The Role of Academic Libraries in the National Education Policy 2020 for Student Development: A Comprehensive Literature Review

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Abstract*—Academic libraries have long served as essential pillars of higher education by supporting teaching, learning, and research activities. In the context of India's National Education Policy (NEP) 2020, academic libraries are undergoing a strategic transformation to align with the policy's vision of holistic, multidisciplinary, inclusive, and technology-enabled education. This paper presents a systematic literature review examining the evolving role of academic libraries in promoting student development under the NEP 2020 framework. The review synthesizes recent empirical and theoretical studies from India and international contexts and analyzes four major thematic areas: gamification for student engagement, research data management (RDM) services, artificial intelligence (AI) for equitable reference services, and digital infrastructure with secure authentication mechanisms. Gamification initiatives such as digital badges, interactive quizzes, and orientation-based activities have demonstrated positive effects on student motivation, information literacy, and collaborative learning, although challenges related to infrastructure limitations, staff competency, and sustainability persist. RDM services enhance students' research capacity by supporting data literacy, preservation practices, compliance with ethical standards, and scholarly communication skills. The integration of AI-driven virtual reference services offers scalable and personalized user support while addressing equity and fairness concerns through continuous evaluation and ethical governance. In parallel, improvements in digital gateways, usability design, and federated authentication systems ensure secure, seamless, and inclusive access to electronic resources for diverse learner populations. Collectively, these innovations contribute to the development of critical thinking, digital competence, research skills, and lifelong learning abilities among students. Despite these advancements, academic libraries continue to face challenges such as limited funding, skill gaps, institutional constraints, and resistance to organizational change. The study emphasizes the need for strategic investment in professional development, technological infrastructure, cross-functional collaboration, and policy alignment to sustain innovation. Ultimately, academic libraries emerge as dynamic learning ecosystems that play a pivotal role in operationalizing NEP 2020 and strengthening student-centered higher education in India.

***Index Terms*—Academic Libraries; National Education Policy 2020; Student Development; Gamification; Research Data Management; Artificial Intelligence; Digital Infrastructure; Information Literacy; Equity and Inclusion.**

I. INTRODUCTION

Academic libraries have historically played a pivotal role in supporting higher education, acting as repositories of knowledge, facilitators of research, and providers of essential services for students and faculty alike. In the context of India's ambitious National Education Policy (NEP) 2020, the strategic transformation of academic libraries is more pertinent than ever for fostering student development, enhancing learning outcomes, and promoting equitable access to educational resources. The NEP 2020 advocates for a holistic, student-centric, and multidisciplinary approach to education, calling for a paradigm shift in the way knowledge is accessed, curated, and disseminated. Within this framework, academic libraries emerge as critical partners in realizing the NEP's objectives, leveraging digital technologies, innovative service models, and inclusive practices. This literature review aims to systematically examine the evolving role of academic libraries in

student development under the NEP 2020, drawing exclusively on recent empirical and theoretical studies. The analysis addresses several core themes: the integration of technology to foster engagement and information literacy; the advancement of research data management (RDM) services to support scholarly inquiry; the pursuit of equity and fairness in library services, particularly through the adoption of artificial intelligence (AI); and the continuous improvement of digital infrastructure and authentication mechanisms to ensure secure and seamless access to resources. By synthesizing evidence from India and international contexts, this review elucidates the multifaceted contributions of academic libraries to student development and offers insights into the challenges and opportunities that lie ahead.

The National Education Policy 2020: Vision and Implications for Academic Libraries

The NEP 2020 sets forth a transformative vision for Indian education, emphasizing flexibility, multidisciplinary learning, technology integration, and inclusive access (Yidavalapati et al., 2021). For academic libraries, this policy mandates a reimagining of their traditional roles to become dynamic learning hubs, digital resource centers, and facilitators of research and innovation.

Libraries are called upon to

- Support the development of critical thinking, creativity, and research skills among students through access to diverse information resources.
- Integrate emerging technologies and pedagogical innovations to enhance student engagement and learning outcomes.
- Foster inclusive access to resources, bridging digital divides and addressing the needs of diverse student populations.
- Provide robust research support, including data management, information literacy, and scholarly communication services.
- The realization of these objectives requires libraries to expand their service portfolio, invest in staff development, and collaborate closely with academic stakeholders.

The following sections analyze the current state of academic library services in India and globally, with a focus on innovations that align with the NEP 2020 vision

II. GAMIFICATION IN ACADEMIC LIBRARIES: ENHANCING STUDENT ENGAGEMENT AND INFORMATION LITERACY

A. Conceptual Foundations

Gamification refers to the incorporation of game-design elements such as points, badges, leaderboards, and challenges into non-game contexts to motivate participation and enhance user experiences (Subaveerapandiyan et al., 2025). In academic libraries, gamification is increasingly recognized as a strategy to counteract declining student engagement and to make library services more interactive and appealing.

