A training course on the employment of artificial intelligence (AI) to improve biomedical bibliographic searching: a report

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Abstract

The article describes a training course conducted by GIDIF-RBM (Italian Association of Health Librarians) aimed at introducing biomedical documentation professionals to the use of generative artificial intelligence (AI) tools for enhancing bibliographic research. Held in October 2024, the course covered the practical application of AI-powered platforms such as ChatGPT, PubMed Buddy, Scispace, Rayyan, Dimensions, and others. Participants explored how these tools can improve the efficiency, relevance, and organization of literature searches. Pre- and post-course surveys assessed participants' familiarity with AI technologies and their emotional responses to their integration in professional routines. Results highlighted a mixture of curiosity, skepticism, and cautious optimism. While AI tools demonstrated value in supporting complex research tasks, outcomes varied across platforms, underlining the continued need for human critical thinking and contextual judgment. The initiative signals GIDIF-RBM's proactive role in preparing health information professionals for the opportunities and challenges posed by AI in biomedical knowledge management.

Key words: *artificial intelligence; training course; bibliographic research; survey.*

Introduction

For nearly 40 years, GIDIF-RBM (Gruppo Italiano dei Documentalisti dell'Industria Farmaceutica e della Ricerca Biomedica, the Italian Association of Health Librarians) has dedicated its activities to training health information professionals in scientific documentation. On October 11th, 2024, GIDIF-RBM held a training course at the Anna and Fulvio Bracco Auditorium in Milan, Italy, focusing on the combined use of Chat-Bots, bibliographic management apps, and portals leveraging generative artificial intelligence (AI) (1) to improve the efficiency and effectiveness of biomedical bibliographic search.

AI tools have developed their own Chat-Bots designed to simulate human conversations, interact with users via text and/or voice messages, answer frequently asked questions, provide 24hrs-7days support, translate texts, and enable increasingly fluid and personalized interactions. Chatbots can be used in various contexts (2), such as customer service, e-commerce, and information services. They are becoming increasingly sophisticated due to advancements in natural language processing and machine learning, making them valuable tools for both companies and users, enhancing overall efficiency and satisfaction.

In the biomedical field, research portals and commercial and non-commercial databases are increasingly employing and integrating generative AI through browser extensions and algorithms. These algorithms operate in real-time while composing search strings or viewing initial bibliographic results (scientific publications), matching the need to order (rank) and organizing results to discover potential "relationships" and connections (network).

The course aimed to initiate the training of biomedical librarians and documentalists in the humanly "intelligent" and knowledgeable use of these tools. The exper-

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tise and keen attention of the participants underscored the importance of understanding and using this innovative technology with critical awareness, as a sine qua non condition, capable of indicating differences and prompting caution and appropriate distance from what "appears" and is.

Materials and methods

At the beginning or the training course, all participants completed a questionnaire to assess their knowledge of AI software (the course's subject) and their emotional perception of these new professional skills ("To what extent does the advent of generative AI frightens you in your work?"). They received a second survey, one month after the end of the course, to verify eventual changes in their work routine after learning about these tools. Aim of the questionnaire was an analysis of the participants' feeling about the use of AI in daily routine, and compare, analyse, and evaluate the results of simple and/or complex search prompt (if used).
The training started with an overview of currently available "freemium"[1] systems, engaging thirty professionals in person and twenty-three remotely.

Application Programming Interface assistants (API)

This API assistant allows the creation of AI assistants within applications. An assistant has instructions and can use models, tools, and knowledge to answer user queries. The API Assistant currently supports three types of tools: Code Interpreter, Retrieval, and Function calling. Assistants are designed to be created by developers via the OpenAI API.

Generative Pre-trained Transformers (GPTs)

These are customized versions of ChatGPT that users can adapt for specific tasks or topics by combining instructions, knowledge, and capabilities. They can be simple or complex, addressing anything from language learning to technical support. Team and Enterprise users can create GPTs on chatgpt.com/create. GPTs reside within ChatGPT and are intended for creation by anyone with a simple user interface. They are:

- *PubMed Buddy:* accesses both PubMed and the Unpaywall database, enabling conversational exploration of scientific literature and access to the full text of articles;
- *Scispace*: executes complex searches in minutes by analysing documents, extracting relevant data on clinical studies and biological mechanisms, facilitating the understanding of drug interactions, the study of new molecules, and the evaluation of side effects. AI algorithms build connections and insights between publications;
- *Dimensions*: this academic GPT combines scientific evidence from Dimensions and the powerful generative AI capabilities of ChatGPT, providing summaries, insights, and citations for topics highlighted in academic articles. It enables pharmaceutical researchers to monitor the evolution of drug therapies and identify potential collaborations or scientific gaps, facilitating the identification of relevant research in clinical and therapeutic areas, such as comparative analysis between different therapeutic protocols and optimization of existing treatments;
- *Rayyan*: a collaborative, intelligent systematic literature review platform trusted by over 500,000 researchers worldwide. It accelerates and streamlines the review process through features like AI-powered screening, advanced filtering, and remote collaboration. It imports either formatted bibliographic references in Ris, EndNote, etc., or directly from databases like PubMed or Mendeley for rapid screening of titles and abstracts to include in systematic reviews, deduplicating results and categorizing studies;
- *Semantic Scholar*: managed by the Allen Institute for AI, a non-profit philanthropic institution founded by Paul G. Allen in 2014, it is a free tool that uses datasets and APIs provided by the user-friendly JSON archive. It explores new relationships, including data on authors, articles, citations, and locations, covering all STEM (Science, Technology, Engineering, Mathematics) and SSH (Social Science and Humanities) disciplines, including biology, medicine, computer science, geography, business, history, and economics. Over 221 million documents come from over 550 partners like

