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APPLICATION OF CHATGPT AND OTHER AI TOOLS IN LIBRARY REFERENCE AND RESEARCH SUPPORT SERVICES

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ABSTRACT



Artificial Intelligence (AI) is transforming library and information services by improving the speed, accessibility, and personalization of information discovery and research assistance. Tools such as ChatGPT, Google Gemini, Microsoft Copilot, Perplexity AI, Elicit, and ResearchRabbit offer new opportunities for academic libraries to strengthen reference services, literature searching, research guidance, citation support, and information literacy education. These technologies can assist users in formulating research questions, summarizing scholarly documents, identifying relevant keywords, understanding complex concepts, and exploring research trends. However, their use also presents challenges, including inaccurate information, fabricated references, algorithmic bias, privacy risks, copyright concerns, and the potential for overdependence on automated responses. This paper examines the applications of ChatGPT and other AI tools in library reference and research support services, with particular emphasis on academic and higher education libraries.

KEYWORDS: *Artificial Intelligence, ChatGPT, Academic Libraries, Reference Services, Research Support, Information Literacy, Generative AI, Scholarly Communication.*

1. INTRODUCTION

Libraries have traditionally played an essential role in identifying, collecting, organizing, preserving, and providing access to information. Reference and research support services are among their most important functions because they help students, teachers, researchers, and other users locate reliable information and use it effectively. With the growth of digital resources, online databases, institutional repositories, and electronic journals, the nature of these services has changed significantly.

The recent development of generative artificial intelligence has introduced another major transformation. AI-powered systems can interpret natural-language questions, generate explanations, summarize text, suggest search terms, compare concepts, and assist with various stages of academic research. ChatGPT and similar conversational tools allow users to interact with information systems through ordinary language rather than relying exclusively on traditional search queries.

For academic libraries, these developments offer opportunities to provide faster reference assistance, extend support beyond conventional service hours, and help users navigate increasingly

complex information environments. AI can also support librarians in preparing research guides, developing instructional materials, identifying information needs, and assisting researchers with preliminary literature exploration.

Nevertheless, AI-generated responses are not automatically accurate, complete, unbiased, or supported by verifiable evidence. Consequently, libraries must integrate AI into their services carefully. Professional judgment, authoritative information sources, user privacy, ethical conduct, and information literacy remain essential.

2. UNDERSTANDING CHATGPT AND OTHER AI TOOLS

Artificial intelligence (AI) enables computer systems to perform tasks such as language processing, pattern recognition, prediction, and decision support. Generative AI creates content, including text, summaries, explanations, and code.

ChatGPT combines "Chat" with GPT, which stands for *Generative Pre-trained Transformer*. It supports question answering, drafting, summarization, and search-strategy development. Google Gemini and Microsoft Copilot offer similar conversational assistance. Specialized research tools include Perplexity AI for source-linked searching, Elicit for literature analysis, ResearchRabbit for discovering related publications, and Semantic Scholar for scholarly literature discovery.

These tools serve different research needs. Since AI-generated information may contain inaccuracies, libraries should complement AI assistance with authoritative databases, catalogues, scholarly publications, and professional verification.

3. OBJECTIVES OF THE STUDY

The major objectives are:

1. To examine the applications of ChatGPT and other AI tools in library reference services.
2. To explore the use of AI in literature searching and academic research support.
3. To identify the benefits and limitations of AI-assisted library services.
4. To examine ethical, privacy, copyright, and reliability concerns associated with AI adoption.
5. To suggest strategies for integrating AI tools into academic libraries effectively.

4. APPLICATION OF AI IN LIBRARY REFERENCE SERVICES

4.1 AI-Assisted Question Answering

Traditional reference services help users identify suitable information sources and answer factual, bibliographic, and subject-related questions. AI assistants can provide preliminary explanations, define unfamiliar terminology, clarify research concepts, and guide users toward possible sources of information.

For example, a student researching sustainable horticulture may ask ChatGPT to explain integrated pest management, identify related concepts, or distinguish organic farming from precision agriculture. The response can provide a starting point for further investigation.

AI can also help users refine broad questions into more focused information needs. However, answers involving medical, legal, financial, institutional, or other high-stakes matters require particular care and verification against authoritative sources.

4.2 Virtual Reference Assistance

AI-powered conversational interfaces can support virtual reference services through library websites, online portals, and other approved communication channels. Depending on the system's configuration, they may answer frequently asked questions about library membership, borrowing rules, opening hours, access to electronic resources, and research facilities.

A library chatbot can provide preliminary assistance outside normal working hours and direct users to appropriate services. For instance, it may explain how to access an institutional repository or guide a postgraduate student toward a relevant bibliographic database.

Such systems should be developed using approved library information and regularly updated institutional documentation. Users must have a clear option to contact a human librarian when the chatbot cannot answer accurately or when a question requires professional judgment.

4.3 Personalized Information Guidance

AI tools can help librarians tailor explanations to users' academic backgrounds, research topics, and information needs. A first-year undergraduate may require an introductory explanation of scholarly databases, whereas a doctoral researcher may need advanced guidance on Boolean searching, citation chaining, or systematic literature reviews.