B. Empirical Evidence from Indian Libraries

Subaveerapandiyan et al. (2025) conducted a comprehensive survey of library leaders across Indian academic institutions to investigate the adoption and impact of gamification in library services. The study found that, although awareness of gamification strategies was moderate, perceptions of their effectiveness were generally positive. Gamification was particularly valued for its potential to:

- Increase user engagement with library resources and services.
- Enhance information literacy and research consultation experiences.
- Foster a sense of community and friendly competition among students.

Notable gamification initiatives implemented in libraries include digital badges for completing information literacy tasks (Mozilla Open Badges), point-based systems for regular library activities (Lemon tree at Huddersfield University), and interactive quizzes (Kahoot!) to reinforce learning (Subaveerapandiyan et al., 2025). Orientation programs have also embraced gamified elements, such as scavenger hunts and digital escape rooms, to familiarize new students with library facilities and resources.

C. Challenges and limitations

Despite these successes, significant barriers impede the widespread adoption of gamification in Indian academic libraries. Key challenges include: Insufficient staff expertise and training in game-based learning and digital tools. Inadequate technological infrastructure and funding for implementing

gamification platforms. Resistance to change among library staff and users accustomed to traditional service models (Subaveerapandiyan et al., 2025).
Furthermore, concerns have been raised regarding the potential for extrinsic rewards (e.g., points and badges) to undermine intrinsic motivation for learning, and the risk of gamified systems inadvertently fostering unhealthy competition or discouraging lower-performing students (Appleton, 2020; Alsawaier, 2018, as cited in Subaveerapandiyan et al., 2025).

D. User perceptions and demographic differences
User attitudes toward gamification vary across demographic groups. Younger students, particularly undergraduates, tend to respond more positively to gamified services due to their familiarity with digital technologies and preferences for interactive learning environments. In contrast, postgraduate students and faculty members may be more skeptical, emphasizing efficiency and practical utility over entertainment (Subaveerapandiyan et al., 2025). The appeal of specific gamification elements also differs by academic discipline, highlighting the need for tailored approaches that align with users' educational goals and motivations.

E. Sustaining Engagement
Research indicates that the novelty effect of gamification can wear off over time, leading to diminished user engagement unless new challenges and features are regularly introduced (Chernbumroong et al., 2024, as cited in Subaveerapandiyan et al., 2025). Continuous evaluation and iterative design are therefore essential to sustain student interest and maximize the educational impact of gamified library services.

III. RESEARCH DATA MANAGEMENT (RDM) SERVICES: SUPPORTING STUDENT RESEARCH AND DATA LITERACY

A. The Importance of RDM in Academic Libraries
The exponential growth of digital research outputs in higher education institutions has necessitated the development of robust research data management (RDM) services within academic libraries. RDM encompasses the entire data lifecycle from creation and collection to storage, documentation, sharing, and preservation ensuring that research data are accessible, reusable, and compliant with ethical and legal standards (Yidavalapati et al., 2021).

B. Current Practices and Service Models in South Asia
Yidavalapati et al. (2021) surveyed academic library professionals across South Asia, including India, to assess the provision of RDM services. The findings revealed that a significant majority (83.6%) of participating institutions offered some form of RDM support. These services included:

- Data management training and information literacy instruction for students and early-career researchers.
- Long-term preservation of research data through institutional repositories.
- Advisory services on data management planning, metadata standards, and data sharing.
- Instructional support for data analysis and visualization using tools such as Python, SPSS, and R.

Despite this progress, the frequency and depth of RDM services varied widely. Many institutions performed RDM activities only sporadically, while a minority offered daily support (Yidavalapati et al., 2021).

C. Skills and Competencies for RDM
Effective RDM service delivery requires library professionals to possess a diverse skill set, including: Technical and ICT skills for data storage, infrastructure, and repository management. Data curation, metadata standards, and documentation expertise. Knowledge of legal, ethical, and policy frameworks related to data management. Proficiency in data analysis, visualization, and deep learning techniques (Yidavalapati et al., 2021). The survey indicated that most library professionals recognized the need for ongoing skill development, particularly in technical areas and understanding researchers' needs.

D. Challenges and Recommendations
Major challenges in implementing RDM services included:

- Limited staff expertise and insufficient training opportunities.
- Inadequate institutional support and funding for infrastructure development.

