

PERCEIVED IMPACT OF CHATGPT IN LIBRARY OPERATIONS AND SERVICES: A NEW FRONTIER IN ACADEMIC LIBRARIES

Uzoamaka Ogwo

National Centre for Energy Research and Development,
University of Nigeria, Nsukka
(uzoamaka.ogwo@unn.edu.ng)

Rebecca C. Ojobor

Department of Library and Information Science,
University of Nigeria, Nsukka
(Rebecca.ojobor@unn.edu.ng)

Francis Ibegbulem

National Centre for Energy Research and Development,
University of Nigeria, Nsukka
(ibegbulemisfrancis@gmail.com)

&

Ebere M. EBISI

Federal College of Education, Eha-Amufu, Enugu State
(ebyyoragui@yahoo.com)

Abstract

In recent years, academic libraries have experienced a digital transformation driven by advancements in cutting-edge technologies and evolving user expectations. A significant development in this transformation is the integration of Artificial Intelligence (AI) tools like ChatGPT, which has made a profound impact on various aspects of library services and operations. This innovative tool offers a dynamic and efficient platform for improved information retrieval, knowledge sharing, and user support within libraries. The implementation of ChatGPT is playing a crucial role in reshaping the academic library landscape. Using a literature-based approach, this paper examines the potential impact of ChatGPT on libraries, discussing its applications, benefits, challenges, and strategies for effective implementation. The paper concludes that ChatGPT have the potential to advance library functions, its future possibilities are enticing; however, it is essential to address challenges related to accuracy, privacy, and ethical use to fully leverage the potential of ChatGPT in academic library practices.

Keywords: Academic libraries, artificial intelligence, ChatGPT, applications, and library services

Introduction

Academic libraries are typically established within higher education institutions such as universities, colleges, and polytechnics. According to Ogwo, Ibegbulam, and Ezema (2022), an academic library is an integral part of its parent institution, primarily set up to support the institution's mission and

vision in teaching, learning, and research. These libraries are specifically designed to meet the academic and research needs of students, faculty, and researchers within the institution. By offering access to a wide range of information resources, academic libraries play a vital role in higher education and contribute significantly to scholarly research. The primary goal is to ensure efficient and extensive access to information materials that support teaching, learning, and research for both faculty and students.

Academic libraries have long been at the forefront of technology adaptation. From digitizing collections to providing electronic resources and online access, libraries have consistently evolved to meet the changing needs of their users. In today's digital age, academic libraries continue to embrace advanced technologies to provide unrestricted access to electronic information resources, addressing the diverse and evolving needs of ICT-savvy users. To fulfill this role, academic librarians offer research support, guidance on information literacy, and access to a wide range of digital resources, including e-books, e-journals, and databases, using innovative technologies. These technologies facilitate remote research, teaching, and e-learning, allowing patrons to access information without having to visit the library in person. The integration of cutting-edge technologies into library operations has transformed the library landscape, raising awareness about the importance of lifelong learning and driving the growth of information demand in the knowledge society. This has led to greater use of library facilities and a higher expectation of service from librarians. To further enhance the availability and accessibility of information resources in academic libraries, the adoption of advanced technologies like Artificial Intelligence (AI) is necessary to streamline the process of accessing and retrieving information to meet the needs of library users.

Artificial Intelligence (AI) is an emerging technology that is rapidly transforming the global technological landscape. The rapid advancements in AI have significantly impacted various industries, and libraries are no exception (Subaveerapandiyar, 2023). AI, a branch of computer science, aims to create intelligent machines that can think and act like humans. By processing large datasets, AI systems can be trained to replicate the functioning of the human brain and perform routine tasks (Bengio, Lecun & Hinton, 2021). AI represents machine intelligence, as opposed to the natural intelligence displayed by humans and animals (Yizad, 2019). Its applications continue to expand into various domains, such as integrating with another cutting-edge technology, the Internet

of Things (IoT), to form a new hybrid technology, AIoT (Artificial Intelligence of Things) (Deng & Lin, 2023).

