Research in Social Sciences
ISSN: 2641-5305
Volume 8, Issue 4, pp. 16-24
2025
DOI: 10.53935/26415305.v8i4.438

Using Chatbot and ChatGPT as Useful Tools in Scientific Academic Writing

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ABSTRACT: *This review investigates the practice and influence of chatbots and ChatGPT as employable tools in writing for scientific academic purposes. A primary collection of 150 articles was gathered from academic databases, but it was systematically chosen and refined to include 30 studies that focused on the use of ChatGPT and chatbot technology in academic writing contexts. Chatbots and ChatGPT in writing enhancement, support for student learning at higher education institutions, scientific and medical writing, and the evolution of research and academic publishing are some of the topics covered in the reviewed literature. The review finds these tools helpful, with their greatest advantages being in areas such as structuring writings, grammatical assistance, content generation, and writing efficiency. However, it identifies significant problems, primarily ethical ones involving plagiarism, misinformation, phony references, and compulsive use impeding the development of new independent writing. The results encourage the implementation of ethical procedures that guarantee human intervention and responsible use, guaranteeing that chatbots and ChatGPT complement human faculty rather than replace it. These tools, when used properly, can significantly improve academic writing while maintaining the highest scholarly standards of originality and integrity.*

Key words*: Academic writing, AI ethics, chatbots, ChatGPT, higher education, scientific research, writing assistance.*

1. Introduction

In recent years, the rapid evolution of AI technologies has made a huge impact on academic writing, particularly scientific research. The Chatbot is undoubtedly one of the biggest developments alongside language models such as ChatGPT. These technologies have increasingly attracted the attention of researchers, students, and academics mainly for their ability to aid in writing well-structured and high-quality research papers (Kim & Kim, 2022; Bhattacharyya et al., 2023). Academic writing is one component of quality higher education and research, demanding linguistic skills, organization, and reasoning. However, many academicians, especially non-native English speakers, undergo great difficulties in the cataclysm of putting their ideas into writing coherently and adhering to the formal conventions of academic writing (Guo & Wang, 2023; Hosseini et al., 2023). With the integration of AI chatbots into the writing mechanism, new chances are created to heal these problems by allowing for automated writing support, refinement of content, and interactive-learning opportunities (Bozkurt, 2023). Moreover, ChatGPT AI chatbots are taking another step forward in science with the introduction of powerful language model software. OpenAI, a state-of-the-art artificial intelligence research and development company, has developed an approachable tool based on a modular framework and neural network configuration to improve natural language

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processing tasks (Mathew, 2023). ChatGPT, an AI-powered chatbot that can write formal, informal, and creative texts, has problems in the classroom. Writing creative works like poetry, short stories, novels, and other works of human caliber is incredibly simple with ChatGPT's ability to comprehend human language. The output's originality is limited by its ease of use of text input information, which renders it uncreative (Qin, 2023).

Chatbots, utilizing natural language processing (NLP) and machine learning algorithms, revolutionize the way users interact with digital tools for academic and research purposes. These AI-driven applications, such as Grammarly, Quillbot, and research-focused AI assistants, can provide real-time feedback on grammar, style, and coherence, assisting writers in enhancing the clarity and precision of their academic work (Cai et al., 2021). The possibilities for ChatGPT, an AI powerhouse from OpenAI, are actually pretty limitless. It can be used to generate AI text, summarize research, develop ideas, and further academic content in a nearly limitless number of ways (Dempere et al., 2023; Chance, 2022). The use of ChatGPT, AI software, and chatbots to generate academic texts raises some ethical concerns in addition to all the other ethical issues and problems. Plagiarism is a problem because content produced by AI chatbots may be viewed as unoriginal depending on the situation, potentially promoting perverted academic misconduct (Athaluri et al., 2023; Peres et al., 2023). Secondly, AI-generated text may embed biases, misinformation, and fabricated references, which could compromise the work's accuracy and scholarly quality. The issue of students' excessive dependence on AI then arises, which may be detrimental to them if they become careless and lose their ability to think critically and write on their own (Lund et al., 2023). These challenges necessitate the prioritization of best practices and ethical guidelines for the use of AI-assisted writing in academia, ensuring its responsible application.

