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Sharon Q. Yang

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To cite this article:

Yang, Sharon Q. (2024). ChatGPT: Unleashing the Power of Conversational AI for Library Reference Services. *International Journal of Librarianship*, 9(1), 109-115.
<https://doi.org/10.23974/ijol.2024.vol9.1.375>

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ChatGPT: Unleashing the Power of Conversational AI for Library Reference Services

Sharon Q. Yang, Rider University, New Jersey, United States

ABSTRACT

Purpose--Explore the impact of AI and ChatGPT on library information services; **Design/methodology/approach**--A sample of twenty-two reference questions are fed to ChatGPT and the answers are evaluated for quality and accuracy; **Findings**--ChatGPT are excellent in information retrieval in some areas, but it is not comparable to a reference librarian in others; **Research limitations/implications**--The findings may not be conclusive due to small sample size; **Practical implications**--Understand AI and ChatGPT and their behavior; **Social implications**--The knowledge from the study can assist librarians to adjust their services to better serve users; **Originality/value**--No research has been done in this area.

Keywords: Artificial Intelligence, ChatGPT, Library information services, Reference Services

INTRODUCTION

On November 30, 2022, the third generation of ChatGPT was released and it was ChatGPT 3.5. It is a chatbot developed by OpenAI, based on the GPT (Generative Pre-Trained Transformer) technology. This new artificial intelligence (AI) application closely resembles human intelligence, enabling meaningful conversations with human beings on a wide range of subjects. ChatGPT is built upon generative AI, a branch of AI that focuses on creating models capable of generating new data similar to the examples it was trained on. These models learn patterns and relationships from input data to produce new, previously unseen data that exhibits similar characteristics. Currently ChatGPT is on version 4.

Other notable AI applications include Microsoft's Bing AI, Google's Bard/Gemini, DALL-E for images, Make-A-Video for videos, MusicLM for music, GitHub Copilot for programming code, and more (Bohyun, 2023). As AI continues to advance, more companies are planning to integrate AI into their existing products.

ChatGPT has been trained on an impressive dataset of "499 billion tokens of data that came from approximately 45 terabytes of compressed plain text, equivalent to about 1 million feet of bookshelf space or a quarter of the entire collection of the Library of Congress" (Bohyun, 2023). As a result, ChatGPT offers a vastly superior service for information retrieval. While using Google's search may return numerous hyperlinks that users have to sift through to find information, ChatGPT delivers information directly to users, generating human-like text responses to questions

and providing instant solutions. Moreover, ChatGPT has knowledge of MARC 21 and can efficiently catalog a book, even if the record is full of errors. It can also write an essay or proof-read a paper, providing suggested edits and further explaining those edits when prompted, akin to a teacher's guidance. Additionally, ChatGPT can compile a list of journals in a specific discipline and recommend a reading list upon request. It has become a go-to resource for information seekers, earning the nickname "superman" for its capabilities. It's no wonder that "within two months after its launch, it reached 100 million active users and became the fastest-growing consumer application in history" (Hu, 2023, as cited in Chen, 2023). The ease of use and utility of ChatGPT may even lead to users becoming addicted to it.

LIBRARIES AND CHATGPT

Unlike previous releases, ChatGPT 3.5 has garnered intense attention worldwide, particularly in U.S. academia. The reactions have ranged from absolute horror to strong enthusiasm, with some colleges and universities banning its use while others encouraged it. ChatGPT undoubtedly stands as another information service giant, following in the footsteps of Google, but surpassing the latter and all Internet search engines in terms of power.

Libraries also serve as information providers. The question arises: Is ChatGPT a competitor capable of outperforming reference librarians and attracting users away from libraries? In response to this, ChatGPT stated, "ChatGPT and reference librarians serve different roles and have distinct strengths, so they are not direct competitors in the traditional sense. However, they can be seen as complementary resources that cater to different information needs and preferences of users" (OpenAI, 2022). ChatGPT further clarified the differences between itself and a reference librarian by listing the advantages of a librarian's service over that of a robot, including personalized assistance, in-depth research support, access to a variety of academic and credible resources, and the ability to handle complex or ambiguous queries. ChatGPT also claims that it will not replace reference librarians, which is both lovely and humorous for a robot to make such a modest statement.

THE STUDY

"Librarians have embraced ChatGPT from the beginning and consider it as the latest innovation with great potential that may change library information services in a positive way. As ChatGPT 3.5 is a relatively new release, a literature review did not produce any study that has tested how well it handles reference questions. The author designed a study in which ChatGPT was compared to humans. The study described in the paper randomly selected a sample of 22 questions that were real reference inquiries by Rider University students and faculty in the online chat program during a two-month period from June 1 to July 31, 2023. The author asked ChatGPT the same set of questions and recorded its answers. Below is the list of questions in their original language, as many were typed by users during the online chat and contained grammatical errors or typos. As part of the study, the author asked ChatGPT (<http://chatgpt.openai.com>) the 22 questions exactly the way the reference librarians received them, including any errors or typos."