According to Copeland (2023), AI refers to the ability of a digital computer or robot to perform tasks typically associated with intelligent beings. Currently, AI is attracting significant attention due to its potential to transform nearly all aspects of human life, including the library and information science sector. The potential impact of AI is widespread (Makridakis, 2017). It is considered a transformative technology with the ability to create new opportunities for growth and radically change how work is performed across industries, including libraries (Duggal, 2023). AI focuses on understanding and executing intelligent tasks like reasoning, adapting to new situations and problems, and learning new skills (Patil, 2018). The incorporation of AI technologies into academic libraries has ushered in an era of innovation and increased efficiency, fundamentally transforming library operations and services. Among the most promising AI technologies is ChatGPT (Deng & Lin, 2023).

ChatGPT has become a buzzword and one of the most widely recognized AI chatbots since its launch in 2022, gaining rapid popularity and attracting over one million unique users within the first week (Mollman, 2022). The technology was developed by OpenAI, an American AI research organization, in November 2022 with support from founding donors Elon Musk and Microsoft Corporation (Brockman et al., 2016). ChatGPT is a recently introduced AI chatbot with exceptional language synthesis capabilities (OpenAI, 2023) and is regarded as one of the most advanced chatbots, capable of addressing complex questions and performing sophisticated tasks (FutureLearn, 2023).

Technically, ChatGPT is a large language model built on OpenAI's Generative Pre-trained Transformer (GPT) architecture, specifically GPT-3 and GPT-4. GPT-3, or the third-generation Generative Pre-trained Transformer, is a neural network machine learning model trained on extensive internet data to generate various types of text (Lutkevich, 2023). This model is pre-trained on a vast dataset comprising books, articles, and websites (Kirmani, 2022; Rubby, 2023) and is capable of engaging across a wide range of topics, delivering responses with high linguistic quality and content accuracy (Stahl & Eke, 2023).

The rapid pace of technological advancements and the widespread adoption of intelligent digital technologies have compelled libraries to adopt and integrate innovative technologies into their operations and services to remain relevant and effectively address the dynamic information needs of ICT-savvy users. The evolving digital information landscape highlights the transformative potential of ChatGPT and other AI tools in academic libraries. These tools play critical roles in areas such as information retrieval, user engagement, digital preservation, and accessibility enhancement initiatives. Leveraging the capabilities of ChatGPT can enable libraries to enhance their services, elevate user experiences, and address the evolving information needs of tech-savvy, data-driven library users. However, its adoption in many academic libraries across the country remains limited due to a lack of awareness among librarians (Patil, 2018). Therefore, this paper aims to explore the potential impact of ChatGPT in libraries, focusing on its benefits, challenges, implications for the future of academic libraries and recommendations for effective implementation. The study will answer the following questions

- What are the potentials of ChatGPT in academic Library practices?
- What are the factors limiting effective Application of ChatGPT in academic Libraries?
- What are the implications of ChatGPT for the future of academic libraries?

Literature Review

ChatGPT is built on machine learning, which is currently one of the most prominent techniques in Artificial Intelligence (AI) technology (Sullivan, Kelly, & McLaughlan, 2023). The authors explain that GPT, which stands for "Generative Pre-trained Transformer," refers to a series of natural language models created by OpenAI. This innovative AI technology first emerged in late November 2022. ChatGPT functions as a large language model (LLM) that utilizes deep learning techniques to generate text. It can provide answers to queries, compose essays, draft emails, create music lyrics, write recipes, develop computer code, design webpages, produce games, and even assist with medical diagnoses (Srivastava, 2023).

