

Challenges, Benefits and Recommendations for Using Generative Artificial Intelligence in Academic Writing - A Case of ChatGPT

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Abstract

The advent of ChatGPT and other generative artificial intelligence (GAI) tools has sparked significant discourse in academic writing, raising both opportunities and challenges. This study examines the impact of ChatGPT on academic writing, particularly in higher education, with a focus on South Africa but extending a global perspective. The primary concerns revolve around the accuracy of AI-generated content and ethical issues like plagiarism, which threaten academic integrity. The problem statement identifies the core issue as the ethical and effective integration of ChatGPT in academic writing, affecting students, faculty, and researchers who utilize these tools. The purpose of this research is to critically analyze the challenges and benefits of using ChatGPT in academic writing and to develop recommendations for its ethical and effective use. Utilizing a systematic review methodology with a mapping review design, the study synthesizes literature from 22 countries, providing a broad understanding of the global perspective on GAI tools in academia.

The findings reveal that while ChatGPT can significantly enhance productivity, improve language support for non-native English speakers, and provide immediate feedback, it also poses risks related to plagiarism, accuracy, and over-reliance on AI. Ethical concerns are paramount, with the need for transparent disclosure of AI use, proper attribution, and policies to prevent misuse. To address these issues, the study proposes the OTHA (Openness, Transparency, Honesty, and Accountability) Framework. This framework aims to guide the ethical integration of ChatGPT by fostering a collaborative approach, ensuring transparency in AI use, promoting ethical training, and establishing accountability mechanisms. The study recommends comprehensive policies, targeted training, equitable access to AI tools, and regular monitoring and evaluation to ensure responsible AI use in academic settings. By implementing these recommendations, educational institutions can leverage the benefits of ChatGPT while maintaining academic integrity and promoting inclusive educational practices.

Keywords: Academic Writing; Artificial Intelligence; ChatGPT; Education Policy; Generative AI; Higher Education

Introduction

The advent of ChatGPT in academic writing brings several controversies to the forefront, particularly concerning the accuracy of information and ethical issues like plagiarism. ChatGPT is known to fabricate credible but fictitious references, challenging academic integrity. The ease with which students can use AI to generate essays and dissertations complicates the detection of plagiarism, a concern echoed by academic journal editors who struggle to differentiate between human and AI-generated texts.

A lot of discussions and conversations have proliferated the public domain within the context of academia on whether a machine can exhibit behavior indistinguishable from a human, is increasingly pertinent as ChatGPT frequently passes this test in academic contexts. This situation raises questions not only about the nature of AI but also about the readiness of students and educators to critically engage with AI-generated content.

This study aims to delve into the multifaceted impacts of ChatGPT on academic writing, with a special focus on South Africa but providing a broad global perspective. Following a systematic review paradigm, using mapping review as a research design, the study scanned literature on 22 countries. By examining both the potential advantages and the challenges, it seeks to provide a balanced perspective on how GAI tools can be ethically and effectively integrated into educational practices. The study concludes by proposing a OTHA (Openness, Transparency, Honesty and Accountability) framework that could be used to respond to challenges and benefits provided by ChatGPT.

Problem Statement

In the rapidly evolving landscape of education and technology, the integration of Generative Artificial Intelligence (GAI) tools such as ChatGPT presents both unprecedented opportunities and significant challenges for academic writing and research. Despite the potential benefits of GAI in enhancing productivity, providing language support, and offering personalized feedback, there are critical concerns regarding ethical use, accuracy, accountability, and academic integrity.

GAI refers to a class of artificial intelligence systems designed to generate new content, such as text, images, audio, or video, based on the data they have been trained on (Zhihan, 2023). These systems use machine learning algorithms, particularly neural networks, to create content that mimics human-like creativity and expression. GAI models can learn patterns and structures from vast datasets, enabling them to produce outputs that are original yet coherent and contextually appropriate (Sætra, 2023). Examples of generative AI applications include generating realistic images, composing music, and writing text, among others. GAI has the potential to revolutionize various fields by automating creative tasks and augmenting human capabilities in producing content. One of the GAI technologies being investigated in this study, which is the basis of the problem being investigate, is the us of ChatGPT in academic writing.

ChatGPT is a specific application of Generative AI developed by OpenAI, designed to understand and generate human-like text based on the input it receives (Perkins, 2022; Partha, 2023). Utilizing the architecture of a transformer-based neural network, ChatGPT has been trained on a diverse range of internet text, enabling it to perform a variety of language-related tasks. These include answering questions, composing essays, drafting emails, translating languages, and engaging in conversations on numerous topics (Jo & Park, 2024). ChatGPT can generate coherent and contextually relevant responses, making it a powerful tool for applications in customer service, content creation, education, and more (Partha, 2023). Despite its capabilities, ChatGPT also presents challenges such as generating plausible but incorrect information and the potential for misuse in producing unethical content.

