

ChatGPT

A disruptive innovation or disrupting innovation in academia?



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The field of dentistry, similar to many other scientific areas, is evolving rapidly because of the well-needed innovations and refinement of the latest techniques and armamentarium for the betterment of those treating (the dentists) and those treated (the patients). Among these, perhaps artificial intelligence (AI) is a critical component of or guiding principle for most of these technologies like automated diagnostics, treatments, disease prediction, and prognosis.¹ Bower and Clayton² are credited with the theory of disruptive innovation, and initially, it referred to the launch of a service or a product into an orthodox business or trade, causing better and more cost-effective performance of those products or services than the prevailing offerings. However, the term disruptive innovation is not confined to only businesses and trades but has been extended to varied markets wherein new technologies potentially can alter the status quo and significantly change the input-output balances of the products or services or existing processes. Chat Generative Pre-trained Transformer (ChatGPT) (OpenAI; <https://openai.com/blog/chatgpt>) is a versatile software application introduced in November 2022 based on a large language model that interacts in a conversational manner with users that has the ability to respond to follow-up queries; acknowledge errors, misinterpretations, and miscalculations; and challenge counterfactual, hypothetical, or fictitious scenarios. With its dynamic and evolving interface, ChatGPT has the ability to write academic essays and even academic research papers that might be at par with the quality of human-written essays.^{3,4} In the short time since it was introduced, ChatGPT has even been a coauthor of at least 1 article⁵ indexed on PubMed and has written a full article almost completely on its own.⁴ A contemplative researcher might debate between the originality, authenticity, and plagiarizing in the content of a manuscript from ChatGPT; however, it is not known clearly whether commercial software like iThenticate (Turnitin) used by journals are (or will be) able to detect that based on the similarity score they generate. Nearly all journals require the submitting authors to confirm the originality of the submission; however, ChatGPT might redefine the boundaries between originality and phoniness. Another issue to ponder is related to the criteria of coauthorship, which is more objective and easily discernible. The International Committee of Medical Journal Editors⁶ clearly defines the role of authors and contributors to meet all of these 4 criteria:

1. substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work
2. drafting the work or revising it critically for important intellectual content
3. final approval of the version to be published
4. agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Moreover, the manuscript's lead author should be able to identify the responsibility of all coauthors for particular parts of the work. Furthermore, all the authors should be mutually confident regarding the integrity of the contributions of the other authors. Thus, even in the best scenarios and advancement, ChatGPT does not meet criteria 1 and 4 above and might fail to qualify for coauthorship.

Until now, we have been highlighting the evolving role, uses, and abuses of ChatGPT in research articles; however, this application has the potential to be used in universities and schools for writing personal statements or essays or completing homework.^{4,7} This makes the work of professors, instructors, and selection and recruitment committees difficult as it might be nearly impossible to identify the authenticity of the text. Even in hospital outpatient departments, ChatGPT might be used to generate electronic health records and preauthorization and to support computer-aided

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D Should academic journals publish texts generated from Chat GPT?

Academic journals should publish texts generated from GPT or any other AI language model if the material is relevant and of high quality, and meets the standards for scientific rigor and credibility required by the journal. However, it is important to note that AI-generated texts should be clearly identified as such and their limitations and limitations of their creators should be acknowledged. Ultimately, the decision to publish AI-generated texts in academic journals should be based on their contribution to the advancement of knowledge in the field and their alignment with the journal's mission and editorial standards.

D Should ChatGPT be listed as a coauthor if you have contributed to the manuscript writing

No, ChatGPT should not be listed as a co-author on a manuscript. Authorship is typically reserved for individuals who have made significant contributions to the conception, design, execution, or interpretation of the research being reported. AI language models like ChatGPT are tools that can assist in writing, but they do not have the capacity for creative or intellectual contributions and do not meet the criteria for authorship. The individuals who programmed and trained the model and those who used it to write the manuscript should be listed as the authors and should take responsibility for the content and accuracy of the work.

D Will the generated content be plagiarized or original?

