

# ChatGPT scientific research cannot replace humans

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The latest generation of artificial intelligence products represented by ChatGPT has set off a huge response in the academic circles of various countries since its launch. Through searches, it was found that since 2023, there have been more than 500 academic papers related to ChatGPT, involving mathematics, medicine, computer science, linguistics, ethics, education, economics, finance, management, law, journalism and other disciplines. Looking at the content of the paper, some scholars affirmed the multiple conveniences that ChatGPT brings to scientific research, but the academic community is generally cautious about whether ChatGPT can subvert traditional scientific research methods and paradigms. The reporter interviewed relevant scholars on issues such as what role artificial intelligence products play in scientific research, whether they will expand the scope of human research, whether the excessive use of artificial intelligence products such as ChatGPT will weaken the research ability and status of scholars, and how to effectively regulate them.

## Digital technology has been widely used in scientific research

Since December 2022, some scholars have used ChatGPT to revise papers and achieved satisfactory results. These

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believe that ChatGPT and other artificial intelligence tools can help scientific researchers improve their research efficiency. Other scholars have already used language processing models in daily scientific research and teaching, such as checking codes, collecting information, and writing research funding applications.

Melissa Terras, professor of digital cultural heritage in design informatics at the University of Edinburgh and editor-in-chief of Digital Humanities, said in an interview with reporters that natural language processing technology has been around for more than 60 years. Now, we are witnessing technology "crossing the chasm", which means that the application of natural language processing technology has moved from a specific small group of early adopters to a larger market. Scholars must accept the fact that emerging technologies are integrated into daily life and find the best way to use the tools. ChatGPT has a very close connection with existing artificial intelligence technology, but there is one difference, that is, ChatGPT users can train ChatGPT by asking questions. Therefore, as users of technology, the public has more control over technology. In addition, the public can also learn how to have a dialogue with technology, understand what tasks technology is good at handling, and clarify what humans are more proficient in than technology.

Simon Mahony, professor at the Center for Digital Publishing and Digital Humanities Research at Beijing Normal University and professor emeritus of digital humanities at the Department of Informatics at University College London, told reporters that natural language processing, machine learning and text encoding are widely used in the field of digital humanities and other humanities. Text encoding through XML is the basis for creating online resources, such as searchable databases and online documents. Many digital humanities projects also use TEI XML as a universal standard for encoding to achieve "interoperability" and "interoperability" of data sets. In addition, the scale of natural language processing data sets enables it to conduct a large amount of statistical analysis on language and language use. Natural language processing technology has a wide range of applications, including humanities research, linguistics, stylistics,

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When it comes to the role of AI tools in the scientific field, some believe that ChatGPT is more like a digital intern, helping scholars collect, mix, clean and compile data, as well as providing insightful interpretations of some research content, which scholars can then use to conduct more in-depth research.

In contrast to some positive views, Nick Montfort, a professor of digital media at the Massachusetts Institute of Technology, told reporters that the public generally understands ChatGPT, Grammarly (a grammar correction tool), and Google Translate as "technology", but in fact they are not. Strictly speaking, they are just commercial paid services, and the technical content is no more than that of electric cars and mobile phones.

Edward Schiappa, a professor of rhetoric at MIT, and Montfort co-authored an article proposing that in university teaching, teachers should fully understand the capabilities and limitations of artificial intelligence and large language models. Faced with the phenomenon that more and more students use ChatGPT to write, Schiappa and Montfort believe that although it is acceptable in certain specific cases for students to submit articles that they did not write as their own, this kind of writing should not be authorized in the academic field because it cannot help teachers advance learning goals and makes it difficult to evaluate student performance. In addition, the current help provided by artificial intelligence and large language model technology to students in writing is vague and far from the help provided by teachers. Writing and speaking skills have always been the foundation of academic success. If undergraduate students are not prepared in these two aspects, they will not be able to become effective communicators in the future. Students should exercise core skills in writing and oral communication, such as creativity, style, grammar, logical ability, argument construction, etc. from daily learning.

In Mahoney's view, the media is over-hyping ChatGPT. Before ChatGPT technology matures and establishes a good

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As some artificial intelligence products are gradually applied to the field of scientific research, will they weaken the research capabilities and status of researchers? Some articles believe that they will not. Because the current series of artificial intelligence products, including the latest ChatGPT, are not perfect tools. ChatGPT's text generation may be full of misinformation, but academic research must be rigorous. At present, the application value of artificial intelligence products such as ChatGPT is to help scholars do the most basic work, so that they have more time to complete advanced scientific research tasks. The work in the field of scientific research includes two parts: quantitative research and qualitative research. There are a large number of parts in the field of natural science research that require homogeneous skills. These jobs are essentially completed through formulas, so this part of the work can be completed by artificial intelligence products. It can save more time for researchers and improve their work efficiency. However, the qualitative and ethical reasoning part can never be replaced by any system or machine. For example, in the field of medicine, diagnosis and understanding of medical test results require more professionals to participate. As scholars have said, artificial intelligence products, including ChatGPT, are very good at identifying questions that answer what based on facts, but cannot answer questions based on judgments. Many of the scholars' experience, understanding, and insights cannot be programmed at all. Nowadays, more and more people are paying attention to the morality, ethics and creative thinking of new technological products while paying attention to the applications of these products.

