

# Investigating the Helpfulness of Artificial Intelligence in Academic and Scientific Writing

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## ABSTRACT

The Artificial Intelligence (AI) revolution is growing at lightning speed, and the brilliance comes in how we use it for the benefit of humanity. The present study enlightens on role of AI in academic and scientific writing. The study also uncovers the academicians, researchers, and writers' attitudes toward AI's helpfulness in academic and scientific writing. Semi-structured interviews are conducted to collect qualitative and quantitative attitudinal data from 15 respondents. Analysis is performed through word cloud and content analysis using QSR NVIVO version 12. The study shows that users have a positive attitude toward AI and find it helpful in improving academic and scientific writing. This study significantly contributes to academic literature and creates new knowledge on the use of AI in academic and scientific writing. The academicians, researchers, and writers can directly utilize the findings of the study in their fields.

## INTRODUCTION

### Generative Artificial Intelligence

Generative Artificial Intelligence (AI) has sparked mass excitement in technology not seen in decades. In response to the prompt provided by the user, the AI interface returns new content. AI prompts can be text, a picture, a video, a design, musical notation, or any other input that the AI system can analyze (TechTarget, 2023). Essays, problem-solving answers, and realistic fake images made from photographs or the voice of a person are all examples of AI-generated content. Some popular generative AI interfaces are ChatGPT, Dall-E, and Deepfakes. ChatGPT garnered a million users in just five days following its November 2022 launch. Its user base surpassed 100 million within two months (Economic Times, 2023). It demonstrates that nearly everyone is attempting to figure out what novel

things they can get these generative AI models to perform, and hence the possibilities appear enormous.

### **RESEARCHER DILEMMA**

A researcher communicates his research and its significance by presenting it in a well-written article. However, researchers and writers often face challenges like writer's block, poor writing style, referencing, and grammatical and structural issues (Bastug, Ertem, and Keskin, 2017). Writer's block is a paralyzing sense of being unable to advance and produce new content (Hall, 1998). The procedure of paraphrasing and grammar checks to achieve the best quality of language is not without difficulties.

According to a global Editage study, almost fifty percent of writers encounter difficulties in preparing an article for journal submission and perceive peer review to be a difficult procedure (Editage Insights, 2018). Therefore, researchers and writers are utilizing AI platforms such as ChatGPT, Grammarly, Quillbot, Copy.ai, Duplichecker, etc. to prepare scholarly articles.

On the other hand, recent studies suggest that AI-generated articles have inherent drawbacks. Transparency and authenticity of scholarly writing are threatened by the deployment of text-generating Large Language Models (LLM), such as ChatGPT (Peres et al. 2023). The artificial hallucinations created by ChatGPT are also highlighted in a study (Alkaissi and McFarlane, 2023).

### **RATIONALE FOR THE STUDY**

It is now critical to recognize the role of AI in overcoming challenges in academic and scientific writing. This study is carried out for a number of reasons. First, the academic domain on the usage of generative AI is still in its early stages. Blogs and articles supersede scientifically proven research papers. Second, India's national think-tank, the NITI Aayog (2018), published a discussion paper on the transformative potential of AI in India, claiming that integrating AI into the country's economy might add \$1 trillion to its GDP. This study can contribute significantly to the above-mentioned objective of India. Third, this study significantly contributes to academic literature and expands knowledge on the use of AI in academic and scientific writing, which is yet to be explored in the context of India.

### **RESEARCH OBJECTIVES**

Derived from significant research gaps, the objectives of this study are the following:

1. To study the role of AI in overcoming challenges in academic and scientific writing.
2. To gauge the AI users' attitude towards its helpfulness in academic and scientific writing.
3. To understand the future of AI in academic and scientific writing from the perspectives of AI users.

## **RESEARCH METHODOLOGY**

The objective is to study the role of generative AI in academic and scientific writing and gauge the users' attitudes toward it. The research is exploratory in nature. We have focused on India because it is the most populated and one of the fastest-growing economies. Data is collected from select major cities of India namely, Indore, New Delhi, Mumbai, and Kozhikode.