The core issue is the ethical and effective integration of ChatGPT in academic writing and research (Imran & Almusharraf, 2023; Hosseini, et al., 2023). This problem affects students, faculty, and researchers in higher education institutions who use or plan to use ChatGPT for academic purposes. While ChatGPT can significantly improve efficiency and support non-native English speakers, there are concerns about plagiarism, accuracy, the reliability of AI-generated content, and the potential erosion of critical thinking and writing skills (Kanyane, 2023). Addressing these concerns is crucial to maintain academic integrity and ensure responsible use of AI tools. The problem is particularly relevant in diverse educational contexts, including under-resourced institutions in South Africa and globally, where disparities in access to technology and varying levels of digital literacy pose additional challenges. This issue has gained prominence since the launch of ChatGPT on November 30, 2022, and continues to evolve as more educational institutions adopt AI technologies in their academic practices. To address this problem, it is essential to develop comprehensive policies, provide targeted training and resources, ensure equitable access to AI tools, and establish monitoring and evaluation mechanisms to assess the impact and ethical use of ChatGPT in academic settings.

The need for a balanced approach that maximizes the benefits of GAI while mitigating risks and upholding ethical standards is imperative. Without clear guidelines and adequate support, the integration of ChatGPT could lead to unintended consequences, undermining the quality and integrity of academic work. Thus, there is an urgent need for educational institutions to implement a structured framework that guides the ethical and effective use of ChatGPT in academic writing and research (Yu, 2023).

Purpose of the Study, Questions and Objectives

Purpose

The purpose of this study is to critically examine the integration of Generative Artificial Intelligence (GAI) tools, specifically ChatGPT, in academic writing and research within higher education institutions. This study aims to:

- **Identify and Analyze Challenges:** Investigate the limitations and potential risks associated with the use of ChatGPT in producing academic content, with a focus on issues such as accuracy, plagiarism, ethical concerns, and the quality of generated outputs.
- **Evaluate Benefits and Enhancements:** Assess the advantages of using ChatGPT in academic writing, including improvements in productivity, language quality, and assistance for non-native English speakers, and identify specific areas where these tools can be most effective.
- **Examine Ethical and Responsible Use:** Explore the ethical implications of using ChatGPT in academic contexts, including authorship attribution, accountability, and the development of guidelines to ensure transparent and ethical use of AI-generated content in scholarly work.
- **Develop Recommendations:** Formulate guidelines and best practices for the use of ChatGPT in academic writing and research, focusing on balancing AI assistance with human oversight, enhancing the reliability and validity of AI-generated content, and promoting academic integrity.
- **Address Knowledge Gaps:** Highlight gaps in current research, particularly in the South African context, and suggest areas for further study to better understand the long-term impacts of AI integration in academia.

Research Questions

Main Research Question: "What are the challenges, benefits, and ethical implications of using ChatGPT in academic writing within higher education?"

- What are the limitations and potential risks associated with the use of ChatGPT in producing academic content?
- What are the advantages of using ChatGPT in academic writing?
- What are the ethical implications of using ChatGPT in academic contexts?
- What guidelines and best practices should be formulated for the use of ChatGPT in academic writing and research?
- What gaps exist in current research on the use of ChatGPT in academia, particularly in the South African context, and what areas need further study?

Research Objectives

- To investigate the limitations and potential risks associated with the use of ChatGPT in producing academic content.
- To assess the advantages of using ChatGPT in academic writing.
- To explore the ethical implications of using ChatGPT in academic contexts.
- To formulate guidelines and best practices for the use of ChatGPT in academic writing and research.
- To highlight gaps in current research, particularly in the South African context, and suggest areas for further study.

Significance of the study

The significance of this study lies in its potential to transform educational practices, inform ethical guidelines, contribute to academic research, and guide technological development. By addressing the challenges and harnessing the benefits of Generative Artificial

Intelligence in academic writing, this study can lead to more effective, inclusive, and ethical educational practices, ultimately benefiting students, educators, and the broader educational community. In this section, the authors demonstrate that the study is significant for several reasons, impacting various stakeholders in the educational and technological sectors.

Advancing Educational Practices

Enhancing Teaching and Learning: The integration of Generative Artificial Intelligence (GAI) like ChatGPT in academic writing provides opportunities to revolutionize educational practices. By understanding the benefits and challenges, educators can leverage AI tools to enhance teaching methodologies, provide personalized feedback, and support students in developing writing skills. This study offers insights into optimizing AI tools to benefit learners, particularly non-native English speakers and those with varying levels of writing proficiency.