1. "Where do I find a DOI?"
2. "Does Rider provide students with access to Qualtrics?"
3. "Do you think you would be able to help me find a population statistic for my business plan?"
4. "Need Help to find sources for my grad school final capstone thesis. My program: Arts Management & Executive Leadership. My thesis topic is about: Exploring the role of faith and forming an arts leadership approach and arts institution-building approach which is intended to transform the lives of young people and including the youth who are at risk"
5. "I'm writing a research paper on abortion. I wanted to talk about the social aspect of abortion (how people feel), how Roe vs. Wade has stirred up emotions and the case about Roe vs Wade, and I'm blanking on other discussion topic for the paper. I was wondering if you could help me find some empirical articles to help further explain my points."
6. "Are there any grant databases that we have access to at Rider?"
7. "Find literature review on The Impact of Social Media on Self-Esteem and Body Image: An Examination of Social Comparison Theory for a sociology class"
8. "How can I get a full copy of this journal article? Female victims of acquaintance rape in college: Incidence and effects of encounters with perpetrators. Authors: Bell, Stephanie C.1 Wolff, Lori A.2 Skolnick, Melissa3"
9. "Where do I find the company profile called United Skates of America?"
10. "Patron needed help finding information about subject matter for a particular class - risk modelling."
11. "I just checked out a book from the Moore stacks: HD7287.96.U6 D47 2016 and realize I will be on vacation on the day it's due. Is it possible to extend?"
12. "Trying to access some articles from Harvard Business Review. I've maxed out my free articles and am being sent to subscribe. Does Rider have access?"
13. "How do I access Chronicle of Higher education?"
14. "My professor told our class he left some documents available to us in the library and I was just wondering where I would go to obtain them?"
15. "Hi! How would I add a source to ref works?"
16. "I need help with my NUR 409 class the assignment is literature review and project plan"
17. "I have to revisit a few Fred Wiseman films before a podcast I have to do on Sunday about him. Most are on Kanopy. Can you remind me how to access it thru our library?"
18. "My download of a pdf version of a book through eBook Collection (EBSCOhost) did not download, and now I have run out of pages I can download."
19. "HI, I'm having trouble getting full access to this article; nor, can I find how to request it as I have with other articles. Please advise."
20. "Hi, Trying to access some articles from Harvard Business Review. I've maxed out my free articles and am being sent to subscribe. Does Rider have access?"
21. "Should titles of a book be italicized. I looked at an example of a mla format paper and it says titles shouldn't be bolded or italicized but I've learned"
22. "Is it possible to get a scanned copy of a book you have at the library?"

ChatGPT's responses are recorded, reviewed, and evaluated. A score from zero to ten is assigned to each response based on its quality, accuracy of information, and relevance to the question. The higher the score a response receives, the more closely it resembles the quality of information a good reference librarian would provide. When an answer is rated ten, it is highly likely to be accurate, informative, and meets a user's needs. Conversely, a score of zero indicates that either the response did not answer the user's question or the information provided is erroneous.

THE FINDINGS

ChatGPT's responses to Questions 1, 2, 18, and 21 are rated highest, a score of 10. The users asked where he could find the DOI of an article, if Rider University provides free Qualtrics to students, why he/she failed to download a PDF file, and if titles should be italicized or bolded in the MLA citation style. ChatGPT provided exhaustive and accurate information instantly. One would expect an AI application like ChatGPT would not know the local policy of Rider University regarding Qualtrics. However, it got the answer correct: Rider University does not provide students free access to Qualtrics. A reference librarian in Rider University Libraries may have to contact OIT before they can give a user a correct answer. ChatGPT does an excellent job in some subject areas.

Eight out of the 22 responses by ChatGPT received a zero: 5, 8, 9, 12, 13, 14, 17, and 20. Most of the 8 questions asked about access to a particular journal, an article, a database or materials on a subject. However, one needs information on local access policies and subscriptions for correct answers and ChatGPT is not trained with this data. It can only give general answers about databases or subject searches, but it could not possibly know the local practice.

The most absurd response among zero ranked response is number 5. The user was looking for empirical articles on social aspect of abortion. ChatGPT responded by recommending 9 articles. A closer examination of those 9 empirical articles showed that none of them are real. For instance, the first article on the recommended list is shown as below. The article does not exist and there is no such a journal by the name "Journal of Psychology and Heath". The link points to a totally different article.

Title: "The Emotional and Psychological Experience of Abortion: A Comprehensive Review" Authors: Major, B., Cozzarelli, C., Cooper, M.L., et al. Published in: Journal of Psychology and Health, 2000 Link: <https://www.tandfonline.com/doi/abs/10.1080/08870440008400305>

The other eight articles on the recommended list are imposters too. Three articles exist, but in different journals, on different dates, and by different authors. Only two journal titles are real, but articles in them are fake. ChatGPT has made up citations that look relevant and real, but none of them are reliable.

