Confirming the Query Search Method: Balancing AI Advancements in Reference Services

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ABSTRACT

Although artificial intelligence (AI) has quickly become a tool that offers quick, simplistic answers to reference questions (Chen, 2023), in this paper, we interrogate AI's ability to consider the human-to-human interpersonal nuances that occur and are vital to answering queries. We ask: what is most essential for reference services - human knowledge sharing or the machine's artificial intelligence? AI, as a mechanistic language model, cannot discern the subtleties of humanity's questions; AI itself admits that librarians are more efficient at answering reference queries from a humanistic approach and lens (Yang & Mason, 2023). This paper is the second part of our introduction to our methodology for reference services, the Query Search Method (QSM). We present conceptual substantiation that, when enacted, the QSM can incorporate AI as an addition to the librarian's toolbox for honoring patrons' ways of knowing that, through the sententiousness of the human experience, invariably seek knowledge beyond "the machine."

ALISE RESEARCH TAXONOMY TOPICS

artificial intelligence (AI); ontologies; pedagogy; query search method (QSM); reference.

AUTHOR KEYWORDS

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INTRODUCTION

Reference service is a knowledge-building sociocultural interaction between humans who exchange ideas and resources to create a shared understanding of an information need. During this interaction, the librarian guides the library user in the (re)search process, and collaboratively they identify the best resources available and accessible to answer the query. This engagement is invaluable as librarians are experts in offering guidance in locating appropriate resources, while patrons are experts in bringing their questions and embedded knowledge (Irvin & Nakashima, 2023). When technology is the focus of the reference interaction, gatekeeping occurs where the librarian unilaterally decides what information and/or resource is accessible and what is not (Frederick, 2021; van Otterlo, 2017; Wolf, 2022; Zabel & Reiter, 2020). However, when librarians approach patrons holistically, they partner to discover life's answers.

Thus, the most vital aspect of reference services is the collaborative nature of the information quest, where the librarian and the patron reciprocally trust their heart/brain connection to determine the relevancy of questions asked and researched, whether via face-to-face, online chat, email, telephone, or virtual conference. Because social connection is necessary for human survival and well-being (Fleming & Manning, 2019), reference engagement, regardless of venue, requires an empathy of care that operationalizes the reference interview, which, in turn, brings credibility to the multimodal information world in which we live (Irvin, 2022).

We posit that the library and information sciences (LIS) field often focuses on technologies seeking efficiency in delivering resources while neglecting our shared humanity at the heart of information services. With the constancy of libraries needing to automate and formalize operations with every new technological innovation (Fernandez, 2023; PressReader, 2024), the discourse about the impacts of AI on librarianship feels insidiously disruptive to the requisite humanistic focus of reference and information services. When looking at the potential of AI in reference services, the argument can be made that its use would streamline service and give librarians more mobility to focus on other aspects of librarianship, such as deep research, community outreach, and data-based decision-making (Adetayo, 2023; Chhetri, 2023). However, we caution that if AI is making decisions for librarians during the reference interaction, a human-connection focused interaction, the so-called enhanced efficiency of AI may create a larger space for patron neglect. The machine wins by technology being centered, while the librarian and patron lose because the community's knowledge has been devalued.

CONCEPTUAL CONSIDERATIONS: Handling the Truth in Reference Services

When a text or other resource passes a librarian's inspection, this distinction is often interpreted to mean that the content is authoritative, credible, and trustworthy; the information is safe. In contrast, sources found beyond the library may be regarded as less credible (Putnam, 2018). One philosophical problem with informational truth is that first, we talk about 'truth' as if it is a universal concept (Ranalli, 2022). This one-layered idea of 'truth' does not work well with global cultures and perspectives (Labaree & Scimeca, 2008). For the library, as a record of

humanity - diverse truths exist and are curated and stored in library collections. During a reference interaction, these truths are systematically retrieved based on relevancy for the patron, regardless of how truth is defined for the librarian. For example, when working with a patron whose query is about confirming the authenticity of visiting aliens, the librarian's concept of truth may differ from that of the patron. Nevertheless, we locate reputable sources of information, which returns us to the definition of reference services: engaging with the patron throughout the quest for information discovery. This is not to say that librarians do not concern themselves with post-truth, misinformation, and other aspects of truth along the information continuum. However, when engaging with a fellow citizen in their quest for information, the librarian must refrain from leveraging their biases over the query.