Addressing Educational Inequities: South Africa's diverse educational landscape includes significant disparities in access to resources. This study's findings can inform strategies to bridge the digital divide, ensuring equitable access to advanced educational tools. By tailoring AI integration to meet the needs of under-resourced institutions, the study promotes inclusive education, enabling students from all backgrounds to benefit from technological advancements.

Informing Policy and Ethical Guidelines

Establishing Ethical Standards: The ethical implications of using AI in academic writing are profound. This study addresses concerns such as plagiarism, authorship, and accountability, providing a framework for ethical AI use. The recommendations can guide policymakers in developing robust guidelines that uphold academic integrity and ensure responsible AI implementation in educational settings.

Shaping Future Policies: As AI technology evolves, there is a pressing need for updated policies that reflect its capabilities and limitations. The study's insights can influence educational policies at institutional and governmental levels, promoting a balanced approach that maximizes AI benefits while mitigating risks. This is particularly relevant for South Africa, where educational policies must adapt to technological advancements to remain effective and relevant.

Contributing to Academic Research

Filling Research Gaps: By identifying gaps in knowledge, practice, and evidence, this study paves the way for further research. It highlights the need for comprehensive studies on the long-term impacts of AI on academic writing, particularly in multilingual and under-resourced contexts. The findings can inspire future research endeavors, contributing to a more nuanced understanding of AI's role in education.

Providing Empirical Evidence: This study offers empirical evidence on the use of GAI tools in academic writing, adding to the existing body of literature. The data and insights generated can serve as a valuable resource for scholars, educators, and technologists, fostering informed discussions and innovative approaches to AI integration in education.

Enhancing Educational Technology

Guiding Technological Development: For developers and technologists, the study provides critical feedback on the strengths and weaknesses of current GAI tools. Understanding the practical challenges and user needs can drive the development of more effective, user-friendly AI solutions tailored to educational contexts. This can lead to innovations that better support academic writing and learning processes.

Promoting Interdisciplinary Collaboration: The intersection of AI technology and education necessitates collaboration across disciplines. This study encourages partnerships between educators, technologists, and policymakers, fostering a holistic approach to integrating AI in academic settings. Such collaboration can ensure that AI tools are designed and implemented in ways that genuinely

enhance educational outcomes.

Literature Review

Overview

The integration of Generative Artificial Intelligence (GAI) tools like ChatGPT in academic writing has emerged as a significant development in the educational landscape. This literature analysis explores the limitations and potential risks, advantages, ethical implications, and necessary guidelines for the effective and ethical use of ChatGPT in academic contexts.

Challenges, Limitations and Potential Risks

One of the primary limitations of using ChatGPT in academic writing is the accuracy and quality of the generated content. While ChatGPT can produce coherent and contextually appropriate text, it often lacks the depth and factual accuracy required for academic standards. Studies, such as those by Sallam et al. (2023), have highlighted that AI-generated content can sometimes disseminate misinformation, which, if not properly verified, can undermine the credibility of academic work. The inherent risk is that students or researchers might rely on this information without cross-verifying, leading to the propagation of errors in academic discourse.

Ethical concerns are another critical issue. The use of ChatGPT raises significant ethical questions, particularly regarding plagiarism. There is a risk that students might use AI-generated content and present it as their own, bypassing the learning process and undermining academic integrity. Misra and Chandwar (2023) emphasize the potential for serious consequences if such misuse is detected, including academic disciplinary actions. The ease of generating coherent text with ChatGPT can tempt students to misuse the tool, leading to academic dishonesty and a decline in the quality of education.

Additionally, AI models like ChatGPT can inherit and perpetuate biases present in their training data, leading to biased or discriminatory outputs. Yu et al. (2023) discuss how this can introduce or reinforce biases in academic work, potentially perpetuating inequalities and reducing the fairness and inclusivity of academic discourse. For example, if the training data predominantly represents a particular cultural or social viewpoint, the AI might generate content that marginalizes or misrepresents other perspectives. This bias not only affects the quality of academic work but also raises ethical concerns about fairness and representation.

Furthermore, over-reliance on AI tools can lead to a decline in critical thinking and analytical skills. Farrokhnia et al. (2023) argue that dependence on AI for generating ideas and content might reduce students' engagement with the learning process, as they may come to rely more on AI-generated content rather than developing their own arguments and ideas. This over-reliance can hinder the development of essential skills such as critical analysis, problem-solving, and original thinking, which are crucial for academic success and professional growth.

