more to networked electronic databases, which replaced the traditional print media as the primary resources for academic research.

The shift from physical to online resources saw a dramatic rise during the COVID-19 pandemic, as libraries were forced to restrict the entry of users into the library premises [7]. This was the time when libraries aggressively took various initiatives to expand open and remote access through institutional logins [8]. Data collected during this period show e-books, digital repositories, and virtual reference services had registered historic peaks in their usage [9]. This phase familiarized users with the advantages of online resources, making them more accustomed to the digital environment.

The post-pandemic phase continues this trend, and many libraries report average individual visit counts dropping by nearly 30% compared to 2018/2019 data [10].

However, the biggest challenge to academic libraries came in October 2022 when OpenAI launched the first Large Language Model (LLM) – the ChatGPT, projected to surpass traditional search engines in information gathering, let alone traditional libraries. Soon, several LLMs offering powerful features such as search and synthesis, summarization, translation, advanced reasoning, and replicability, etc., have been launched. Research-oriented LLMs like ResearchRabbit and Perplexity have fundamentally changed how researchers navigate the massive corpus of academic literature and ever-flowing real-time big data. With the help of academic literature networks generated by these LLMs, researchers are finding it increasingly convenient to depend on AI-LLMs rather than on traditional libraries.

With this as background, questions are now being raised, more frequently, about the legitimacy of the continuation of academic libraries in HEIs. Are libraries really needed at a time when information is not only available freely but also

customized to precisely suit the requirements of information seekers by AI-enabled technologies?

II. WHAT THE LEADING ORGANIZATIONS THINK?

Global policy agencies—such as the Organization of Economic Cooperation and Development (OECD), UNESCO, the International Federation of Library Associations and Institutions (IFLA), and Online Computer Library Center (OCLC)—periodically release their assessments on the future of information dissemination in society, the future of academic libraries, and how Artificial Intelligence will transform higher education and scientific research.

A. The OECD View

The OECD does not think AI systems are going to replace the academic libraries entirely. On the contrary, it sees a greater role for academic libraries in ethically curating the information and providing it to the users on a trusted platform. It unequivocally states that "a knowledge synthesis infrastructure will not be complete without ongoing curation and quality assurance by domain experts, librarians, and information scientists" [11]. The OECD also points to the fact that AI's competence is entirely reliant on the datasets it is trained on. Hence, it is the human insight that makes the data relevant to an information seeker. It recommends that academic libraries transition from being mere custodians of books to becoming a platform for the study of massive, machine-readable datasets. The OECD also warns of an emerging resource gap – the massive concentration of high-performance computing (HPC) power and data resources within private tech giants, leaving behind public-funded universities and other public research systems. Libraries must structure their institutional repositories in a way that they meet FAIR data principles (Findable, Accessible, Interoperable, and Reusable) so AI research tools can crawl across and retrieve the right information.

B. The UNESCO View

Under the fourth Sustainable Development Goal of UNESCO, which aims at Inclusive and Equitable Quality Education for all, UNESCO envisions a framework that underscores the need for a shift in the librarian's role. UNESCO's mandate underscores the need for a human-centred approach to AI. UNESCO points out that libraries are no longer just repositories of books; it emphasizes the scope for AI's role in academic libraries, in addressing current inequalities regarding access to knowledge, research, and the diversity of cultural expressions. UNESCO hopes that AI does not widen the technological divides within and between countries and envisions "AI for all" [12]. UNESCO's policy document, prepared together with the IFLA, notes that the nature of libraries has changed drastically in an effort to adapt to this new digital era. Libraries have begun to redefine their spaces and approaches to provide internet access, digital skills, resources, and many other internet-related services to people, thereby connecting people to public information and resources all over the world [13].

C. The IFLA View

IFLA, through its *Statement on Libraries and AI* argues that academic librarians are shifting from teaching people how to search (using keywords and Boolean operators) to teaching AI Literacy and Prompt Engineering. This includes training researchers how to audit an LLM's output critically, detect algorithmic bias, and avoid over-relying on automated esummaries. IFLA emphasizes that traditional library values—such as privacy, intellectual freedom, and accountability—must be applied to AI tools.

D. The OCLC View

OCLC recognizes the transformation of academic libraries as they adapt to the changing research and learning behaviors of their home institutions, which are the principal drivers of the library service. transition from a collections-based model to a more diffuse services-based model. The model of excellence for libraries will also need to be plural, based on strategic fit to the needs of the institution they serve, and not on collection size or gate count [14].