This review paper intendes to examine the role of chatbots and ChatGPT in scientific academic writing by: (1.) assessing the efficacy of chatbots and ChatGPT in academic contexts to elevate writing quality, coherence, and efficiency,(2.) concerning practical and ethical issues pertaining to AI-assisted writing, namely plagiarism, disinformation, and academic integrity; and (3.) suggesting procedures and guidelines to enable the responsible use of AI creative tools in academic research and instruction.This paper critically examines recent research and existing literature to provide a thorough understanding of how AI-powered writing assistants can assist researchers, improve productivity, and preserve the values of academic authenticity and integrity.

2. Related Work

Liu et al. (2023) conducted a systematic review to investigate the uses of ChatGPT in relation to academic writing by extracting 327 scholarly documents from the Web of Science database. The primary goal of this study is to identify ChatGPT’s reach and constraints in this field. According to the authors, ChatGPT is being used more and more by researchers and students to boost writing speed, lessen writing anxiety, obtain a rough draft of an academic paper, and receive feedback on their work. However, the study brings up some practical and ethical issues, such as the risk of plagiarism, the supply of inaccurate or out-of-date information, and the gender or racial bias built into ChatGPT. Another issue raised is authorship verification to keep academic publications objective and fair. In order to address these concerns and integrate AI-assisted academic writing tools responsibly, they call for more research and policy initiatives. Tawfeeq et al. (2024) conduct a thorough investigation into the moral ramifications of Chatbots. Their review extends beyond ethical issues to include issues like privacy, equity, bias, malicious use, and the effect on human communication and social skills. They survey the literature on the ethics of AI and then go on to discuss the current ethical guidelines for conversational AI technologies. The paper explores ethical dilemmas that may arise from the use of ChatGPT by analyzing case studies and examples, including the misuse of ChatGPT for generating harmful content or reinforcing stereotypes. The authors criticize the inadequacy of present ethical frameworks and call for more stringent, multidisciplinary guidelines that address the moral obligations of creators, users, and regulators of AI. Clearly, the first element stresses the urgency of creating an ethical code to keep up with the ever-increasing presence of ChatGPT in society. In a separate study, Nafea et al. (2024) reviewed the phenomenon of ChatGPT pertaining to scientific manuscript writing in a direct and concise manner. This study looks

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into the extent to which ChatGPT is useful and the challenges it faces becoming a component to writing in scientific research. In other words, the paper considers how researchers may incorporate ChatGPT in the enhancement of coherence, clarity, and structure within their manuscripts. Concurrently, it raises a few issues, such as the credibility of authorship, originality of content, and plagiarism based on AI, thereby underlining the urgent need for clear guidelines on attributes of work wherein AI is utilized in the production of published work. The researchers gathered feedback from researchers that use ChatGPT and concluded that while the tool is helpful, it should be used responsibly with human supervision, thereby rendering their findings to feed into a more grounded understanding of the position of ChatGPT in academic and scientific writing. Ray (2024) addresses some areas that make a wholesome review on ChatGPT by presenting its evolution, technical background, a broad range of applications, and ethical concerns. The author also explains the applications of ChatGPT, based on models such as GPT-3.5, in several areas, such as research, education, health care, and customer services. The questions addressed in The paper also identifies areas for future research, such as enhancing AI-human interaction and integrating ChatGPT with other technologies. The review concludes that while ChatGPT brings about a number of fundamental changes in a remarkably short period, responsible use necessitates ongoing ethical reflection and interdisciplinary collaboration.

The current study emphasis is on a very specific facet of ChatGPT: Scientific academic writing, while in the former studies, ChatGPT was assessed in more general areas, e.g., educational, ethical, or AI in general. By bringing together the various impacts that the emergence of ChatGPT and its incipient chatbots brings to bear on such matters as writing output, research output, and ethical considerations of scholars, this study serves to bridge the gap. Given the focused investigation as opposed to a more generic review, it offers targeted evidence to the theoretical and practical considerations of AI writing tools and sheds light on the academic writing process in tertiary education and research.