Benefits, Advantages and Opportunities

Despite these challenges, the advantages of using ChatGPT in academic writing are substantial. One significant benefit is the enhancement of productivity and efficiency. ChatGPT can automate routine writing tasks, such as drafting outlines, generating ideas, and providing grammar and style suggestions. This allows students and researchers to focus on more complex aspects of their work, thereby enhancing productivity. Johnston et al. (2024) highlight how this capability of ChatGPT can streamline the writing process and free up time for more in-depth analysis and research. By handling mundane tasks, ChatGPT enables users to allocate more time to critical thinking and detailed examination of their subjects.

For non-native English speakers, ChatGPT offers valuable language support, improving the clarity and quality of academic writing. Huang and Tan (2023) demonstrate that ChatGPT can help bridge language barriers, promoting inclusivity and enabling a broader range of students to participate effectively in academic discourse. By providing assistance with grammar, vocabulary, and sentence structure, ChatGPT helps non-native speakers articulate their ideas more clearly and confidently. This support is particularly beneficial in academic settings where precise language use is essential for conveying complex concepts.

Additionally, ChatGPT can provide immediate feedback on writing, helping students identify and correct errors in real-time. Song and Song (2023) emphasize the personalized assistance that AI can offer, which can enhance learning outcomes and improve writing skills over time. The instant feedback mechanism allows students to learn from their mistakes and make necessary adjustments, fostering a more interactive and engaging learning experience. This feature is especially useful in large classrooms where individual feedback from instructors may be limited.

Ethical Implications

The ethical implications of using ChatGPT in academic contexts are profound. Ethical use of ChatGPT requires clear guidelines on authorship and accountability. Hosseini et al. (2023) argue that AI-generated content should be acknowledged and disclosed appropriately to maintain transparency and academic integrity. The temptation to present AI-generated text as one's own is a significant ethical issue, and institutions must establish policies to ensure proper attribution and avoid academic misconduct. Clear disclosure guidelines can help maintain the integrity of academic work and ensure that contributions are accurately credited.

Moreover, the potential for plagiarism is a significant concern. Misra and Chandwar (2023) stress the need for institutions to develop policies to address how AI-generated content is used, ensuring that it does not undermine the originality required in academic work. The ease with which ChatGPT can generate text makes it tempting for students to pass off AI-generated content as their own, leading to plagiarism. Institutions must implement robust measures to detect and prevent such practices, ensuring that academic integrity is upheld.

Bias and fairness are also critical ethical considerations. Nazer et al. (2023) suggest regular audits and checks to identify and mitigate biases in AI-generated content, ensuring that the outputs are fair and non-discriminatory. AI models are trained on vast datasets that may contain inherent biases, and without proper oversight, these biases can manifest in the generated content. Regular audits can help identify and correct such biases, promoting fairness and inclusivity in academic work. Ensuring that AI-generated content is free from bias is crucial for maintaining the credibility and ethical standards of academic research.

Guidelines and Best Practices

To address these issues, several guidelines and best practices should be formulated. Transparency and disclosure are paramount; users must disclose the extent of ChatGPT's involvement in their academic work, and standardized statements should be included in all submissions involving AI-generated content. Institutions should provide training on the ethical use of AI tools, emphasizing the importance of academic integrity and the potential risks of plagiarism. Imran and Almusharraf (2023) recommend incorporating discussions on the ethical implications of AI into the curriculum and offering workshops and seminars on responsible AI use. By educating students and researchers about the ethical considerations of using AI, institutions can foster a culture of responsibility and integrity.

Quality assurance and verification are also essential. Lew (2023) argues for a rigorous review process that includes human oversight to ensure the reliability and validity of AI outputs. Encouraging a balanced approach to using AI tools is critical. AI should complement, not replace, human skills and efforts. Ellis and Slade (2023) highlight the importance of promoting AI as a supplementary tool that enhances the work of students and researchers. A balanced approach ensures that while AI tools are used to streamline processes and improve efficiency, the critical skills of human users are not compromised.

Lastly, policy development is crucial. Farhi et al. (2023) suggest developing comprehensive policies that outline acceptable uses of AI in academic contexts, addressing issues of plagiarism, authorship, accountability, and ethical use. Such policies should be regularly reviewed and updated to keep pace with technological advancements and feedback from the academic community. Establishing clear policies provides a framework for the ethical and responsible use of AI tools in academia, ensuring that their integration enhances rather than undermines the educational process.