Several authors have conducted research on Artificial Intelligence (AI) and emerging technologies. For instance, Talley (2016) explored the potential use of intelligent agents and AI in academic law libraries. The study highlighted the benefits of integrating these technologies and differentiated

between them, offering examples of applications such as conversational agents for reference services, circulation tasks, and information literacy modules. Similarly, Abayomi et al. (2021) investigated the awareness and perceptions of academic librarians in Nigeria regarding the use of AI for managing university libraries. The findings revealed that while academic librarians were aware of AI's application in library operations, they expressed concerns about potential job displacement due to its adoption. Similarly, Arlitsch and Newell (2017), in their study explored the societal impact of AI and the opportunities it offers libraries. The authors noted that advancements in computer processing power, big data, and machine learning have driven rapid AI development. The study highlighted how AI has transformed various industries, including libraries, and examined the implications of automation on employment, social systems, and political frameworks, along with its potential influence on libraries. In a related investigation, Miao (2019) analyzed human rights ethics in AI research using a library literature analysis method. This study addressed ethical dilemmas surrounding AI technology and emphasized the need to safeguard human rights in AI development and systems. The study underscores the necessity of regulating AI in the context of human rights ethics, addressing issues such as the ethical and moral status of humans in relation to intelligent machines and the specific rights that might apply to intelligent machines. Additionally, the study emphasizes the importance of balancing sensitivity with the need for human oversight and control over AI technology. According to McLean (2023), ChatGPT is a conversational AI tool designed to facilitate interactions in a manner akin to having a face-to-face conversation, making it particularly suitable for service-oriented organizations like libraries. It enables users to input prompts and receive AI-generated responses, providing quicker feedback and leveraging internet capabilities (Hetler, 2023). The tool's dialogue-based structure allows it to address follow-up inquiries, acknowledge errors, challenge flawed assumptions, and decline unsuitable requests (OpenAI, 2022; Chen, 2023).

Potentials of ChatGPT in Academic Library Practices

ChatGPT is a valuable tool for improving library operations and services. It can be deployed to various sections of the library to help librarians provide prompt and efficient services to patrons. Although its application in libraries is relatively new, yet its promising potentials in library operations and services cannot be overestimated; they include but are not limited to:

Research assistance: ChatGPT can enhance the research process by generating ideas and simplifying various tasks. It can suggest topics within a specific area of interest, provide background information, formulate problem statements, research questions, and hypotheses, and summarize existing works. Additionally, it can streamline research activities such as literature searches, citation management, and database exploration, making the process more efficient. The tool functions as a discovery and search engine, helping researchers find relevant articles and refine search terms (Lappalainen & Narayanan, 2023). Moreover, ChatGPT supports researchers with tasks like data analysis, copywriting, citation generation, and language translation (Cox & Tzoc, 2023). ChatGPT has the capability to create a reference list or bibliography of relevant resources on different topics. This is currently playing an unimaginable role in research assistance, conducting virtual experiments, analyzing data, copywriting and editing text, and generating citations in various citation styles (e.g., APA, MLA, Chicago) for research papers and projects.

Virtual reference services: Virtual reference services in libraries refer to the provision of assistance, information, and support to library users through digital platforms, enabling users to receive personal assistance without being physically present at the library. Since ChatGPT is easy to navigate, it enables interactive conversations, enhancing the virtual reference service to be more engaging and user-friendly. It has the potential to transform how users interact with library systems, access information, and seek support (Liu et al., 2021). According to Mail and Deshmukh (2023) ChatGPT can be used to provide virtual reference services to library users where users can ask questions through the chatbot and receive answers in real-time, 24/7, without waiting for a librarian to assist.

Facilitates teaching and learning process: ChatGPT can be used to introduce new subjects, and stimulate curiosity by providing introductory information on novel areas; provide quick answers to student's questions, helping them to understand concepts and solve problems. It can act as a virtual tutor, offering explanations, examples, and step-by-step guide in various subject areas. Students can utilize the tool for assignments, research, and personalized learning. However, Ramabina (2024) emphasizes the importance of librarians supporting faculty in teaching students critical thinking skills to assess the accuracy and quality of ChatGPT's responses. It is important to recognize that

while ChatGPT can be a useful teaching aid, it should supplement rather than replace human educators, who offer guidance, mentorship, and deeper engagement in student learning.