During the research part of the reference interview process, the librarian untangles the nuances of information and the web of sources to identify valuable strands of data that can lead to an answer to the query. With the introduction of AI to library services, we perceive that the data sets that generative AI platforms interface with, are built on pervasive knowledge systems built and retrieved by Western sources and thus reiterate political and social biases (Chen, 2023; Chhetri, 2023; Wolf, 2022). The (re)search process is essential, especially since the introduction of “the Bot” takes on a clinical and formulaic construct. This dissonance results mainly from the machine's lack of the “heart” to know a community.

Taking the critical race information theory (CRiT) construct of LIS into consideration, where information services are intersectionally pedagogical, praxis-oriented, and theoretical, reference services today are prescriptively grounded on an equitable and socially just dynamic (Dunbar, 2023). Within the CRiT lens, the nuanced complexities of reference services can be appreciated because due to no librarian or patron's brain being the same, no query is guaranteed a fixed, immutable, easily attainable answer. In the LIS reference classroom, students need to be taught to think critically, approaching queries with a socially and culturally nuanced perspective. Contemporary reference pedagogy asks students to consider not just the words that make up the question being asked but also the person asking the question and the knowledge that they bring to the query. The “bot” does not embody a sentient epistemic stance to consider human complexity.

LITERATURE REVIEW: What AI is Missing in Reference Services

Wolf (2022) discusses how countries worldwide are considering regulating AI technologies. He posits that the creators of AI from the western hemisphere will develop technology based on western values. While Wolf advocates for western values like freedom of speech, pragmatism, and exceptionalism as essential indicators for advancing AI in society, he acknowledges that “culture trumps technology” (p. 30). In considering reference services, Yang and Mason’s (2023) research states that AI only considers technical, digitized information for answering questions and is deficient in understanding local histories, policies, and practices.

While ChatGPT and similar technologies may be useful for information gathering, “the machine” is just one of many tools available and used that make the librarian indispensable for library users. AI can aid librarians in being partners in the information discovery process.

Reimagining reference services can mean less dependence on the reference desk and the physical collections (Barnes et al., 2017). However, do we genuinely want to depend on technology to answer life's questions?

Frederick (2021) speaks of "cringing" at the habits of those who google a question and take an answer as "good enough" (p. 1). Frederick points to scientists who cite retracted articles as being unaware of the need to verify information. She posits that we must develop a mindset that fosters curiosity and the desire to understand the world. Indeed, Zora Neale Hurston posits that "research is formalized curiosity" (1942/1996, p. 143). It is within this realm of curiosity that reference and information services thrive. Furthermore, even though AI language models may be well suited to perform several information processes for reference services, the technology can be overly simplistic, lacking necessary information details, and at times, also inaccurate, particularly across diverse spoken languages (Stepanov et al., 2023).

We recognize that AI has its strengths and contributions to information services, but it also has its weaknesses and threats. The ethical issues surrounding AI use in libraries and other educational settings (formal and informal) weigh heavily on librarians' and administrators' minds for evolving library services (Lor et al., 2021; Mikalef et al., 2022; van Otterlo, 2017). Chhetri (2023) analyzes the use of AI in libraries via a SWOT analysis approach and identifies strengths, including efficiency in information retrieval, automation of professional practices, and enhanced data analysis for decision-making. Chhetri's study also recognizes that the lack of human nuance in social interaction is a weakness of AI in libraries. In other words, the human element is irreplaceable.

Studies are already being published to confirm the stance that AI is a tool that, in these nascent stages, still needs to be vetted for credibility and reliability in information accuracy and quality (Adetayo, 2023; Giray, 2023). Participants in these studies note that human relatability is essential to integrate AI in delivering information services. Chen (2023) reminds us that AI is another step in humanity's technological journey, adding to the birth of the World Wide Web, Google, and Web 2.0 applications. AI is another step in our informational growth as a profession that necessitates understanding its strengths and weaknesses as a new literacy practice (Lo, 2023).