Finally, while ChatGPT offers significant benefits for academic writing, including enhanced productivity and language support, it also poses substantial challenges related to accuracy, ethics, and over-reliance. Establishing clear guidelines and best practices is essential to harness the benefits of AI while mitigating its risks, ensuring that AI tools are used ethically and effectively in academia. By addressing these concerns and implementing robust measures, educational institutions can leverage the potential of AI tools like ChatGPT to enhance the quality and inclusivity of academic work, fostering a more dynamic and equitable learning environment.

Gaps in Knowledge, Practice, and Evidence

The literature on GAI in academic writing reveals a complex landscape of challenges, benefits, and ethical considerations (AlZaabi, et al., 2023). While GAI tools like ChatGPT offer significant potential to enhance productivity and support non-native English speakers, issues related to accuracy, ethical use, and accountability remain critical. Addressing the identified gaps in knowledge, practice, and evidence will be essential for realizing the full potential of GAI in academic writing and ensuring its responsible and effective integration into academic practices. By conducting targeted research and pilot programs, South African institutions can lead the way in developing best practices for integrating GAI tools in a manner that is equitable, effective, and ethically sound (Verrax & Scheid, 2024). Clear analysis of gaps is crucial to achieve this. The following section presents the knowledge gap, practice gap and evidence gap regarding the use of GhatGPT in academic writing and research (Nyanchoka, et al., 2020).

Knowledge Gap: In the South African context, the integration of GAI in academic writing is still in its nascent stages (Tarisayi, 2024). There is limited understanding of how GAI tools like ChatGPT can be adapted to meet the unique linguistic and educational needs of South African students and scholars. South Africa's diverse linguistic landscape, with 11 official languages, poses a significant challenge for GAI tools primarily designed for English. Research is needed to explore how these tools can be optimized to support multilingual academic writing and cater to students from various linguistic backgrounds. Moreover, the impact of GAI on educational outcomes in under-resourced institutions remains unexplored.

Practice Gap: The practical application of GAI in South African academic settings requires a tailored approach. South African higher education institutions face distinct challenges, such as disparities in access to technology and varying levels of digital literacy among students and faculty. For instance, a significant portion of the student population in rural and township areas may have limited access to reliable internet and advanced technological tools, which can hinder the effective use of GAI. Empirical research is needed to develop and implement strategies that ensure equitable access to GAI tools across all educational settings. Case studies on pilot programs in universities, such as the University of Pretoria or the University of Cape Town, can provide valuable insights into best practices and potential pitfalls.

Evidence Gap: While there is growing interest in the potential of GAI to enhance academic writing, robust empirical evidence from the South African context is scarce. Studies are needed to assess the actual impact of GAI tools on writing quality, academic integrity, and student engagement. For example, a pilot study at a South African university could investigate how ChatGPT assists students in writing assignments, focusing on metrics such as improvement in writing clarity, reduction in plagiarism incidents, and overall student satisfaction. This study could also explore the perceptions of faculty regarding the use of GAI, identifying concerns and recommendations for ethical and effective integration.

Methods

Overview

This section outlines the systematic methodology adopted for this study, which aimed to explore the challenges, benefits, and ethical implications of using Generative Artificial Intelligence (GAI) tools, specifically ChatGPT, in academic writing within higher education. The methodology followed a structured approach involving four main steps: development of the research question using the PICO framework, database search based on a scientific protocol, article appraisal using the PRISMA method, and data analysis using COS-TAQDA software (Costa & Mfolo, 2024).

Research Design

This study employs a Mapping Review methodology within the qualitative systematic review typology of Grant and Booth (2009). The purpose of a Mapping Review is to provide an overview of a research area by identifying and categorizing relevant literature. This approach is particularly suitable for understanding the broad landscape of challenges, benefits, and recommendations associated with using Generative Artificial Intelligence (GAI) tools, such as ChatGPT, in academic writing and research. The process of the design was characterised by a sequence of steps critical in a study of this nature (Costa, et al., 2024).

Critical Methodological Steps

Step One: Development of the Research Question using the PICO Framework

The first step in our methodology was the development of a precise research question using the PICO framework. This framework facilitated the construction of a clear and targeted research question by specifying the Population, Intervention, Comparison, and Outcome components:

P	Population	The study focused on students, faculty, and researchers within higher education institutions who are involved in academic writing.
I	Phenomenon of Interest	The intervention under investigation was the use of Generative Artificial Intelligence (GAI) tools, particularly ChatGPT, in academic writing and research.
C	Comparison	The use of GAI tools was compared with traditional methods of academic writing that do not utilize AI assistance.
O	Outcome	The outcomes of interest included the impact on academic productivity, the quality of writing, ethical considerations, and implications for educational equity

Table 1: PICO Framework.