Textbooks writing aids: ChatGPT and other AI tools have the capacity to change the method of knowledge creation. ChatGPT can produce a rough draft of text that can be used as inspiration for writing of textbooks. Textbooks that would take years to write manually can be generated by ChatGPT in just hours through a series of queries (Cox & Tzoc, 2023). The tool can assist in suggesting book titles, chapter outlines, subheadings, content creation, explanations, examples, data, and summaries on various topics. However, the generated text must be reviewed and revised to ensure accuracy and maintain quality. Additionally, writing a textbook requires extensive research, expertise, and subject matter knowledge. Therefore, authors should use ChatGPT as a supportive tool rather than relying entirely on AI for the process.

Catalog search and discovery: ChatGPT can assist users in navigating the library's catalogue, suggesting relevant search terms, and guiding them through the process of locating resources in the library. ChatGPT utilizes natural language processing to interpret user queries based on relevant keywords and deliver appropriate search results. Its ability to provide virtual guided tours helps users navigate library catalogs, databases, and digital archives. By offering step-by-step assistance, ChatGPT improves the accessibility and usability of library resources, enabling users to efficiently find the information they need (Ramabina, 2024).

Personalized reading recommendations: ChatGPT can be used to provide personalized reading recommendations to users by leveraging on its natural language processing and machine learning capabilities to create user profiles by analyzing reading history, preferences and interest based on their reading history and preferences. Jenneboer et al. (2022) assert that AI-powered chatbots can improve user engagement, promote library resources, offer a more personalized and enjoyable reading experience, and enhance service efficiency. Similarly, Watson (2023) suggests that ChatGPT can analyze users' reading preferences and recommend books accordingly. By examining previously borrowed books and users' responses about their reading habits, ChatGPT can suggest titles that align with their interests.

Reader's advisory service to patrons: With the aid of ChatGPT technology, librarians can provide personalized reading recommendations to patrons by searching for the patron's reading preferences

and interests; ChatGPT can suggest books, authors, or other relevant areas that could be of interest to the patron. Aithal and Aithal (2023) are also of the view that access to information and research assistance are other areas of library services ChatGPT can significantly assist librarians to offer to users with ease.

Provide access to physically challenged users: ChatGPT can enhance accessibility to library services for individuals with physical challenges, promoting inclusivity. Its implementation not only allows librarians to focus on more complex inquiries but also offers 24/7 support, including audio responses for users with special needs (Adetayo, 2023). Additionally, ChatGPT can be integrated with voice recognition software, enabling users with mobility impairments to interact through voice commands. Text-to-speech (TTS) technology can also be incorporated to make resources accessible to those with visual impairments.

Training and professional development: ChatGPT promotes training and professional development of librarians by recommending online courses, webinars and resources that librarians can access to enhance their skills and knowledge. It can provide practical exercises and platforms to help librarians practice, learn and improve their skills in library operations and services. ChatGPT do not only provide access to information and resources related to library science, but also ensure that librarians stay updated on best practices and latest trends in their field (Prathibha, Shilpa, & Rani, 2021)

Challenges Associated with the Application of ChatGPT in Libraries

There are a lot of perceived challenges to effective implementation of academic libraries in Nigeria. Some of these challenges include the following:

Credibility and accuracy issues: Although ChatGPT is trained on a large-scale corpus, the accuracy of its responses largely depends on the quality of the dataset. It may lack sufficient knowledge in certain specialized fields, making it challenging to handle complex and technical language, sometimes resulting in significant deviations or errors in its answers (Xiao, 2023).

Maintenance and updates: ChatGPT system requires ongoing maintenance, updates and improvements which are generally a serious challenge in our environment. Lack of routine maintenance, deterioration of hardware, system breakdown and data loss can disrupt optimal implementation and functioning of ChatGPT in libraries (Chowdhury, 2024)

Ethical and privacy issues: ChatGPT pose a risk of data breaches or unauthorized access to data used in the public domain without the author's consent. Patel et al (2023) highlight that, the potential for inaccurate, biased, or even harmful outputs from ChatGPT raises ethical concerns regarding privacy, bias, and transparency when used in academic libraries. Additionally, AI-assisted cheating poses a threat to academic integrity, as many researchers and students turn to AI essay writing platforms, which leads to issues of plagiarism (Alser & Waisberg, 2023; Lund et al., 2023).