[1] The concept of freemium is to offer a product with basic functionality for free but make it clear that there are other more advanced features available if the user wants to upgrade to the premium version or a subscription.

PubMed, Springer Nature, Taylor & Francis, SAGE, Wiley, ACM, IEEE, arXiv, Microsoft Academic, and Unpaywall;

- *Elicit*: an innovative tool designed to facilitate bibliographic research and information organization. It allows users to efficiently extract relevant data from scientific articles and academic sources, aiding in the synthesis and analysis of evidence. With its intuitive interface, Elicit allows users to formulate specific questions and collect detailed answers, simplifying the literature review process, making it particularly useful for researchers, students, and professionals;
- *Perplexity.ai*: using advanced natural language processing algorithms, it allows users to ask questions and receive accurate and contextualized answers, drawing from a wide range of sources. Thanks to its ability to understand the context of questions and provide relevant answers, Perplexity AI represents a significant step towards more fluid communication between humans and machines;
- *Character.ai*: offers a set of avatars that can be called upon (like a phone call) and interrogated in conversation, like Alexa and Siri; Awakened AI, an avatar with an elegant British accent, is noteworthy.

Due to space constraints, a detailed comparison of the tools described, tested, and compared during the afternoon sessions will not be provided. It should be noted that major bibliographic databases and platforms for researchers and health information professionals, such as Scopus, Embase, and Cochrane Library, are implementing AI functions.

Experimentation *in vivo* remains the next step.

Discussion and concluding remarks

AI tools have potential applications across all sectors, from production to services to healthcare, to optimize processes.

Opinions generally agree that this optimization would save time in solving problems, finding solutions, and searching for information.

Regarding the latter, the qualitative aspect cannot leave us indifferent, even though quality is a variable that no sector should ignore.

The article "Exploring the use of ChatGPT in OBGYN: a bibliometric analysis of the first ChatGPT" (3) is commented on by Enrico Finale, coordinator of the SOC Obstetrics and Gynecology of the ASL VCO of Verbania, and Alessandro Gallo, General Manager of Springer Healthcare, in the online journal *Medici Oggi*. Finale and Gallo (4) reflect on how researchers, who emphasize the importance of AI in medicine for interpreting diagnostic images, analysing data, patient outcomes, and optimizing predictive models, state that with the aid of ChatGPT, they did not find significant literature references (see original research article) in the gynecological specialty. Why? Has the potential of ChatGPT not yet been considered in this area? The question seems necessary.

Our afternoon exercises, which involved posing the same question to different systems, yielded different outputs, some more or less satisfactory, some more pertinent, others less so, some more technical, others less so, some with more information, others less, some reporting sources, others not, etc.

These examples lead us to think that "much" is relative, at least today. Not knowing what the future holds, for now, we must deal with the *hic et nunc* (here and now). AI can play an important role on many fronts: increasing diagnostic effectiveness and therapeutic efficiency, preventing the spread of dangerous substances in the air, food, soil, and water, preventing accidents, diseases, and discomfort through suggestions for a healthy lifestyle, and not only preventing but also predicting pandemics, and so on. However, these opportunities are not without risks; the use of sensitive data for discriminatory purposes, attempts to replace professionals, and trading the benefits of increased well-being for cuts in financial resources are just some of the drawbacks.

An anonymous online questionnaire was administered to all the participants one month after the end of the course. Its purpose was to evaluate whether the different tools proposed during the course were employed and, above all, the participants' feelings about the AI tools.

What will be the new sensations in tackling bibliographic search with AI? To what extent should we trust and rely on this technology? Will AI create and/or increase a state of insecurity, or will it strengthen the awareness that critical thinking still makes the difference?

But less than a half of the participants filled the questionnaire back. Are most of us, perhaps, afraid of AI?

Anyway, this GIDIF-RBM initiative, which is one of the initiatives about AI tools and topic, is symptomatic

of the fact that the Association feels committed to offer health information professionals a guide to address the new knowledge and skills and challenges that AI inevitably proposes.

If opposing change is an anachronistic attitude, what we can do is try to understand its application, at least in our field, finding a balance of roles for a possible serene cultural coexistence in which AI speaks, and the human being thinks.

We are reassured when the curious and captivating name of an AI system, Perplexity, recalls the empirical truth that nothing, whether in science or in any other sector as in life, is certain. Much less Artificial Intelligence.

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