This framework (PICO) enabled the formulation of the research question: *“What are the challenges, benefits, and ethical implications of using ChatGPT in academic writing within higher education?”*

Step Two: Database Search, predicated on a scientific protocol as follows

Overview

This was the crucial step as it was concerned with collection of data from different databases using Harzing’s Publish or Perish software for literature search (Harzing, 2022). This software is a compendium of a number of databases such as Google Scholar, Crossref, Pubmed, Scopus, We of Science, Open Alex etc. The researcher chose to use Google Scholar as it gives an option for 1000 returns at a single hit of search terms.

Search Strategy

Following the formulation of the research question, a comprehensive database search was conducted. This step was predicated on a scientific protocol to ensure a systematic and unbiased collection of relevant literature (Costa & Mfolo, 2024). Search terms included:

- “Chatgpt Challenges” AND “Benefits AI in academic writing in South Africa”.
- “ChatGPT in academic writing”.
- “Generative AI tools in education,” and.
- “Ethical implications of AI in academia.

A total of 1500 articles were generated as depicted in the following Prisma Workflow Diagram.

The inclusion/exclusion criteria

Establishing inclusion and exclusion criteria for study participants is a fundamental and necessary practice in the design of high-quality research protocols. Inclusion criteria are defined as the essential characteristics of the target population that researchers will use to address their research question (Patino & Ferreira, 2018). In this study, the following inclusion/exclusion criteria were applied:

- Peer reviewed articles and Preprints.
- Articles written in English.
- Articles from 2022.
- Articles written about GenAI and ChatGPT.
- Articles focussing on education, higher education and academic writing.

Step Three: Using the PRISMA for selection of articles

Overview

PRISMA, which stands for Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA, 2024), is a standardized methodology used to enhance the quality and transparency of systematic reviews and meta-analyses. The PRISMA guidelines provide a framework for systematically identifying, selecting, and critically appraising relevant research, as well as for collecting and analyzing data from the studies included in the review (Rethlefsen & Page, 2022). The primary aim of PRISMA is to ensure that systematic reviews are transparent and replicable, thereby enhancing their reliability and utility. This involves a detailed and rigorous process that minimizes bias and allows for a comprehensive synthesis of the evidence.

PRISMA Workflow Diagram

The PRISMA workflow diagram, also known as the PRISMA flowchart, visually represents the process of selecting studies for inclusion in a systematic review. It outlines the four main phases of the review process: identification, screening, eligibility, and inclusion (Rethlefsen & Page, 2022).

Identification: This phase involves a comprehensive search of multiple databases to identify potentially relevant studies. All identified records are collected, including those from additional sources such as references of selected articles and grey literature. In this study, a total of 1500 records were collected using Harzing's Publish or Perish software (Harzing, 2022).

Screening: During the screening phase, duplicate records are removed, and the remaining records are screened based on their titles and abstracts. Studies that clearly do not meet the inclusion criteria are excluded (Liberati, et al., 2011).

Eligibility: The full texts of the remaining articles are assessed for eligibility. A total of 400 studies were evaluated in detail against the inclusion and exclusion criteria established for the review. After full evaluation process, only 40 studies were eligible for inclusion.

Inclusion: The final phase involves including studies that meet all the criteria in the systematic review. As mentioned above, the total number of studies included were 40. Out of this total, 30 studies covered broad and international perspective while 10 studies were those reporting on the South African perspective regarding the subject matter. These studies were then analyzed and synthesized to answer the research question (Patino & Ferreira, 2018).

Figure 1 below demonstrates how reporting items were included in this study.

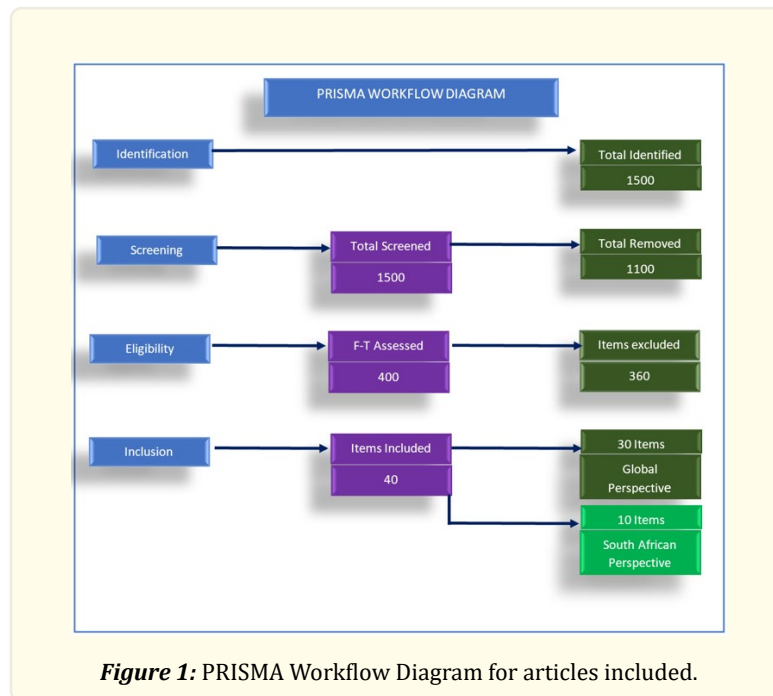


Figure 1: PRISMA Workflow Diagram for articles included.