When asked why it creates fake citations, ChatGPT argues, "As an AI language model, I don't intentionally create fake citations. My primary goal is to provide helpful and accurate information to the best of my abilities based on the data I was trained on. However, I can make mistakes or generate incorrect information due to limitations in my training data or the inherent nature of language generation" (OpenAI, 2022). One must verify the information from ChatGPT.

The user in question 9 was looking for the company profile for United Skates of America. ChatGPT responded by claiming that “this is a fake company and it does not exist”. However, if the user asked for the company profile by rephrasing the query, “Please give me the company profile for United Skates of America”, ChatGPT will provide the correct company profile, conflicting its previous assertion. ChatGPT may provide different answers to the same question at different times of the day or it may provide the same answer in different languages to the same question. It is hard to detect plagiarism.

The study found some notable facts about ChatGPT, including its outstanding ability to understand a question even though the question is not well formed and can be confusing even for humans. For instance, Question 16 has an error and Question 18 is not coherent. ChatGPT had no problem in returning a correct response. When needed, ChatGPT may prompt for more questions for clarification that is similar to a reference interview, but it cannot handle complex conversations. The strength of ChatGPT lies in its instant availability, broad knowledge base, and quick answers. ChatGPT is available 24/7, providing immediate responses to queries without the need to wait for human assistance. It has access to a vast amount of information from diverse sources, which allows it to answer a wide range of general questions. For straightforward and common questions, ChatGPT can often provide fast and accurate answers. One problem with the public free version of ChatGPT lies in its delayed data update. Right now the information it can provide is based on data before September 2021. There is a two-year delay. This is not acceptable for information seekers.

LIMITATIONS

The sample of 22 questions is small, and the review/evaluation has been conducted by only one reference librarian. It would be beneficial to involve more reference librarians in the evaluation of the ChatGPT responses. The study could be made more interesting by comparing the answers from ChatGPT with those given by reference librarians in the chat transcripts from Rider University Libraries.

Although ChatGPT 4, the commercial version, might be more up-to-date and intelligent, it is currently inaccessible to the public. Therefore the observations expressed in this paper are based on ChatGPT 3.5 and may not reflect the power of ChatGPT 4.

CONCLUSION

ChatGPT is, thus far, the most intelligent language robot ever to have existed. However, the lack of training data on local policies and practices makes it inadequate to answer specific questions for users. For instance, it cannot explain how to access a particular article or book in Rider University libraries. It lacks emotions and does not understand context. It cannot read the meaning between the lines. It is impossible for ChatGPT to conduct perfect reference interviews and find out what a user really wants. The developer company, OpenAI, indicated that ChatGPT may overcome those obstacles in the future by being trained on local data and fine-tuned to handle more specific questions.

"Another challenge for ChatGPT is the creation of fictitious references, which can potentially impact the credibility of academic research. When ChatGPT generates a research paper, it may cite and create references or articles that do not exist. For example, the author cited may be legitimate and have published research on the subject, but the article in the citation could be a fabrication" (Teel, Wang, & Lund, 2023). The study described in this paper proved the above accusation to be true. This presents a big problem for the academic community. Hopefully, OpenAI will fix this problem in the foreseeable future.

As ChatGPT advised, "Given the potential for automation to replace human labor, it is important for librarians to stay up to date on the latest developments in AI and to find ways to use AI technologies in a way that complements and enhances their work, rather than replacing it" (Bates, 2023). ChatGPT will continuously improve its performance, but it will not be able to replace a librarian yet. Currently, ChatGPT and other AI language models will be the research tools that librarians use to improve library information services. Librarians may need to include ChatGPT in research instruction. Librarians have to advise users on how to ask the right questions and teach users to apply critical thinking skills when evaluating ChatGPT content. Users can access ChatGPT 24/7 and get quick and straightforward information outside of regular library hours. Reference librarians can focus on more intricate or specialized topics that might require in-depth exploration and analysis.

Other uses for ChatGPT and similar AI applications include but are not limited to creating bibliographies, newsletters, posters, and suggesting research ideas. Library discovery services and online catalogs may incorporate ChatGPT so users can ask simple questions when conducting searches. ChatGPT is not something librarians should fear, but rather ChatGPT and similar AI tools are destined to be the best friends for librarians.

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About the author

Dr. Sharon Q. Yang works for Rider University Libraries as a System Librarian-Professor. She graduated from the School of Library Services at Columbia University with an MS in 1986 and received her doctoral degree in 1997. Her research interests include library systems, discovery services, Semantic Web, Altmetrics, and information services. Dr. Yang has won several research awards and presented at national/international conferences. She has served twice as a Fulbright scholar and is currently participating in the Fulbright Senior Specialist Program from 2016 to 2023.

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