Dearth of quality research output: Islam and Islam (2023) point out that a key challenge of AI tools is the potential for users to become overly dependent on them, which could weaken productivity and critical thinking skills (Chukwuere, 2023). Aydın and Karaarslan (2022) also note that ChatGPT's knowledge is limited to information available up until 2021, and unlike search engines, it cannot access the web to gather information on current events. This limitation affects the quality of research output.

Poor internet connectivity: ChatGPT and other cloud-based AI services rely on internet connectivity and may not be accessible in areas with poor internet connectivity. Poor bandwidth and unreliable internet connectivity can lead to serious downtime, data inaccessibility, frequent service interruption, slow response time, data loss, user frustration etc. According to Chowdhury (2024), poor internet connectivity can lead to technical difficulties for libraries, including system downtime, compatibility problems, and limitations in scalability.

Training and customization: tailoring ChatGPT to meet the unique needs of a library requires time and expertise in fine-tuning the model. Training and customizing AI models require expertise in machine learning and natural language processing, which may not be readily available within the library staff. Ensuring that the model remains coherent, accurate and user-friendly is a very big task which requires adequate training. Due to the high costs of training, ChatGPT cannot incorporate new information resources. As of now, it relies on data from 2021 and is unable to provide accurate responses about events that occurred after 2022 (Zhihu, 2023).

Other challenges to implementing ChatGPT in libraries are insufficient funding for initial integration efforts. Limited financial resources may prevent libraries from acquiring the necessary hardware, software, and infrastructure to support ChatGPT and other AI technologies. This lack of funding can restrict the ability of ChatGPT to integrate smoothly with existing library systems. Furthermore,

inadequate planning for its integration can lead to unforeseen costs, budget overruns, poor data management, security breaches, privacy concerns, and insufficient staff training, all contributing to ineffective implementation. Additionally, unreliable power supply can disrupt library services, frustrate users, and cause hardware damage, increasing the risk of data breaches.

Implications of ChatGPT for the Future of Academic Libraries

The rapid growth of artificial intelligence (AI) is set to redefine the core functions of academic libraries. Currently, AI applications, particularly ChatGPT, enhance research support and other library services. It is believed that the long-term impact of ChatGPT on library practices will extend beyond its current capabilities. Chen (2023) suggests that the evolving role of AI will transform academic libraries into dynamic knowledge ecosystems by incorporating intelligent automation, predictive analytics, and personalized learning experiences. This section examines how AI may shape the future of academic libraries, focusing on the structural, functional, and strategic changes that will redefine their mission within and beyond their parent institutions

AI-Driven structural transformation: the future development of academic libraries will involve significant structural changes driven by AI-powered automation and digital integration. With ChatGPT's incorporation into academic libraries, traditional library spaces, which once focused on physical collections, will increasingly feature AI-enhanced digital repositories that offer seamless access to extensive knowledge networks. According to Murtala, Meghna, and Mayank (2023), the "walls" of libraries now extend beyond physical spaces, with online resources, social media, crowdsourcing, and mobile services reshaping how collections and services are accessed and shared on the go. The rise of AI-driven digital libraries will enable real-time indexing, advanced metadata tagging, and intuitive search functions, transforming the way information is retrieved. Additionally, AI will impact the physical design of academic libraries. As digital collections grow, library spaces will evolve from static book storage to dynamic, AI-assisted learning hubs. These AI-enhanced environments could include intelligent study areas with adaptive lighting, noise control, and personalized resource suggestions based on user preferences and study behaviors.