Semi-structured interviews are conducted to ascertain the attitudes of 15 AI users. All interviewees are between the age group of 20 to 48 with required experience in academic or scientific writing. Their academic positions are: professor, educationist, research scholar, copywriter, academic content creator, and postgraduate student. In qualitative studies, a valid sample needs to be composed of information-rich respondents in order to investigate multiple perspectives on the subject (Johnson & Waterfield, 2004). Therefore, 15 AI users are selected as respondents for the current study based on the research objective, purpose, and availability. Each participant is provided with a consent form that explains the nature and goals of the study.

Qualitative analysis is performed through word cloud and content analysis using QSR NVIVO version 12. Quantitative attitudinal responses are collected from respondents on a scale of 1 to 7 ranging from extremely unhelpful to extremely helpful.

## **RESULTS AND DISCUSSION**

This section is divided into three subsections and each subsection addresses one of the objectives of the study.

### **Objective 1: Role of AI in overcoming challenges in academic and scientific writing**

Due to the vast amount of information available today, researchers and writers require assistance in processing and organizing data and sources. Furthermore, due to the constant pressure to publish, researchers must generate relevant, novel, and well-written papers. As per the interviews with AI users, the following is a

list of the top 10 AI tools used by researchers and writers to overcome challenges in academic and scientific writing.

1. Grammarly: Grammarly is a cloud-based typing software that examines spelling, grammar, punctuation, clarity, engagement, imperfections, and plagiarism and proposes replacements in any text written in English and German language. Users can change their language for the occasion, style, and tone using this AI tool.
2. Cite This for Me: It is a popular online citation generator intended to assist researchers in swiftly creating a full bibliography or reference list. It provides citation style generators for APA, Harvard, MLA, Vancouver, Chicago, IEEE, and other formats.
3. Quillbot: It provides AI-powered features such as paraphraser, summarizer, co-writer, plagiarism checker, word counter, translator, grammar checker, proofreader, spell checker, punctuation checker, and essay checker. QuillBot intends to augment the content quality by automating these necessary procedures. A writer can now concentrate on what to write rather than how to write.
4. ChatGPT: ChatGPT can save time and effort spent on research papers by generating ideas and organizing writers' thoughts. Researchers use ChatGPT to fulfill many academic and non-academic tasks, such as research writing, both formal and informal speech wording, book summarization, and idea generation. However, it is a controversial issue to use ChatGPT in academic research (Chen, 2023; Dergaa et al. 2023)
5. Consensus: The Consensus AI tool is a search engine that uses AI to quickly find solutions to queries asked by users. AI is used to scan research articles and extract the main conclusions from each one. In contrast to manual searching, this allows individuals quicker access to data from peer-reviewed articles.
6. ChatPDF: Using the AI application ChatPDF, users can interact with a PDF document. It can quickly extract information from large PDF files and respond to users' questions by using relevant paragraphs. ChatPDF employs a next-generation AI model similar to ChatGPT to read the content of PDF files and give relevant responses. It enables users to converse with PDF documents as if they were human.
7. Scite: Scite's assistant allows users to collaborate on essays and research papers, as well as locate evidence to support and contradict their arguments. It uses Smart Citations to identify and evaluate scientific articles. Smart Citations show users how a publication was cited by providing the context of the citation as

well as a classification identifying whether the citation provides supporting or contrasting evidence for the cited statement.

8. Elicit: Elicit automates the research procedures by finding papers, extracting key claims, summarizing, brainstorming ideas, and more. It can identify relevant articles and extract crucial information even without explicit keyword matches.

9. Trinka: It corrects misspellings and advanced grammar issues in real time by delivering writing suggestions. It is designed for professional and scholarly production as a sentence structure checker and language proofreader. It is designed to catch faults that conventional grammar checkers miss, such as problems with subject-verb agreement, syntax, word choice, pronoun and article usage, and technical spelling. It also includes a professional tone, the use of technical terms, conciseness that extends beyond syntax and spelling, and style guides (Trinka, 2023).

10. Bit.ai: Bit.ai is used to draft, share, collaborate, and track shared documents. It offers powerful features like Digital Content Management, Smart Bit Document Editor, End-to-End Bit Document Sharing, Custom Document Branding, Security, and Customizable Workflow Solutions (Bit.AI, 2023).