Thus, though leading institutions maintain an optimistic outlook on the prospects of libraries being instruments of change and as a strong support in research and innovation, do postgraduate students and researchers also think the same way and hold a positive opinion about the future of academic libraries? What is the on-ground situation in Higher Education Institutions (HEIs)? To understand the situation prevailing in the HEIs, a survey was conducted with a sample of 100 participants consisting of 65 postgraduate students and 35 doctoral scholars.

III. METHODOLOGY

A quantitative research study was conducted to investigate the opinions and perceptions of postgraduate and doctoral scholars who are members of the Knowledge Resource Center (Library) of a leading academic institution in India through a survey. In all, of the 49 PhD scholars from various disciplines who were members of the library under study, more than 70% were surveyed (35). Similarly, there were 220 Postgraduate students enrolled with the library, of which about 30% of students (65) were surveyed. As regards the gender distribution of the participants, 24% of respondents were women, and the remaining 76% were men. The age group of postgraduate students ranged between 18 and 24 years, whereas the age range of doctoral scholars was between 28 and 51 years.

A structured questionnaire was prepared to collect data from the respondents using Google Forms. The questionnaire was divided into two sections, titled Part A and Part B. Part A contained open-ended questions and was meant to obtain demographic information from respondents. Part B consisted of closed-ended questions with a five-point Likert scale with choices ranging from strongly disagree to strongly agree. In all, the questionnaire consisted of 40 questions, 10 in Part A and 30 in Part B.

The data collected were tabulated, and descriptive statistical methods such as percentage distribution and frequency analysis were used for data analysis. The analysis focused on understanding user perceptions about the role of libraries as information intermediaries, as opposed to whether users think they are self-sufficient in searching for the information they need in the age of AI, without the need for a librarian and library resources. Graphs, pie-charts, and bar-charts were created for better comprehension of the findings. The five point Likert-scale outcomes were collapsed into two categories and the results are tabulated as percentages. In this process, neutral responses were equally distributed to both the categories to maintain balance so that easy comparison of

agreement versus disagreement opinions can be easily compared and comprehended.

A. Research Ethics

The study adhered to the norms and ethical standards adopted by researchers in educational and social science research. Before the commencement of the research, participants were clearly briefed about the objectives of the research. Respondents were encouraged to participate voluntarily with the assurance that the data collected would be exclusively used for the current study and that data privacy would be strictly ensured.

IV. RESULTS

The results showed a surprising correlation between the level of education being pursued and what users think of the library as a useful source of information. 68% of Postgraduate students consider the library as indispensable for their educational pursuits, whereas only 40% of doctoral scholars think so. Doctoral scholars seem to prefer online resources over conventional printed material available (74%) in the library, and their confidence about self-sufficiency in searching for related literature is also high (60%) as compared to only 36% and 40% respectively of the Postgraduate students. Both PhD scholars (64%) and Postgraduate students (69%) exhibited reasonable satisfaction with the reference services provided by the library. As regards to the dependability of information accessed online, Postgraduate students expressed scepticism (58%) as against only 28% of PhD scholars. Both Postgraduate students (88%) and PhD scholars (72%) expressed dissatisfaction about the non-availability of online resources in the language of their choice and expressed reasonable satisfaction (58%, 47% respectively) about the resources available in the library in their preferred language. When asked about what they think about the future of academic libraries, both groups (74% of PG students and 62% of PhD scholars) maintained that the library would continue to be an indispensable part of academic institutions and that there cannot be any replacement for it even after the AI revolution (65% and 66% respectively). Whether the academic libraries need to upgrade themselves and provide more technology-driven services received an overwhelming response of 95% by the Postgraduate students and 100% of PhD scholars. Both groups (78% of PG students and 82% of PhD scholars) see human intervention and guidance by an expert librarian as helpful in making the information accessed more reliable and trustworthy. To contain unethical practices in research, such as plagiarism, copyright violation, citation procedures, etc., both groups consider the role of librarians as very significant (78% and 82%). Both groups hold a similar opinion that the libraries should conduct more and more workshops and training programs (both 100%) to familiarise library users with searching techniques and the use of AI in research and education. While Postgraduate students believe the impact of AI and other modern technologies on the current services and facilities of the library are only marginal (67%) and think the libraries are likely to be transformed considerably in the next one decade (96%), PhD scholars find the impact to be noticeable (54%) and agree with the Postgraduate students regarding the possibility of substantial transformation of libraries (98%) in the coming decade. As regards the influence of gender on what respondents think of the role of libraries in purveying suitable resources for academics and research, 72% of males and 70% of females share similar views. Even in regard to the future of academic libraries, there is no significant difference between the two genders. 86% of male as well as 78% female respondents share almost similar views.