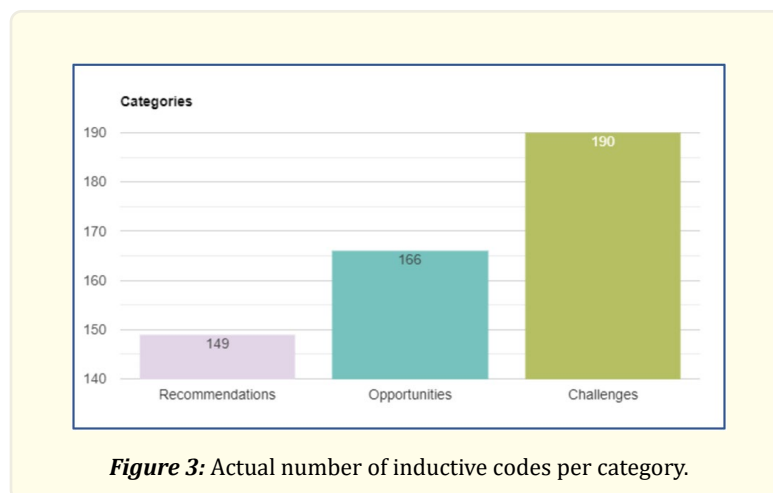
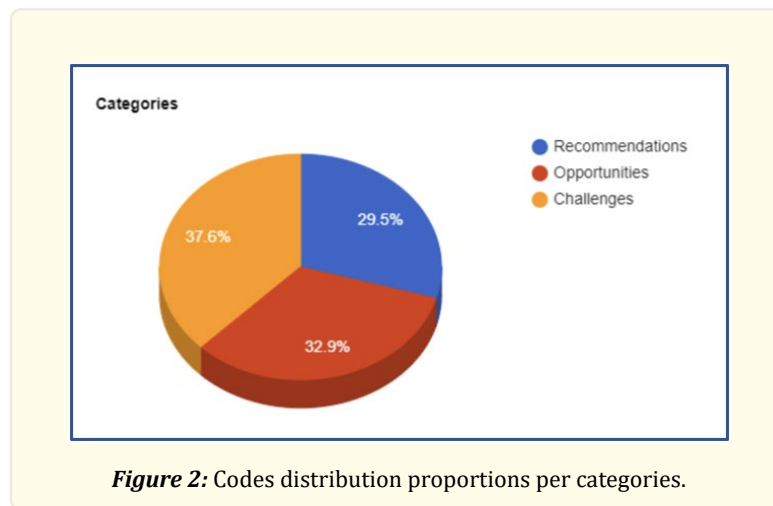
Step Four: Analysis and Synthesis

Overview

In most public health and social science disciplines, nearly all forms of systematic reviews provide evidence synthesis (including the mapping reviews in this context) and as such are classified as evidence-based research (EBR) (G., et al., 2002; Kolaski, et al., 2023). Given the important nature of reviews and their potential to influence people's lives, it is always vital for evidence syntheses to accurately report the current body of knowledge. This was the fundamental rationale for this study - to provide evidence regarding the challenges, benefits and recommendations based on what works regarding the use of ChatGPT (and GenAIs) in academic writing and research. To be seen as credible, it was equally crucial to convincingly and rigorously demonstrate the precision of methods of analysis and synthesis in this mapping review.

Analysis

The coding strategy for this study was based on the in-vivo strategy, as postulated by Onwuegbuzie, et al. (2016). This meant that data excerpts would be reflected as they are in their original articles, in order to support the richness of evidence on the phenomenon of interest. First the coding strategy was organised into anchor codes (apriori codes), also known as deductive codes. These codes were generated from the title of the study, which were (1) challenges, (2) Opportunities and (3) Recommendations. These represented key proforma categories that would house posteriori data as generated through reading or articles line by line, over and over again (Chenail, 2012). This process involved careful reading of the articles, searching for significant statements, also known as inductive codes.