3. Methodology

The researchers begin their study by conducting a comprehensive search for literature related to chatbots, ChatGPT, and AI-assisted academic writing. They utilize the Google search engine to locate relevant sources and compile a total of 150 articles. These articles come from various journals, including the Online Journal of Distance Education and e-Learning, the Journal of Technology and Science Education, the Online Learning Journal, Sciedu Press's International Journal of Higher Education, and the Journal of Physics, among others. Instead, the sources are all pedagogical and technical, which leads to a balanced and comprehensive analysis. For the purpose of conducting a thorough analysis, the researchers have access to each article in PDF format. In the following phase, the researchers use a refinement criterion before eliminating any articles that do not support the main idea of the investigation. More precisely, they do not include articles that discuss general AI techniques like machine learning algorithms or AI ethics, writing techniques that are not related to AI (like essay structure or grammar correction tips), or project management techniques in academic settings. This filtering is intended to reduce the number of articles to 90 that are more specifically related to academic writing and artificial intelligence. The third refinement step involves eliminating articles that discuss AI applications in domains unrelated to the study's purview, such as creative writing and digital marketing. While these areas also involve AI-assisted text generation, they fall outside the core domain of scientific academic writing, which constitutes the study's primary concern. As a result, the dataset is further reduced to 65 articles. In the fourth stage, the researchers focus specifically on content that addresses the role of chatbots and ChatGPT in academic writing. They exclude articles dealing with linguistic or cultural differences in chatbot interactions, such as those examining how users from different countries engage with AI in customer service or general communication. Although such topics are linguistically significant, they do not directly contribute to the discussion of academic authorship. This step reduces the selection to 45 articles. Finally, the researchers removed studies focusing on scientific fields where AI-assisted writing is employed for purposes unrelated to language production, such as chemistry, biology, or mathematics. These studies tend to emphasize AI's utility in data analysis or formula generation

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rather than in written academic expression. This final stage of refinement narrows the selection to 30 articles that directly engage with AI-assisted academic writing tools like ChatGPT, particularly in the context of scholarly publishing, scientific writing, and higher education communication, as shown in Table 1.

Table 1. Reduction of Articles in the Research Process

Step	Filtering Criteria	Reduction
1	initial collection of research articles on chatbots, ChatGPT, and AI-assisted academic writing	150
2	excluded studies on general learning strategies, writing techniques, and project management	90
3	removed articles focusing on digital marketing, creative writing, and general AI applications unrelated to academic writing	65
4	excluded research discussing language differences in chatbot interactions, rather than their impact on academic writing	45
5	removed articles centered on e-learning platforms and curriculum development rather than chatbot use in writing	30
6	Final selection: studies specifically examining chatbots and ChatGPT as tools in scientific academic writing are left.	30

4. Findings

The researchers collected articles from various journals and categorized them into five themes: ethical concerns and challenges of ChatGPT in academic writing, the role of ChatGPT in higher education and student writing, the influence of ChatGPT on scientific and medical writing, AI, chatbots, and the future of academic research and publishing, and practical applications and limitations of ChatGPT in writing. Each of these themes will be examined in a separate section.

4.1. Ethical Concerns and Challenges of ChatGPT in Academic Writing

Six recent academic studies examine the ethical questions and challenges faced in applying ChatGPT for academic writing and research. These studies scrutinize the use of ChatGPT as a postulate tool and enumerate certain problems like misinformation, plagiarism, academic dishonesty, and overdependence. Guleria et al. (2023) consider ethical and privacy concerns surrounding ChatGPT in scientific writing and revealed that there are serious risks in medical science and engineering given the inaccurate nature of the information ChatGPT produces. They emphasize that clear policies and guidelines should be set forth regarding the use of AI tools in research.Tran and Nguyen (2024) observe how ChatGPT could enhance the writing skills of English major students. Their study shows the students use ChatGPT for feedback and ideas, yet raise concerns such as academic dishonesty, over-reliance, and issues of privacy. The authors recommend careful use in an educational context so as not to compromise academic integrity or get in the way of independent learning. Alkaissi and McFarlane (2023) investigate what is termed "artificial hallucinations" by ChatGPT, i.e., false or fabricated information in scientific writing. The case studies show that ChatGPT sometimes fabricates facts, indicating there is an ethical dilemma, and hence, they assert that researchers should always verify AI-generated content. Harati (2024) provided an analysis of AI tools and ethical issues relating to academic writing and research. His review touches on concerns such as plagiarism, theft of intellectual property, bias, and the curtailment of critical thinking. Harati advocates for the adoption of strict academic rules that demand transparency while carving out a significant space for authorship when utilizing AI-generated content. Yip et al..Yip et al. (2016) review legal and ethical issues from a more academic perspective and consequently treat global guidelines such as the Declaration of Helsinki and the Belmont Report. While their work does not single out ChatGPT, it presents ethical principles of confidentiality, informed consent, and malingering avoidance that are of utmost importance. Al-Sofi (2024) analyses how ChatGPT is used by Saudi EFL students to produce academic writing. The findings assert that the students believe ChatGPT to have its advantages; however, against these come some issues of plagiarism,