By adjusting the complexity and format of explanations, AI can make information assistance more accessible. Nevertheless, personalization should not depend on collecting unnecessary personal information. Libraries must maintain confidentiality and follow applicable data protection policies.

4.4 Multilingual Reference Services

In multilingual academic environments, AI translation and language-generation tools can help users understand research concepts and formulate queries in different languages. This may be particularly useful for students who are more comfortable learning in Kannada or another Indian language while consulting scholarly material published in English.

Librarians can use these tools to prepare bilingual guides, explain database-search procedures, and simplify technical terminology. Translations of specialized terminology, titles, author names, and bibliographic details must be checked carefully to avoid distortion.

4.5 Improving Reference Interview Skills

A reference interview is a professional interaction through which a librarian clarifies the user's actual information requirement. ChatGPT can help librarians prepare questions that identify the subject, scope, purpose, academic level, and preferred format of information required.

AI may suggest alternative interpretations of an ambiguous query or recommend supplementary questions. However, the librarian remains responsible for understanding the user's context, resolving ambiguity, and selecting appropriate information resources.

5. APPLICATION OF AI IN RESEARCH SUPPORT SERVICES

5.1 Research Topic Identification

Researchers frequently require assistance in identifying a manageable topic, defining a research problem, and developing research questions. ChatGPT can suggest possible themes, explain emerging concepts, identify related terminology, and help narrow a broad area into a focused research question.

For example, a researcher interested in academic libraries might explore AI literacy among librarians, user perceptions of AI-based reference services, or the influence of conversational AI on information-seeking behaviour.

These suggestions should be considered preliminary. Researchers must examine the existing literature to determine whether a topic is genuinely under-researched, practically significant, and methodologically feasible.

5.2 Literature Searching and Review

AI supports literature searching by suggesting keywords, synonyms, related concepts, and structured database-search strategies. For example, research on AI adoption in academic libraries may use:

("Artificial intelligence" OR "generative AI" OR ChatGPT) AND ("academic libraries" OR "library services") AND ("reference services" OR "research support").

Tools such as Elicit, Semantic Scholar, and ResearchRabbit help identify relevant publications and explore citation relationships. However, search strategies must be adapted to individual databases,

and retrieved publications should be verified against their original records and full texts. AI assists literature searching but cannot replace comprehensive database searches and critical evaluation.

5.3 Summarization and Critical Reading

Researchers often face difficulties in examining large numbers of scholarly articles. AI tools can help summarize supplied documents, identify major themes, explain technical terminology, and compare arguments across selected texts.

For librarians, this capability can support research consultations and literature-literacy workshops. For researchers, it may help with preliminary screening and orientation to unfamiliar subject areas.

However, summaries may omit important qualifications, methodological weaknesses, contradictory evidence, or limitations. AI-generated summaries should therefore be checked against the original documents. For systematic reviews, eligibility decisions and evidence extraction must follow a documented, reproducible process, with human verification of every included study and extracted finding.

5.4 Citation Management and Bibliographic Support

AI can assist users in understanding citation styles, identifying missing bibliographic elements, and correcting formatting errors. It may also explain differences between APA, MLA, Chicago, and other citation systems.

Reference-management tools such as Zotero and Mendeley help organize references, store bibliographic metadata, and insert citations into academic documents. Their core reference-management functions should be distinguished from optional AI features, which vary by product and version.

A significant risk arises when conversational AI invents authors, article titles, journals, page numbers, or digital object identifiers. Librarians should teach users to verify every reference through publisher websites, DOI records, library catalogues, or reliable bibliographic databases.

5.5 Research Methodology and Data Interpretation

ChatGPT can explain research designs, sampling methods, questionnaire construction, coding approaches, and basic statistical concepts. It may assist researchers in developing draft questionnaire items or understanding how to interpret statistical outputs.

However, research instruments require expert review, appropriate validation, and ethical approval where applicable. Statistical results must be calculated using suitable analytical methods and verified against the original data. AI-generated interpretations should not substitute for statistical expertise or methodological rigor.

5.6 Academic Writing and Scholarly Communication

AI tools can help improve grammar, readability, sentence structure, organization, and clarity in research manuscripts. They can also suggest headings, identify repetitive passages, and help researchers prepare abstracts or plain-language summaries.

Their use must not compromise originality, intellectual responsibility, or research integrity. Researchers should follow the policies of their institutions and target journals concerning AI assistance, disclosure, authorship, confidentiality, and acceptable manuscript preparation. AI systems should not be credited as human authors, and authors remain responsible for the accuracy and originality of submitted work.

6. BENEFITS OF AI INTEGRATION IN ACADEMIC LIBRARIES

AI-supported services offer several potential advantages.

First, faster preliminary assistance: Routine questions and basic explanations can be handled more quickly, allowing librarians to devote additional attention to complex enquiries.

Second, improved accessibility: Conversational interfaces, simplified explanations, and multilingual support may help users with different levels of digital and academic proficiency.