- Compliance issues with funder requirements and data preservation standards.
- To address these challenges, Yidavalapati et al. (2021) recommend that institutions:
- Invest in professional development through conferences, workshops, and MOOCs.
- Foster a culture of continuous learning and collaboration among library staff.
- Engage with stakeholders to design user-centered and sustainable RDM services.
- Alignment with NEP 2020 Objectives

The expansion of RDM services aligns closely with the NEP 2020's emphasis on research, innovation, and digital literacy. By equipping students with the skills to manage and analyze data effectively, libraries contribute directly to the development of critical thinking, scientific inquiry, and lifelong learning competencies.

IV. EQUITY, FAIRNESS, AND THE ROLE OF ARTIFICIAL INTELLIGENCE IN LIBRARY SERVICES

The Promise and Perils of AI in Academic Libraries As academic libraries integrate artificial intelligence (AI) technologies such as large language models (LLMs) into reference and support services, questions of equity, fairness, and inclusivity become paramount. LLMs offer the potential to provide scalable, personalized assistance to students, overcoming barriers of time, location, and language (Wang et al., 2025). However, concerns persist regarding the risk of algorithmic bias and the reproduction of societal prejudices embedded in training data.

V. EMPIRICAL EVALUATION OF FAIRNESS IN LLM-BASED REFERENCE SERVICES

Wang et al. (2025) systematically evaluated the fairness of six state-of-the-art LLMs deployed in academic library virtual reference services. Using synthetic patron personas varying in sex, race/ethnicity, and institutional role, the study assessed whether LLMs differentiated their responses based on these attributes. The main findings were:

- No evidence of systematic differentiation by race or ethnicity in LLM responses.
- Only minor evidence of stereotypical gender bias in one model; overall, LLMs treated men and women equitably.
- LLMs demonstrated nuanced accommodation of institutional roles, adapting formality, politeness, and vocabulary to reflect professional norms rather than discriminatory practices (Wang et al., 2025).

These results suggest that, with proper evaluation and prompt engineering, LLMs can support equitable and contextually appropriate communication in academic library services.

VI. THEORETICAL PERSPECTIVES ON EQUITY AND COMMUNICATION

The pursuit of fairness in library services is anchored in the American Library Association (ALA) Code of Ethics, which mandates unbiased, courteous, and equitable service for all users (Wang et al., 2025). Studies have documented historical disparities in human-mediated reference interactions based on patron demographics (Shachaf & Horowitz, 2006; Vladoiu et al., 2023, as cited in Wang et al., 2025). The adoption of AI offers an opportunity to mitigate, but not eliminate, these biases underscoring the need for ongoing monitoring and domain-specific evaluation.
Linguistic theories such as systemic functional linguistics and politeness theory provide frameworks for interpreting how AI systems manage social relationships and professional communication. LLMs that can modulate their responses to align with institutional expectations and user needs are better positioned to advance the NEP 2020's goal of inclusive and student-centered education.

VII. IMPLICATIONS FOR STUDENT DEVELOPMENT

By ensuring that AI-driven services are fair, accessible, and responsive to diverse student profiles, libraries can:

- Democratize access to information and research support.
- Reduce barriers for marginalized and underrepresented groups.
- Foster a culture of respect and inclusion that empowers all learners.

- Digital Infrastructure and Authentication: Enhancing Access, Security, and Usability
- The Evolution of Digital Resource Access in Academic Libraries

The digital transformation of academic libraries has necessitated the development of robust online platforms, authentication systems, and user interfaces to facilitate seamless access to electronic resources. The design of digital gateways such as library login pages reflects institutional priorities regarding security, usability, and inclusivity (Shang & Huang, 2024).

VIII. COMPARATIVE ANALYSIS OF AUTHENTICATION AND USABILITY

Shang and Huang (2024) conducted a comparative study of university library login pages across major academic alliances (IVY Plus, BTAA, JULAC, JVU), analyzing authentication mechanisms, usability features, and security compliance. The main findings were: Core functionalities (e.g., ID/password logins, privacy policies) were consistent across alliances, reflecting shared standards for access management.

Mature alliances prioritized streamlined interfaces and resource accessibility, while newer consortia emphasized cybersecurity features such as IP restrictions and third-party integrations.

Usability features especially multilingual support were key differentiators, with significant implications for serving diverse student populations. Regional and institutional factors influenced design choices, with older alliances favoring simplicity and newer ones adopting security-centric designs (Shang & Huang, 2024).

IX. BEST PRACTICES AND CHALLENGES

The study highlights the importance of balancing security requirements with user experience. Federated identity management systems (e.g., Shibboleth, Open Athens) have been widely adopted to enable single sign-on (SSO) and protect user privacy. At the same time, universal design principles such as responsive layouts, accessible navigation, and screen-reader compatibility are critical for ensuring that digital platforms are usable by all students, including those with disabilities or limited digital literacy.