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misinformation, and academic dishonesty. According to Al-Sofi, ethical use of AI can be ensured through detection-based tools, training users in AI, and revising academic policies.

Together, these six studies in the realm of academia have shown that ChatGPT can be an aiding tool for students and researchers in writing; but at the same time, they also mark the serious nature of ethical issues. The major concerns revolve around plagiarism, misinformation, threats to academic integrity, privacy issues, and the erosion of critical thinking. There is a consensus among the studies that AI tools such as ChatGPT should assist human judgment in academic writing rather than replace human judgment.

4.2. Practical Applications and Limitations of Chatgpt in Writing

Studies deal with the practical application of ChatGPT and its limitations in writing. Bhatia (2023), Tarchi et al. (2024), and Rapanta (2024) explore ChatGPT as something that can be used beneficially in academic and scientific writing. These works emphasize ChatGPT's ability to generate text or annotations, submit feedback, or assist the user in performing literature reviews and structuring research reports. According to Bhatia(2023), ChatGPT generates high-quality, basically coherent, and logical-sounding academic text, sometimes even to the extent of authorship of large portions of scientific papers. Tarchi et al. (2024) emphasize the application of ChatGPT in source-based writing tasks; the tool aids students in synthesizing and structuring ideas based on the texts provided. Rapanta (2024) also supplies an autoethnographic account of the employment of ChatGPT-4 in scholarly research writing; it illustrates that, given a critical and ethical use, the tool boosts academic productivity. However, throughout the articles under review, there are several limitations and concerns. Bhatia (2023) warns that ChatGPT sometimes produces inaccurate, nonsensical, or biased content, with limited post-2021 knowledge and the potential to generate fake scientific abstracts indistinguishable from human-written ones. Tarchi et al. (2024) find that students' use of ChatGPT reduces the inclusion of literal information from source texts; they indicate a risk of undermining textual accuracy. Rapanta (2016) therefore asserts that critical human oversight remains key to verifying the originality, coherence, and ethical standard of academic output. Lozić and Štular (2023) and Abbas (2023) examine the barriers in generating original scientific content through ChatGPT. Both studies find that ChatGPT-4, although operating relatively better than other AI chatbots in recombining existing knowledge, claims no originality in making scientific contributions, at least in the humanities. Abbas (2023) brings to the fore core ethical issues such as authorship, accountability, transparency, and credibility that are central when ChatGPT is used in academic contexts. Finally, the last case study by Nobre (2023) refers to the use of ChatGPT to write about regional economic development. The AI seems capable of structuring content and summarizing research. The author identifies limitations in depth, originality, and contextual understanding, especially when addressing complex, region-specific topics.

Taken togethers, these studies regard ChatGPT for practical use and consideration in academic writing. It helps in text generation, source-based writing, and productivity. On the other hand, there are questions over accuracy, bias, limited knowledge, and lack of originality. Ethical issues of authorship, accountability, and transparency are presented as well. Nonetheless, studies insist that ChatGPT is in no way capable of replacing critical human judgement. It is only of use in tasks where some circumscribed contextual understanding and originality are demanded. Its very appropriation and pertinence in academic writing should depend on a responsible and ethical use by human beings along with their verification.