Table1: What Library Users Think?

N	Issue	PG Students	PhD Scholars
		(in percentage)	
1	Library as a useful source of information	68	40
2	Prefer online resources	36	74
3	Confidence about self-sufficiency	40	60
4	Satisfaction with the reference services	69	64
5	Skepticism on dependability of online information	58	28
6	Dissatisfaction about the non-availability of online resources in the language of choice	88	72
7	Satisfaction about the resources available in the library in the preferred language	58	47
8	Library as indispensable part of academic institutions	74	62
9	No replacement for the library even after AI revolution	65	66
10	Need to upgrade and provide more technology-driven services	95	100
11	Human intervention and guidance must in making the information more reliable	78	82
12	Role of librarians significant in containing unethical practices	78	82
13	Should conduct more workshops on searching techniques and the use of AI	100	100

14	Impact of AI on the current services and facilities of the library is only marginal	67	54
15	Libraries are likely to be transformed considerably in the next decade	96	98

V. DISCUSSION

The survey shows that a great majority of Postgraduate students and PhD scholars view library resources and librarians' support as indispensable for identifying and accessing appropriate resources for their academic pursuits and research. While acknowledging the easy availability of vast and unlimited resources on the World Wide Web, the participants acknowledge the importance of libraries as learning spaces that provide the right milieu for academics and research. The survey, as well as the perspective of influential world organizations, points to an altogether different role libraries are expected to play in the changing digital environment. Library users expect librarians to conduct more frequent workshops and training programs, not just on searching techniques on conventional search engines, but also on working with AI technologies. It is expected, both by premier institutions and the library users, that libraries must reinvent their role to be more effective information intermediaries by introducing more relevant and current technologies to their users. Gender seems to have little or no impact on how users view the role of the library or the future of academic libraries in the age of AI.

VI. LIMITATIONS OF THE RESEARCH

The study was primarily conducted on a small sample size of 100 library users belonging to Postgraduate and Doctoral education to identify their satisfaction levels in respect of current library facilities and services, and to understand what they think about the future of academic libraries in the age of AI and the explosion in the availability of customized knowledge for knowledge seekers. One of the primary limitations of this study is the small sample size affecting external validity and hinders extrapolation of results to a larger population. Secondly, the research was conducted using convenience sampling on users enrolled with the library where the researcher currently serves. This might have unintentionally introduced construct validity issues, such as the researcher's expectation, participants' bias, and the Pygmalion effect, influencing the feedback of the participants. Another important limitation is that the study was conducted on students belonging to traditional streams like Arts, Science, and Commerce faculties and not on students belonging to Engineering, Management or Technological disciplines. Since students from traditional

VII. CONCLUSIONS

The findings of the survey, as well as the perspectives of major world organizations that envision the future of libraries in a digital environment, amply show that the future of academic libraries is not as bleak as portrayed by critics. Library users in HEIs – whether Postgraduate students or doctoral research scholars – accept the irreplaceable role played by reference librarians in locating and accessing appropriate resources. Library users generally perceive the learning environment offered by academic libraries as useful, motivating, and supportive for their educational and research pursuits. At the same time, library users are of the view that academic libraries need to introduce more and more AI-enabled services and innovate themselves in the digital environment to keep their relevance in the changing times. The study also pointed out the crucial role librarians play in creating awareness and sensitizing academics about plagiarism, copyright, Open Educational Resources, citation styles, etc. The training programs conducted by libraries for their users on search techniques and locating and accessing learning resources must expand into using AI tools and technologies. Users think resources provided by a librarian after proper vetting are more dependable than those identified by users themselves. Other challenges identified by users in respect of online resources and AI technologies are in respect of their limited competencies in accessing digital resources and the technical complexities associated with modern technologies. Adaptation to AI-enhanced learning environments is still in the nascent stage and is slowly picking up. Although the current research is based on a relatively small sample size sourced through convenience sampling from a population linked to only one HEI, which may not be extrapolated to a larger population, the study nevertheless provides a reasonable understanding of the ground realities prevalent in Higher Education Institutions.

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