Functional shifts in library services: the functional development of academic libraries will be shaped by AI's capacity to enhance knowledge discovery and user engagement (Lappalainen & Narayanan, 2023). Traditional library services, such as cataloging, reference assistance, and research support, will be strengthened by AI-driven automation, improving efficiency and accessibility. AI-powered research assistants will offer students and scholars in-depth analyses of academic literature, providing synthesized insights, identifying research gaps, and suggesting potential methodologies. Intelligent chatbots and virtual librarians will act as 24/7 research advisors, delivering contextualized responses and guiding users through complex academic queries (Mail & Deshmukh, 2023).

Strategic shifts and ethical considerations: The integration of AI in academic libraries will require strategic changes in library management and governance. Librarians' traditional roles will shift to becoming AI facilitators, digital literacy educators, and ethical advisors. They will need to gain expertise in managing AI-generated content, ensuring the accuracy of information, and addressing algorithmic biases. Additionally, AI's use in academic libraries brings up important ethical issues, such as data privacy, intellectual property rights, and the reliability of AI-generated recommendations (Patel et al., 2023). Institutions will need to create policies that maintain academic integrity while responsibly using AI. Ensuring transparency in AI decision-making and safeguarding user data will be essential to maintaining trust in AI-driven library services.

The Future of AI-enhanced academic libraries: the integration of AI with emerging technologies like augmented reality (AR) and virtual reality (VR) in academic libraries will significantly enhance the learning experience. This aligns with Murtala, Meghna, and Mayank (2023), who note that ChatGPT AI is a cutting-edge technology with vast potential for application in libraries. The authors also suggest that envisioning future possibilities requires a focus on both the opportunities and challenges associated with ChatGPT. As AI continues to evolve, academic libraries will play a key role in shaping its ethical and practical uses in academia. By embracing AI-driven innovations while upholding intellectual rigor and inclusivity, academic libraries will provide immersive research environments, allowing users to explore historical archives and virtual services, and continue to be vital pillars of knowledge creation and dissemination.

Conclusion

The examination of ChatGPT's perceived impact on library operations, particularly in academic libraries, has provided valuable insights into how the technology can enhance library functions. Through a literature-based approach, this study concludes that incorporating ChatGPT into academic libraries unlocks new opportunities for improving operations and services. Its ability to enhance accessibility, facilitate research, and provide round-the-clock support in a user-friendly manner makes it highly attractive. While the study acknowledges challenges such as ethical and privacy concerns associated with ChatGPT's application in libraries, the future prospects of the technology in academic settings remain promising and compelling.

Recommendations

Based on the study's findings from the existing literature, the following recommendations are proposed:

- Regular maintenance and proactive updates should be prioritized in academic libraries to guarantee the reliable and efficient implementation of innovative technologies like ChatGPT.
- Clear policies and guidelines for the ethical use of ChatGPT must be established. Libraries should strike a balance between offering valuable services and protecting user privacy while upholding ethical standards.
- Institutions and libraries should invest in high-bandwidth internet to enhance connectivity and network performance.
- Collaborating with AI experts or hiring consultants for training, customization, and implementation is recommended.
- Academic libraries can explore additional funding sources, including grants, donations, or partnerships with academic departments. Open-source AI solutions should also be considered to reduce software costs.
- Providing alternative power sources such as solar energy is crucial. Backup solutions like uninterrupted power supply (UPS), voltage stabilizers, surge protectors, and generators can ensure continuous service availability.