4.3. AI, Chatbots, and the Future of Academic Research and Publishing

Several recent studies focus on the issue of AI, chatbots, and the evolution of academic research and publishing. All seek to understand how tools such as ChatGPT change the domain of scholarly communication, of writing, and the overall environment of research. Alqadi et al. (2023) investigate ChatGPT's use in academic writing among researchers. From their survey, it appears that ChatGPT aids with idea generation, summarization, paraphrasing, and proofreading. However, hashed opinions concerning its accuracy and reliability are given by participants, thereby citing some advantages and restrictions to its use in academic settings.

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Similarly, Golan et al. (2023) argue that AI tools like ChatGPT increase efficiency in writing, editing, literature reviewing, and even generating manuscript outlines. These tools assist researchers, mostly novices, in removing barriers in hypothesis formulation and manuscript preparation. However, concerns still exist about access to the currently available literature and potential biases in outputs. According to Homolak (2023), ethical concerns against the use of AI in publishing intensify. The uncertainty about authorship, ownership, and responsibility casts a shadow on the topic. Using AI-detection tools, he further reflects on inhibiting factors of those very tools, which render false positives on abstracts dated pre-AI era. Meyer et al. (2023) argue for cautious optimism. They acknowledge ChatGPT's potential to improve research productivity but warn about issues of factual inaccuracies, bias, and the opacity with which contents are generated. The twist is they want to stress that use of AI is not plagiarism per se, but it produces plagiarized content and thus calls for responsible human oversight. Garga et al. (2024) compare ChatGPT and Bard (Gemini) with established databases like Scopus and Web of Science and conclude that AI models, while promising, are still not reliable for rigorous academic research. Accuracy, completeness, and source validation are areas that these AI tools lag behind traditional databases.

As a whole, these studies review how AI and chatbots shake down the academic scenario with research and publishing. They accept ChatGPT's use in idea generation, summarizing, editing, or assisting in writing. Yet they reserve their criticism for accuracy and bias and issues of authorial identity and objectivity of the content. Ethical questions on ownership and responsibility open large discussions. While it does augment productivity, it suffers from the question of Veracity and source appraisal. These studies are advocating for human intervention and strict regulation of ChatGPT for responsible embedding in scholarly communications.

4.4. The Influence of ChatGPT on Scientific and Medical Writing

Multiple recent articles discuss the theme "The Influence of ChatGPT on Scientific and Medical Writing." For example, the works of Salvagno et al. (2023), Abd-Elsalam and Abdel-Momen (2023), and Fatani (2023) describe how ChatGPT assists scientific and medical writing by producing drafts, arranging content, and supporting proofreading. The studies emphasize that ChatGPT contributes to a more efficient process of writing by helping researchers in the structuring of material and in the generation of prose, the need for which is particularly acute in the early stages of the development of a manuscript. These authors include Biondi-Zoccai et al. (2025), who consider some legal and ethical issues arising from the use of ChatGPT in scientific research and further point out that ChatGPT accelerates the process of writing and peer-reviewing but that concerns remain as to its accuracy, transparency, and fair access to the technology. Likewise, Baumgartner (2024) stresses the opportunities of ChatGPT for translational medicine but cautions to not overly rely on it, urging a responsible use of the tool in adjunct with professional expertise. According to Fatani (2023) , ChatGPT translates, summarizes, and drafts scientific content, especially in medicine and dental research, contributing toward faster and easier academic article publication. Still, the article also recommends that the use of this tool be monitored carefully due to ethical concerns. Bhattacharyya et al. (2023), conversely, present a critical view, pointing out the high incidences of fabricated and erroneous references generated by ChatGPT. According to their analysis, almost half of the citations in ChatGPT-constructed content are either outright fabrications or contain gross inaccuracies. This means that ChatGPT may be a tool for generating readable and coherent text, but human verification always remains present as a layer to maintain scientific rigor and credibility.

Collectively, these articles endorse the view of ChatGPT's growing influence in scientific and medical writing. These benefits include enhanced writing speed, better content organization, and possibly nearly matching support for those for whom English is a second language. Ethical issues, including plagiarism, misinformation, and unequal access, remain huge challenges. The studies contend that appropriate expert oversight and regulatory frameworks, along with responsible ChatGPT implementation, should set a clear path in this direction.