The content generated by AI language models like ChatGPT is not considered to be original in the traditional sense, as it is generated based on patterns learned from existing text data. While the output produced by such models may be new and unique, it is not considered to be the product of original thought or creativity.

As for plagiarism, it is important to properly cite any sources used by the AI model in generating the content. This includes acknowledging the training data and any specific texts that were used as input to the model. If the generated content includes substantial amounts of text that are identical or very similar to existing sources, it could be considered plagiarism and may violate copyright law.

In summary, while AI-generated content may not be considered original in the traditional sense, it is still important to ensure that it is properly cited and that any sources used by the model are acknowledged.

D In future, can ChatGPT take the role of the authors or peer reviewers or editors?

In the future, AI language models like ChatGPT may play a role in supporting authors, peer reviewers, and editors in various ways, such as by suggesting text or generating summaries. However, AI models are not capable of replacing human authors, peer reviewers, or editors in a fully autonomous manner.

Authorship, peer review, and editing involve complex cognitive and creative processes, as well as ethical and social considerations, that are beyond the capabilities of current AI technology. Furthermore, the credibility and validity of scientific and scholarly work depend on human judgement and expertise, which cannot be fully replaced by AI.

While AI models may be able to assist in certain aspects of the writing, reviewing, and editing process, it is unlikely that they will be able to fully replace human involvement in the near future. Ultimately, the use of AI in these roles will need to be carefully considered and balanced with the need for human oversight and judgement to ensure the quality, credibility, and ethical standards of scientific and scholarly work.

Figure. Transcript of a realistic conversation with ChatGPT (OpenAI).

diagnoses and patient postoperative instructions and support.⁸ In direct patient care, the leeway for error is negligible, and the lack of accountability of ChatGPT accentuates this fact with stringent health care laws and defamation suits. Moreover, the use of AI might omit the human touch factor in the doctor-patient interaction and minimize the time that could have been used in understanding

the patient as a whole. However, this application still might be useful for busy clinicians managing the care of multiple patients simultaneously or in triage situations. To validate the points we made above (and to add to the dilemma) around the use of ChatGPT, we had a convincing conversation with the chatbot, which is shown in the [Figure](#).

ChatGPT is a disruptive innovation because it upsets the norm for many scientific, academic, medical, dental, health, and social standards regarding original work and the creation of manuscripts and documents, but, at the same time, it has the potential to disrupt the origination of innovation from human brains. The future will bring the introduction of more players and competitors in the field of chatbots, such as Google's Bard (based on Language Model for Dialogue Applications AI) and Microsoft products built on Bing and Edge. Beyond a doubt, ChatGPT is useful and saves human efforts, but with this there is an urgent need to revise the guidelines and recommendations used by academic journals, university committees, and educational institutions on tolerance limits to set between ethical norms and academic misconduct.

Editor's perspective

A key issue in scientific publication is the authors' taking responsibility for the article content, and AI tools are not able to be held accountable. Leading journals such as *Nature* and *Science* have published ground rules for the use and or exclusions associated with AI-generated works.^{9,10} Neither of these journals will allow AI to be listed in the authorship. Some

journals have elected to prohibit all AI-generated text and images, whereas others may allow AI-generated material that is disclosed in the methods section. The Journal of the American Dental Association is modifying its author guidelines to address this new technology to ensure transparency and veracity in its publications.

New technologies bring opportunities, and in the case of ChatGPT, there are associated novel challenges for the scientific publishing community. A variety of questions have arisen such as when will software capable of identifying AI-generated text be developed and available and how effective such software will be. What is the consequence for authors using AI in an undisclosed and nontransparent manner? Claiming AI-generated text as one's own would be considered plagiarism. The emergence of AI and the development of large language model tools that are freely available to the public is an exciting development that is requiring adaptation in scientific and biomedical publishing. It will be interesting to follow the challenges presented by this new technology with regard to academics and student writing. ■

Chat Generative Pre-trained Transformer is a disruptive innovation because it upsets the norm for many standards regarding original work, but it has the potential to disrupt the origination of innovation from human brains.

<https://doi.org/10.1016/j.adaj.2023.02.008>

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Disclosures: None of the authors reported any disclosures.

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