Third, enhanced research discovery: AI-assisted keyword generation, related-paper recommendations, and exploratory searching can help researchers identify useful starting points.

Fourth, improved instructional support: Librarians can develop examples, tutorials, search exercises, frequently asked questions, and information-literacy materials more efficiently.

Fifth, support for professional development: AI can assist librarians in learning emerging technologies, preparing presentations, developing research proposals, and understanding unfamiliar subject areas.

Sixth, extended service availability: Appropriately configured virtual assistants can provide basic guidance beyond regular library working hours.

These benefits are potential outcomes rather than guaranteed improvements. Their actual value depends on the quality of implementation, access to reliable information, staff competence, and systematic evaluation.

7. CHALLENGES AND LIMITATIONS

7.1 Accuracy and Hallucinations

Generative AI can produce incorrect statements, misleading explanations, and fabricated references. Fluent language may make such errors difficult for inexperienced users to recognize. Verification against authoritative sources is therefore essential.

7.2 Privacy and Confidentiality

Users may disclose unpublished research, personal information, sensitive datasets, or confidential institutional documents when interacting with AI systems. Libraries must assess data-retention practices, account settings, contractual conditions, and institutional security requirements before approving a tool.

7.3 Copyright and Intellectual Property

Uploading copyrighted books, subscription-based articles, unpublished manuscripts, or licensed database content to external AI systems may create legal or contractual concerns. Libraries should provide clear guidance on permitted uses, licensing restrictions, and the handling of protected content.

7.4 Bias and Unequal Access

AI outputs may reflect biases in training data, uneven language representation, or limitations in the materials available to the system. Differences in internet connectivity, subscription access, devices, and digital literacy may also disadvantage some users.

7.5 Academic Integrity and Overdependence

Excessive reliance on AI may weaken independent searching, critical thinking, and scholarly writing skills. Students may also submit AI-generated material without appropriate disclosure or verification. Libraries should promote responsible use rather than prohibit critical engagement with AI without considering educational needs.

7.6 Staff Training and Resource Constraints

Effective adoption requires training, technical support, policy development, and ongoing evaluation. Smaller institutions may face financial and staffing limitations. Selecting tools solely because

they are popular, without assessing their suitability and total cost, may lead to ineffective implementation.

8. STRATEGIES FOR EFFECTIVE IMPLEMENTATION

Academic libraries should adopt a phased, user-centred approach.

1. **Develop an AI use policy:** Define acceptable uses, verification requirements, privacy safeguards, disclosure expectations, and restrictions on sensitive information.
2. **Train library professionals:** Organize workshops on prompt formulation, source verification, AI limitations, copyright, research ethics, and information security.
3. **Integrate AI with authoritative resources:** Direct users to library catalogues, subscribed databases, institutional repositories, official documents, and peer-reviewed literature.
4. **Establish human oversight:** Ensure that complex reference questions, sensitive enquiries, and high-stakes research decisions receive appropriate professional attention.
5. **Strengthen AI literacy:** Teach students and researchers to evaluate generated responses, check citations, recognize uncertainty, and compare information across independent sources.
6. **Pilot services before expansion:** Test AI chatbots or research-support workflows with a limited group of users before institution-wide implementation.
7. **Protect user data:** Use institutionally approved services, minimize data collection, and avoid entering confidential information into unapproved platforms.
8. **Evaluate performance regularly:** Measure response accuracy, user satisfaction, referral rates, accessibility, staff workload, and the frequency of incorrect or unsupported answers.
9. **Ensure equitable access:** Provide alternative human-assisted services and suitable guidance for users with limited digital skills or language barriers.
10. **Review policies continuously:** Reassess tools and procedures as capabilities, subscription terms, privacy conditions, and institutional requirements change.

9. PROPOSED MODEL FOR AI-ENABLED LIBRARY REFERENCE AND RESEARCH SUPPORT

A practical service model should combine AI assistance with professional librarian oversight through five connected stages:

Stage 1: User enquiry. The user presents a reference question, research topic, or information need.

Stage 2: AI-assisted clarification. An approved AI tool helps refine the question, identify keywords, or provide an initial explanation.

Stage 3: Evidence retrieval. The librarian or user searches authoritative catalogues, scholarly databases, institutional repositories, and publisher platforms.

Stage 4: Verification and guidance. Relevant information, citations, and AI-generated summaries are checked for accuracy, completeness, credibility, and suitability.

Stage 5: User education and evaluation. The librarian explains the search process, recommends further resources, and collects feedback to improve the service.

This model treats AI as an assisting technology rather than an independent authority. It also preserves the educational role of the librarian by helping users develop transferable information-seeking and evaluation skills.

10. CONCLUSION

ChatGPT and other AI tools offer academic libraries opportunities to improve reference and research support through literature exploration, summarization, and instructional assistance. However, concerns regarding accuracy, fabricated references, privacy, copyright, and bias require responsible implementation and user education. The future of academic librarianship lies in combining AI capabilities with professional expertise, authoritative resources, and information literacy to ensure reliable, ethical, and equitable access to knowledge.

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