## **Objective 2: Attitude of Users towards helpfulness of AI**

**Word cloud analysis:** To examine users' attitudes on the helpfulness of AI, the interview transcripts are run on NVIVO version 12 to produce word clouds of the 30 most often used words. Figure 1 is the software generated word cloud out of interview transcripts.



Figure 1. Word cloud.

**Content analysis:** Few excerpts from interviews are presented below.

**Interviewee 1:** “My problem is that I am a researcher...not a writer. Free AI softwares have helped a lot to improve my writing style. Now I can frame well-structured paragraphs with less grammatical errors.”

**Interviewee 2:** “When dealing with other people, just copying and pasting ChatGPT answers can be a great failure. ChatGPT and other AI tools can get us bricks but the construction of house is in our hands.”

**Interviewee 3:** “I Use it (AI) for a draft, but make sure it is an authentic message from my side before I send it. I've been testing it (AI) for citing also. It can't search behind paywalls and the fake references are a real setback.”

**Interviewee 4:** “The writing career will definitely suffer as a result of artificial intelligence! We (writers) struggle to find inspiration and rely on basic templates when we write and face the dreaded writer's block as a result. Then, there is AI... faster than humans...little to no work required!...The average won't exist in the future; instead, it will be a game of coming up with unique ideas, expressing empathy, and presenting interesting stories.”

**Interviewee 5:** “When I prompted ChatGPT to provide some basic information on neurological parts of the brain, it gave me incorrect information. Everyone who firmly believes in the current state of AI development should take this as an important lesson.”

**Interviewee 6:** “...but for now, I see graduate students making the mistake of relying on AI to write research projects. Surely, the better-articulated writing style is a win-win situation. However, they will block the rewards of striving to innovate, develop their own style of writing, or even genuinely appreciate the overall research process.”

**Interviewee 7:** “Whenever I prompt for factual information, it (AI) always made up something that doesn't exist. That's unfortunately how it is trained; to generate answers that somehow satisfy the request of the enquirer.”

**Interviewee 8:** “Why do I have a feeling that the AI will actually hinder creativity? I hope I am wrong.”

**Interviewee 9:** “...It (AI) alone cannot work, it needs brain of humans too. I have very well noticed it...I often ask AI to restructure the paragraph to suit a 55-year old senior professor. Yeah, why not!”

**Interviewee 10:** “After using AI for writing, you're more likely to be accused of plagiarism, and it's not a genuine expression of your knowledge because you never wrote it.”

**Interviewee 11:** “I think ChatGPT is just a tool that can help researchers with their research. I don't rely on it totally because it comes with a lot of pitfalls.”

**Interviewee 12:** “I believe it (AI) will force us to deepthink, even more profoundly. I always keep a critical eye and cross-check their output.”

**Interviewee 13:** “At a point, I face writer’s-block after writing few papers on same topic. Every time I have to draft a new introduction for the new paper. Therefore, I use AI for drafting 200-300 words introduction section for research papers. I also recommended the same to freshers in the field.”

**Interviewee 14:** “I was once deceived by an AI algorithm! and it left me questioning the reliability of these tools. As someone who frequently goes to technology for knowledge, I asked ChatGPT to back up a claim with a citation and was taken aback when the reference offered turned out to be bogus! The AI even assigned a random DOI number to the reference.”

**Interviewee 15:** “ChatGPT and I have become friends! We both prompt each other into writing content. I poke it with questions, and it pokes back with ideas and trends. I then build my content out of GPT response.”

Figure 2 depicts AI users’ attitude towards its helpfulness in academic and scientific writing on a scale of 1 to 7.