References

- Abayomi, O. K., Adenekan, F. N., Abayomi, A., Olateju, Ajayi, T. A., & Aderonke, A. O. (2020). Awareness and Perception of the Artificial Intelligence in the Management of University Libraries in Nigeria. *Journal of Interlibrary Loan, Document Delivery & Electronic Reserve*, 29(1–2), 13–28. <https://doi.org/10.1080/1072303X.2021.1918602>
- Adetayo, A. J. (2023). Artificial intelligence chatbots in academic libraries: The rise of ChatGPT. *Library Hi Tech News*, 40(3), 18–21. <https://doi.org/10.1108/LHTN-01-2023-0007>.
- Aithal, S. & Aithal, P.S. (2023). Effects of AI-Based ChatGPT on Higher Education Libraries. Internet material available at: <https://ssrn.com/abstract=4453581>
- Alser, M., & Waisberg, E. (2023). Concerns with the usage of ChatGPT in Academia and Medicine: A viewpoint. *Am. J. Med. Open*, 100036.
- Aydın, Ö., & Karaarslan, E. (2022). OpenAI ChatGPT generated literature review: Digital twin in healthcare. Available at SSRN 4308687.
- Bengio, Y.; Lecun, Y.; Hinton, G. (2021). Deep Learning for AI. *Commun. ACM* 2021, 64, 58–65 available at <https://dl.acm.org/doi/pdf/10.1145/3448250>
- Brockman, G., Cheung, V., Pettersson, L., Schneider, J., Schulman, J., Tang, J., & Zaremba, W. (2016). Openai gym. arXiv. <https://doi.org/10.48550/arXiv.1606.01540>
- Chen, X. (2023). ChatGPT and its possible impact on library reference services. *Internet Reference Services Quarterly*, 27(2), 121–129
- Chowdhury, H. (2024). Use of ChatGPT in the Library Services: Prospects and Challenges. *International Journal of Multidisciplinary Studies*, IX (2): 9-20
- Chukwuere, J. E. (2023). ChatGPT: The game changer for higher education institutions. *Jozac Academic Voice*, 3, 22-27.
- Copeland, B. J. (2023). Artificial Intelligence. In: *Encyclopedia Britannica* <https://www.britannica.com/technology/artificial-intelligence>
- Cox, C., & Tzoc, E. (2023). ChatGPT: Implications for academic libraries. *College & Research Libraries News*, 84(3), 99. <https://library.fiu.edu/ChatGPT-infolit/libraries>
- Deng, J. & Lin, Y. (2023). The benefits and challenges of ChatGPT: An overview. *Frontier in Computing and Intelligent Systems*, 2 (2): 81-83. https://www.researchgate.net/publication/367106604_The_Benefits_and_Challenges_of_ChatGPT_An_Overview [accessed Oct 07 2023]. Doi:10.54097/fcis.v2i2.4465 doi:<https://doi.org/10.5860/crln.84.3.99>
- Duggal, N. (2023). What is artificial intelligence: Types, history, and future. <https://www.simplilearn.com/tutorials/artificial-intelligence-tutorial/what-is-artificial-intelligence#>
- Hetler, A. (2023). What is generative AI? Everything you need to know. <https://www.techtarget.com> <https://www.techtarget.com/searchenterpriseai/definition/GPT-3>