Butler (2008) reminds us that reference work is memory work, and memory work comes from the knowledge of *being* in a place. *Where can a machine be without human support?* Knowledge is carried from moment to moment, place to place. *Where can a machine go without a human escort?* Butler tells us that memory is what creates our brains as knowledge-based systems. Our brains dance with our imaginations to build an inner collection of records that, while intangible, are accessible through communications and relationship-building.

Rettig (1984) states that "librarianship has become, in the words of a cliche, a world of 'bits and bytes'" (p. 9). The problems Rettig identified in 1984 for reference services are still true today: poor library school preparation, inadequate reference collections, and understaffed reference desks. Additionally, Rettig notes that the real reason behind problematic reference

services is not a lack of resources or technology but a lack of imagination where empathy lives. We bring Rettig's wisdom into our discussion here:

> Reference librarians are sure only to succeed in those they serve if they appreciate and understand their patrons' needs, as appreciated and understood by the patrons themselves. Case-by-case, question-by-question, reference librarians must first "fill in" for their patrons. Then, in each encounter, a librarian can apply his bibliographic knowledge to the patron's problem. Next he disengages from the other body he has become, and — chameleon-like — becomes yet another. Thus, the process goes on. When a reference librarian knows the tools of the trade, one must look for another explanation for a failure to answer a question correctly. A failure to understand, a failure to empathize with the user's need can, indeed, explain it. (1984, p. 9)

Although embodied AI incorporates language learning models (LLMs) to enable bots to perceive information and to collaborate, Song et al. (2020) confirms that LLMs "cannot effectively distinguish between relevant and irrelevant knowledge" (p. 2). Rettig posits that the embodied experience of the librarian during the reference interaction is actualized within the realm of "facts and reason" (p. 9) between two human beings - the patron and the librarian - both endowed with a heart and brain. Together, the heart and brain invoke the humanity of exchanging knowledge to mutually create an experience; and the reciprocal information event is what makes reference services foundational to the ethos of librarianship.

Thus, reference services need a strategic way to interface with contemporary technologies like databases, social media, and online data sites that are becoming increasingly embedded with AI. We have devised a methodology for delivering reference and information services that requires engagement with these current technologies. As a pedagogical method for delivering reference services, the Query Search Method (QSM) synthesizes the socio-cultural semantics of the reference interaction with the technological literacy practices to manipulate and evaluate databases, online catalogs, bibliographic networks, and web-based information sources with Boolean logic, controlled vocabulary, and natural language processing (Irvin & Nakashima, 2023). In the LIS classroom, students learn how to operationalize the QSM, which fortifies librarian search skills as a response to the prolificity of AI in information science.

THE ALGORITHMIC LIBRARIAN: Teaching the QSM as a Truth-seeking Pedagogy

The heart of reference services centers on the (re)search process. Reference principles focus on librarians' behavior, yet LIS discourse around reference ignores the human asking the question. The reference interview as a practice is often referred to in abstracts. However, reference practice involves actualizing human skills: soft skills to engage in a collaborative interview to strategically assess information needs while simultaneously enacting technical skills to access information sources. The QSM offers four concrete steps and processes to teach LIS students the value of human-centric information services in the age of AI: the search matrix, the (re)search strategy, the (re)search process, and the answer/resolution (Figure 1).

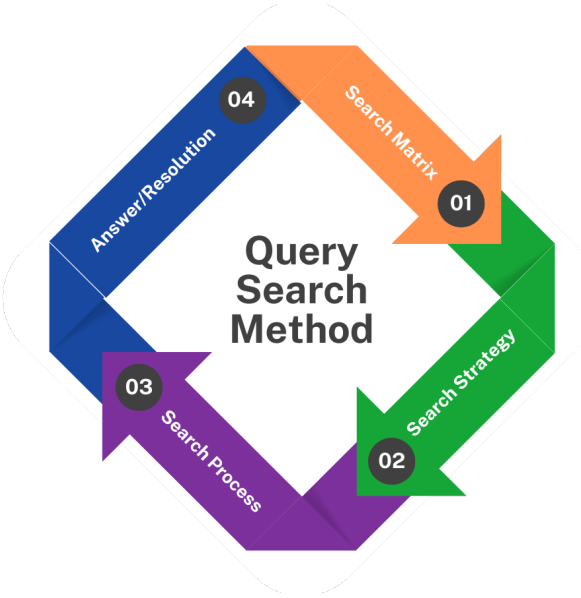

Figure 1. *Steps to the QSM*

The QSM is unique because it emphasizes collaboration with the patron to center their knowledge and expertise as the foundation for the search strategy and process. The four elements of the QSM are as follows:

Search Matrix. The librarian *greets the patron* when they listen to the query. Upon hearing and responding to the query, the librarian begins to deconstruct or *unpack the query* by combining keywords and synonyms to build a data pool of terms and combining them with Boolean operators to build Boolean expressions for preliminary searching. While sharing their thinking process with the patron, the librarian and patron collaboratively begin to strategize toward finding an answer to the query. The search matrix is the tool through which the librarian not only documents the patrons' embedded knowledge regarding the query but also adds data to include their understanding of the query or how the search will engage with various informational systems. Without the reference interview, one cannot establish a search matrix or a fluid set of parameters to engage with.

Search Strategy. Before initiating the *search process,* the librarian articulates a search strategy with the search matrix. The strategy is where the librarian discerns relevant resources that can be consulted, highlighting to the patron the features of resources that can meet their information needs. During the search strategy, the librarian ensures that resources are relevant, accurate, and vetted for credibility.

Search Process. The search strategy identifies the most effective search inputs and output from the sources the librarian and patron are consulting. The search process is documented to keep track of its depth as an iterative endeavor (therefore, search becomes (re)search) and to have information to follow up with the patron. Because of the strategic conciseness of the QSM up to this point, the proverbial "rabbit hole" is often avoided.

Answer/Resolution. The query's resolution may be *an* answer that leads toward *the* answer to the query. We prefer to say that we *resolve* queries rather than 'answer' queries because, given the dynamic nature of information across formats and platforms, print and digital, answers can differentiate from librarian to librarian, resource to resource.

> Sometimes, a resolution is a greater outcome because the librarian has helped the patron to understand their query better. We recognize that answers can be definitive with ready reference and directional queries. At the same time, with research-oriented queries, readers' advisory, and imposed queries, the librarian's research more often reveals a resolution to a search instead of offering a unilateral, definitive answer.
>
> Follow-up is the final part of the resolution phase of the QSM. It can be accomplished in two ways: the closing question and referral. The closing question can be: Does this work for you? Is this information helpful? If the patron is satisfied, all is well. If not, the librarian refers the patron to another resource, library, or community-based service or entity (Irvin & Nakashima, 2023).

Within the QSM is the latitude to be malleable to different personalities, skill sets, and queries. This methodology is reproducible by establishing a practical path through a query that offers heightened accuracy in results. The QSM utilizes inquiry, requiring librarians to situate themselves as learners and collaborative researchers. With the QSM, librarians recognize their own agency as a response to the patron within the information search process (Kuhlthau, 2008) as they interrogate and explore information sources with the patron. The QSM honors the patron's knowledge and expertise and guides the librarian to recognize how agency, heritage, and sociocultural layers are always in play as reference questions do not fit neatly into technological library systems. These identity layers are the essential aspects of human ontology and epistemology that AI cannot access. With the QSM, the librarian recognizes information sources beyond "the machine" by examining the question contextually and holistically, thus accessing truth in specific and unique contexts.

CONCLUSION

AI enters the conversation, and almost immediately, as information professionals, we feel threatened that our value will be diminished and our practices deemed worthless. In the tradition of Zora Neale Hurston, we say that our curiosity, when formalized into a reference services methodology that engages our hearts and minds (i.e., imaginations), we connect with another person's embodied knowledge for a brilliant journey in information discovery. We champion the Query Search Method because we have seen time and again, during the course of teaching the practice to library science students for a decade, the maturation the method brings to students learning how to holistically deliver reference services during this historical time where 'the machine' is so central to our lives. The QSM synthesizes the information search process and the five steps of reference services to create a replicable approach that heightens the accuracy of results, and the credibility of resources used. Ultimately, the machine can only do what it is programmed to do - by human beings. The QSM keeps "the machine" in its proper place: as a tool for students and practitioners to use in their professional practice ethically and holistically. The QSM helps librarians to stand for the truth that comes from human interaction in locating quality information we use in the work that we do for the best information to meet the knowledge needs of library users everywhere.

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