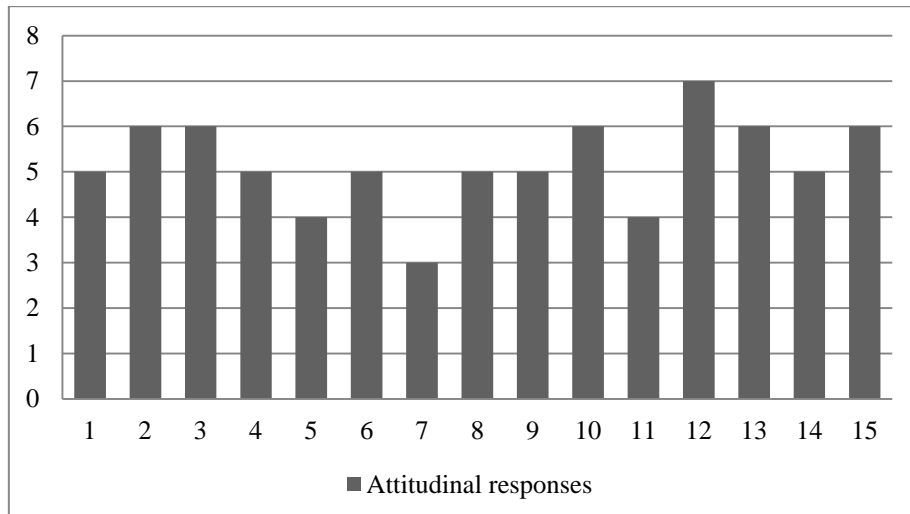


Figure 2. AI users’ attitude towards its helpfulness.

### Objective 3: Future of AI

The findings show that AI is here to stay with us forever. Respondents perceive that regulations on AI will emerge in the future thereby, restricting its usage in academic and scientific writing. Below are a few excerpts from interviews with respondents on the future of AI.

**Interviewee 1:** “...However, not all people use their creativity in healthy or ethical ways. It is going to be a force multiplier for both good and harm. Some will use AI to gain power in any way they can, and others will suffer.”

**Interviewee 2:** “The ill effects of this can be seen, even when the AI is at its early stage. How many people today are becoming increasingly disconnected and depressed 'cause social media replacing much of their lively interaction with loved ones. Many of us have already received sophisticated training to prefer robots to human contact.”

**Interviewee 5:** “I am doubtful of AI’s future in writing academic articles because there are AI-detector tools to check if an article is written by ChatGPT-like AI. And I have seen top journals have started mentioning in the author’s guidelines that they are not currently accepting ChatGPT as an author.”

**Interviewee 8:** “As I have seen, the benefits of disruptive technology have outweighed the negative aspects. We just need good people. However, only time will tell how AI will affect humanity in the long run.”

**Interviewee 13:** “But keep in mind that AI was developed by humans and can only be destroyed by humans. Some jobs may be wiped out, but many new jobs will be created as long as they are tied to human interest.”

**Interviewee 14:** “We, as professionals, can't deny generative AI's immense capability. We have the potential to use it to our advantage because of its ability to unlock new levels of creativity, intelligence, and invention. Although it is merely the beginning, the prospective rewards are too great to overlook. By embracing AI, we can take the first step towards more innovative academic literature.”

**Interviewee 15:** “Currently, AI learns from humans, so, AI is biased in the same ways as humans are biased. AI can be sexist, racist, and so on. Humans are extremely imperfect, and some are even evil.”

## CONCLUSION

The AI revolution is growing at lightning speed, and the brilliance comes in how we use it for the benefit of humanity. The present study enlightens on how AI helps in academic and scientific writing. The study also uncovers the academicians, researchers, and writers’ attitudes toward AI’s helpfulness in academic and scientific writing.

The study shows that AI users have a positive attitude toward AI and find it helpful in improving academic and scientific writing. The results show that AI is democratizing access to technology for everyone, yet the contribution of AI in



maximizing human creativity is still contentious. While AI offers us tremendous tools and information, it is human minds' imagination that will lead the way for revolutionary solutions to the most difficult issues. Thus, by collaborating human experiences and mindfulness with AI models, we may push problem-solving to new heights, unleashing the full power of our collective intelligence.

Simultaneously, technology is literally in everyone's hands and becoming so simple to use that there are rapidly emerging concerns about ethics, privacy, threats, and responsibilities (Eke, 2023). At the time of writing, no regulatory body exists to ensure that AI innovation is aligned with societal well-being and to mitigate possible risks connected with its development and deployment. However, few management journals have made it clear that they are not accepting ChatGPT as an author or co-author (e.g., Taylor & Francis, 2023; Elsevier, 2023; Springer-Nature, 2023).

Although AI will undoubtedly replace some jobs, it has also generated many more, ending in a net gain. The goal is to be ready for and adaptive to future changes and possibilities. Remarkably, the human touch will become increasingly valuable in an automated world.

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