- Islam, I., & Islam, M. N. (2023). Opportunities and challenges of chatbot in academia: A conceptual analysis. Authorea Preprints.
- Jenneboer, L., Herrando, C., and Constantinides, E. (2022). The impact of chatbots on customer loyalty: a systematic literature review. *Journal of Theoretical and Applied Electronic Commerce Research*, 17(1): 212 – 229.
- Kirmani, A. R. (2022). Artificial intelligence-enabled science poetry. *ACS Energy Letters*, 8, 574-576
- Lappalainen, Y., & Narayanan, N. (2023). Aisha: A Custom AI Library Chatbot Using the ChatGPT API. *Journal of Web Librarianship*, pp. 1–22.
- Liu, X., Zheng, Y., Du, Z., Ding, M., Qian, Y., Yang, Z., & Tang, J. (2021). “GPT understands, too”, arXiv, doi: 10.48550/arXiv.2103.10385.
- Lund, B. D., Wang, T., Mannuru, N. R., Nie, B., Shimray, S., & Wang, Z. (2023). ChatGPT and a new academic reality: Artificial Intelligence-written research papers and the ethics of the large language models in scholarly publishing. *Journal of the Association for Information Science and Technology*, 74(5), 570– 581
- Lutkevich, B. (2023). [What is generative AI? Everything you need to know.](#)
- Mail, T.S. & Deshmukh, R. K. (2023). Use of chat GPT in library services. *International Journal of Creative Research Thoughts (IJCRT)*. 11 (4):264-266. www.ijcrt.org
- Makridakis, S., 2017. The forthcoming Artificial Intelligence (AI) revolution: its impact on society and firms. *Futures* 90, 46–60. <https://doi.org/10.1016/j.futures.2017.03.006>. Mantelero, A., Esposito, https://www.researchgate.net/publication/371211480_Exploring_ethics_and_human_rights_in_artificial_intelligence_-_A_Delphi_study
- McLean, D. (2023). What is ChatGPT and ten creative ways to use. <https://www.elegantthemes.com/blog/business/what-is-ChatGPT#:~:text=Talk%20to%20AI%20like%20it's,even%20the%20most%20minute%20details.>
- Murtala, A., Meghna, V., & Mayank, T. (2023). Adoption of ChatGPT and the future of Libraries. *International Journal of Research in Library Science (IJRLS)* 9(2): 200-206
- Ogwo, U., Ibegbulam, F. & Ezema, I. J. (2022). Prospects and challenges of cloud computing for effective information service delivery in academic libraries in Nigeria. In: *Trends in academic library management: A book in honour of Prof. Benson Eziukwu Edoaka*. Enugu: DeRafelo Publisher
- OpenAI. (2022). OpenAI about page. Retrieved from <https://openai.com/about>
- Patel, S. B., Lam, K., & Liebreinz, M. (2023). ChatGPT: friend or foe. *Lancet Digit. Health*, 5, e102

- Patil, H. P. (2018). Use of Intelligent Agent Technology / Artificial Intelligence in Libraries. *International Journal of Science and Research (IJSR)*.
<https://www.ijsr.net/archive/v9i1/ART20204394.pdf>
- Prathibha, S. N., & Shilpa Rani, N. R. (2021). ChatGPT: A Boon to Library Services. *LIS Links Newsletter*, 7(1), 8-13. <http://newsletter.lislinks.com>
- Ramabina, M. (2024). Exploring the utilisation of ChatGPT in academic libraries: a self-reflection perspective. *Regional Journal of Information and Knowledge Management*, 9(1), 47-60.
- Rubby, M. (2023). How ChatGPT Works: The model behind the bot.
<https://towardsdatascience.com/how-ChatGPT-works-the-models-behind-the-bot-1ce5fca96286>
- Srivastava, M. (2023) 'A day in the life of ChatGPT as an academic reviewer: Investigating the potential of large language model for scientific literature review'. OSF Preprints.
<https://doi.org/10.31219/osf.io/wydcx>.
- Stahl, B. C. & Eke, D. (2023). The ethics of ChatGPT- Exploring the ethical issues of emerging technology. *International Journal of Information Management*.
<https://doi.org/10.1016/j.ijinfomgt.2023.102700>
- Subaveerapandian, A. (2023). Application of Artificial Intelligence (AI) In Libraries and Its Impact on Library Operations Review. *Library Philosophy and Practice (e-journal)*. 7828.
<https://digitalcommons.unl.edu/libphilprac/7828>
- Sullivan, M., Kelly, A. and McLaughlan, P. (2023) . ChatGPT in higher education: Considerations for academic integrity and student learning. *Journal of Applied Learning and Teaching*, 6(1).
<https://doi.org/10.37074/jalt.2023.6.1.17>.
- Watson, M (2023). How to use ChatGPT for book recommendations, custom booklists, and more. Internet material available at <http://bookdevotions.com>ChatGPT-book-recommendations/>
- Xiao, H. (2023). The Impact and Challenge of ChatGPT on Library Work. in B. B. M. Hussain et al. (Eds.): ICHSSR , ASSEHR 765, 997–1003,. https://doi.org/10.2991/978-2-38476-092-3_122
- Zhihu, Z. (2023). A Brief Analysis of ChatGPT Fundamentals [EB/OL]. Internet material available at <https://zhuanlan.zhihu.com/p/591423431>.