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4.5. The Role of ChatGPT in Higher Education and Student Writing

Six recent academic studies examine the role of ChatGPT in higher education and student writing. The studies brought out ChatGPT's potential, the real use cases in writing tasks, and the challenges posed to the higher education context. All these studies illustrate that ChatGPT is primarily employed as a writing assistance and learning tool by undergraduate and postgraduate students alike. Costa et al. (2023) carried out a scoping review on ChatGPT in academic health writing. The study found that ChatGPT does improve the clarity, coherence, and structure of scientific texts, particularly in nursing and medical research. However, they emphasized that responsible use needs professional supervision and an ethical regulatory body. Areas of risk concerning originality and ethical issues were highlighted as being the next crucial area for guidance. Imran and Almusharraf (2023) conduct a systematic review of the literature focusing on ChatGPT in higher education. Their findings show that ChatGPT is a useful tool for both students and scholars in terms of content generation and thought arrangement. However, they suggest policy changes to prioritize academic integrity and provide more training for AI-enabled learning environments. Guo et al. (2023) interact with EFL students with the chatbot Argument in argumentative writing tasks. Their study confirmed that students initiated collaborative relationships with the chatbot, further supported by complementary interfaces such as online dictionaries and translators. But even though the chatbot enhances writing, it still could not fully cater to students' needs, implying that human intervention and Guidance is indispensable. Sasikumar and Sunil (2023) study post graduate commerce and management students' chatbot preferences for academic writing. The results show that students preferred chatbots that dispensed accurate authentic information and that were easy to use. They would also prefer open-source tools and tools that supported clear presentation styles. Their study ranked chatbot tools by way of student preference using the AHP-TOPSIS method. Özçelik and Ekşi (2023) look at ChatGPT's role in teaching register knowledge within English writing. Their case study shows that students found ChatGPT helpful for formal writing tasks but not for informal or neutral tone writing. While it assists learners to gain better control over the formal style, its effectiveness in situational writing contexts is questioned. This research built on the understanding of ChatGPT limitations in stylistic adaptability. Gururaj and Dsouza (2024) offer a more comprehensive perspective on AI tools for academic writing. They categorize tools into classes like content generation, citation management, and proofing. While AI tools such as ChatGPT make writing easier and quicker, the authors stressed that critical thinking and human judgment should be at the core of academic work. Their study reinforces the concept that AI should be helping, not replacing, the intellectual work of students.

Through these investigations, we get clear evidence of chatGPT's increasing relevance in higher education and student writing. They further detail the merits of chatGPT in clarifying work; in developing an idea effectively in an oral presentation; in putting content together with coherence, and so on. ChatGPT is an assistant tool in writing; however, it cannot do away with human intervention or critical thinking. Other problems pertaining to plagiarism, misinformation, and academic integrity exist. It should be used responsibly, under professional supervision with clear policies informing such use. The studies further highlight the existing regulatory systems, which protect the ethical use of chatGPT in scientific academic writing and its practical implementation.

5. Conclusion

In concluding this review paper, the growing use of chatbots and ChatGPT in scientific academic writing is highlighted. These tools demonstrate significant potential to support the enhancement of students' and researchers' productivity across disciplines, as well as the organization of content and the quality of their writing. The reviewed research reveals that using chatbots and ChatGPT speeds up the academic writing process by providing assistance with grammar corrections, idea formulation, paraphrasing, and improving academic writing structure. Thus, they prove somewhat helpful in higher education when students face difficulties with academic conventions or language correctness. These findings, however, highlight the presence of moral and practical issues, including plagiarism, misinformation, fake citations, and a decline in students' critical thinking skills. It is necessary to create legally binding guidelines to maximize the ethical use of chatbots and ChatGPT. Such rules

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promote a responsible approach to their application, supported by human oversight. Researchers and educators contribute to improving scientific writing in terms of quality, accessibility, and efficiency by implementing a practical strategy for using these tools ethically in support of academic integrity. This fosters a more inclusive academic community.

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ISSN: 2641-5305
Vol. 8, No. 4, pp. 16-24
2025
DOI: *10.53935/26415305.v8i4.438*

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