Mahoney believes that artificial intelligence seems to have become a new "keyword" that scholars must master. Artificial intelligence technology is regarded as a "savior" in areas such as training, scoring and evaluation, but Mahoney disagrees. At present, society has gradually realized that there are many problems with artificial intelligence, especially regarding issues such as race, country and gender. Whether artificial intelligence can have authorship is a question worth exploring. In fact, there are similar ethical dilemmas in the use of artificial intelligence and data sources. For example,

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way to go to correct digital discrimination.

## ChatGPT should be a tool to assist creation

At present, some well-known academic journal publishers have banned or restricted authors from using ChatGPT. The editor-in-chief of Science has more clearly mentioned that it is forbidden to use text generated by ChatGPT in submitted papers. Brian Lucey, professor of international finance and commodities at Trinity College Dublin, Ireland, and Michael Dowling, professor of finance at Dublin City University, jointly published an article stating that publishers and researchers should not regard ChatGPT as a threat, but as a research assistant—a low-cost or even free electronic assistant. To this end, they also conducted an experiment, requiring ChatGPT to generate a standard research report, including research ideas, literature reviews, data sets, and tests/suggestions, and specifying the topic, telling ChatGPT that the paper will be published in a financial journal. The researchers pasted less than 200 abstracts of relevant studies into the ChatGPT window and asked ChatGPT to generate a paper. After getting the paper, the researchers asked ChatGPT to add "expertise in the financial field" to the text to generate a second version of the paper. After reading the second version, the researchers again put forward some suggestions for improvement in the ChatGPT window and asked ChatGPT to generate the third version of the paper. Subsequently, the third version of the paper was sent to 32 anonymous reviewers to determine whether the paper met the publication criteria. The researchers all believed that the paper was acceptable, but only the research ideas and dataset parts in the paper scored high, while the literature review and test/suggestion parts scored low. It can be seen that ChatGPT is good at linking them from externally obtained texts, or obtaining easily identifiable parts from the text for adjustment. When encountering more complex tasks, ChatGPT's weaknesses are very obvious.

Lucey and Dowling reminded that ChatGPT is just a tool and people should be wary of the specious papers it

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those who lack research funding, such as researchers in emerging economies, graduate students, and early career researchers.

Tesla also talked about how, like humans, artificial intelligence also has environmental costs, which is an issue that needs social attention. It is undeniable that ChatGPT has the ability to help scholars determine the basic content of the paper and the topics covered. By speeding up the specific process of written language writing, ChatGPT allows manuscript producers to achieve greater results within a given time. From this perspective, ChatGPT is only a tool to assist in creation.

### **ChatGPT has limited impact on higher education**

When talking about the impact of ChatGPT on higher education and what core values and skills educators and institutions in the humanities should focus on cultivating in students, Truss said there is no need to worry about the impact of ChatGPT on higher education. Educators need to design teaching tasks that stimulate students' creative thinking processes, which ChatGPT cannot replace students to complete. Modern education also includes guiding students to contact new tools, criticize, examine and master them. Educators and students must learn how to coexist harmoniously with technology, rather than resisting the advancement of technology and standing still.

Workplace automation will affect employment opportunities for graduates of humanities majors. However, the combination of humanistic values and emerging technologies will also create a new batch of professions and positions. Scholars and educators first need to have a deep understanding of the principles and characteristics of technology, the core problems it solves, and application scenarios, and explore the boundaries of technology before they can teach the next generation how to understand and use technology and best prepare them for entering a completely different

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correctly. From now on, educators must find ways to integrate ChatGPT and other robots into daily teaching so that students can understand the difficulties, limitations and reasonable use scenarios of the new generation of digital technologies.

In Mahoney's view, the foundation of humanities and humanities education is to cultivate students' self-awareness, moral consciousness, critical thinking, analytical reasoning, creative problem-solving and coherent writing skills. No matter how digital technology is updated, educators should not ignore any of the above points.

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## Social Science Recommendations

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Interdisciplinary focus on multi-field applications of artificial intelligence

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Classical Studies Should Get Rid of the Fetters of Western Research Paradigms

On the construction of a community with a shared future for mankind from the perspective of Chinese and Greek civilizations

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