A. Challenges include:

- Navigating the tension between stringent security protocols and ease of access for legitimate users.
- Addressing the needs of multilingual and international student populations.
- Ensuring that technological investments are aligned with institutional goals of equity and inclusion (Shang & Huang, 2024).

B. Alignment with NEP 2020 and Student Development

A well-designed digital infrastructure underpins the NEP 2020's vision of technology-enabled, inclusive education. By providing students with secure and user-friendly access to resources, libraries support academic success, foster digital literacy, and bridge gaps in access for remote and marginalized learners.

X. **Academic Libraries and Student Development: Synthesis and Thematic Integration**

Holistic Student Development

The evidence reviewed across the aforementioned domains underscores the centrality of academic libraries in advancing student development under the NEP 2020. Libraries contribute to: Cognitive and Research Skills: Through information literacy programs, RDM services, and gamified learning experiences, libraries nurture critical thinking, problem-solving, and independent inquiry. Digital Literacy: By offering training in data analysis, digital resource navigation, and online security, libraries equip students for success in a technology-driven world. Equity and Inclusion: AI-driven reference services, multilingual interfaces, and universal design features ensure that all students, regardless of background or ability, can access and benefit from library resources.

Community and Wellbeing: Gamified activities, collaborative platforms, and inclusive service models foster a sense of belonging and engagement, supporting students' social and emotional development.

XI. INSTITUTIONAL AND POLICY IMPLICATIONS

To realize the full potential of libraries in student development, institutions must:

Invest in Professional Development: Staff training in emerging technologies, pedagogical innovation, and diversity competence is essential for service excellence. Upgrade Infrastructure: Ongoing investment in digital platforms, authentication systems, and resource collections ensures that libraries remain responsive to evolving student needs. Foster Collaboration: Libraries should actively collaborate with academic departments, IT services, and external partners to co-create student-centered services. Cultivate a Culture of Innovation: Encouraging experimentation with new service models, such as gamification and AI, positions libraries at the forefront of educational transformation.

XII. CONCLUSION

Academic libraries stand at the nexus of tradition and innovation, uniquely positioned to advance the goals of the National Education Policy 2020 and support the holistic development of students. The literature reviewed herein demonstrates that libraries are actively embracing technological advancements, pedagogical innovations, and inclusive practices to meet the diverse needs of contemporary learners. Gamification strategies enhance engagement and information literacy, research data management services support scholarly inquiry and data skills, AI-driven virtual reference ensures equitable access to information, and robust digital infrastructures guarantee secure and seamless resource access.

Nevertheless, challenges remain. Staff capacity, infrastructure, funding, and resistance to change continue to limit the scalability and sustainability of innovative library services. Addressing these barriers requires strategic investment, leadership commitment, and a shared vision for the future of academic libraries.

In the spirit of the NEP 2020, academic libraries must continue to evolve as vibrant, student-centered learning environments empowering all students to reach their full potential, fostering a culture of inquiry and inclusion, and serving as indispensable partners in the educational mission of institutions. The ongoing transformation of academic libraries is not merely a response to policy mandates but a proactive contribution to the realization of a more equitable, innovative, and effective education system.

REFERENCES

[1] A. Subaveerapandiyan, P. Lohia, D. Kalbande, N. Ahmad, and K. C. Sharma, “Exploring the role of gamification in enhancing academic library services: A survey of library leaders in India,” figshare, preprint, 2025, doi: 10.6084/m9.figshare.29664167.v1.

[2] J. Yidavalapati, P. Sinha, and A. Subaveerapandiyan, “Research data management and services in South Asian academic libraries,” Library Philosophy and Practice (e-journal), Art. no. 6457, 2021. Available: https://digitalcommons.unl.edu/libphilprac/6457

[3] H. Wang, J. Clark, Y. Yan, S. Bradley, R. Chen, Y. Zhang, H. Fu, and Z. Tian, “Fairness evaluation of large language models in academic library reference services,” arXiv preprint arXiv:2507.04224v3, 2025. Available: https://arxiv.org/abs/2507.04224

[4] R. Shang and B. Huang, “Design priorities in digital gateways: A comparative study of authentication and usability in academic library alliances,” arXiv preprint arXiv:2504.13404v1, 2024. Available: https://arxiv.org/abs/2504.13404

[5] E. Orduña-Malea and J. J. Regazzi, “U.S. academic libraries: Understanding their web presence and their relationship with economic indicators,” Scientometrics, vol. 94, no. 2, pp. 327–340, 2013, doi: 10.1007/s11192-013-1001-0.