Synthesis

Clear steps of how synthesis was done in any systematic review (or even traditional literature review in postgraduate studies) is of paramount importance to support transparency, openness and accountability of methods used (Chin, et al., 2022). In this study, the synthesis is presented in Table 2, as postulated by Grant and Booth (2009) in their definition of different types of reviews, including the mapping review approach. The synthesis table in systematic reviews serves a critical role in organizing, comparing, and summarizing the data extracted from included studies, thereby enhancing the clarity, transparency, and overall quality of the review (Younas & Ali, 2021). Its primary purpose is to systematically compile crucial details from each study, such as study characteristics, methodologies, participant demographics, interventions, outcomes, and key findings, into a structured format. This organization simplifies the visualization and management of large amounts of information, facilitating a better understanding of the collected data.

One of the key functions of the synthesis table is to enable side-by-side comparisons of different studies (Thomas & Harden, 2008). This comparison highlights similarities and differences, which is essential for identifying consistent findings or discrepancies across studies. Additionally, it allows for an assessment of the methodological quality and variations among the included studies, which can influence the interpretation of the results.

Enhancing transparency and reproducibility is another critical function of the synthesis table. By providing a clear and detailed record of how data were extracted and synthesized, the table ensures that the review process is transparent and understandable. This level of documentation allows other researchers to replicate the review, thereby verifying its findings and conclusions (Chin, et al., 2022).

The synthesis table also plays a crucial role in identifying trends, patterns, and gaps within the data. It helps recognize overarching trends and patterns, which are crucial for drawing broader conclusions. Moreover, by summarizing the available evidence, the table highlights gaps in the research, indicating areas where further studies are needed.

In terms of synthesis, the table facilitates both qualitative and quantitative analyses. For qualitative synthesis, it helps identify common themes and patterns across studies, providing a clear overview of qualitative data for thematic conclusions. For quantitative synthesis, or meta-analysis, the table serves as the foundation for pooling data and performing statistical analyses, providing necessary details for calculating effect sizes and other statistical measures (Grant & Booth, 2009).

Supporting evidence-based decision-making is another significant purpose of the synthesis table. By presenting a clear and comprehensive summary of the evidence, it aids practitioners, policymakers, and researchers in making informed decisions. It provides a robust basis for developing guidelines, policies, and practices based on the most reliable and up-to-date evidence (Thomas & Harden, 2008).

The synthesis table is an indispensable tool in systematic reviews, serving multiple purposes that enhance the clarity, transparency, comprehensiveness, and utility of the synthesized evidence, enabling robust and reliable conclusions that can inform future research, policy, and practice (Chin, et al., 2022).

<i>Paper</i>	<i>Author</i>	<i>Findings</i>
A1	(Lew, 2023)	<p>Key Findings:</p> <p>The study demonstrates that ChatGPT can produce dictionary definitions in the COBUILD style comparable to those by human lexicographers. However, the quality of original examples generated by ChatGPT was not as impressive as those crafted by professionals, indicating the need for fine-tuning the system for better performance.</p> <p>Study Conclusions:</p> <p>The research highlights the potential of AI and Large Language Models (LLM) in lexicography, showing that with minimal instruction, these systems can emulate specific defining styles effectively. Further work is needed to fully explore the capabilities of AI in lexicography, including studies involving human dictionary users.</p>
A2	(Zamfiroiu, et al., 2023)	<p>Key Findings:</p> <p>The study highlights the potential of ChatGPT in various fields, such as education, healthcare, and scientific writing. It emphasizes the model's ability to assist in learning processes, medical diagnosis, drug discovery, and scientific content generation.</p> <p>Study Conclusions:</p> <p>The authors suggest that while ChatGPT shows promise in enhancing various aspects of life, caution must be exercised due to limitations such as inaccuracies in generated responses. They recommend responsible and ethical use of ChatGPT, emphasizing its role as a supplement rather than a replacement for human expertise in education, healthcare, and scientific communication.</p>

A3	(Hosseini, et al., 2023)	<p>Key Findings:</p> <p>The paper discusses the ethical implications of using AI tools like ChatGPT in scholarly writing, highlighting challenges in responsible authorship and accountability. It argues against naming LLMs as authors due to their lack of free will and inability to take responsibility.</p> <p>Study Conclusions:</p> <p>The study concludes that LLMs should not be named as authors in scholarly manuscripts as they cannot meet the requirements for authorship, lack accountability, and cannot manage conflicts of interest or copyright agreements. Transparency, integrity, and accountability are crucial in research, and LLMs currently fall short in meeting these standards.</p>
A4	(Sallam, et al., 2023)	<p>Key Findings: The systematic review on ChatGPT in healthcare highlighted benefits like improved productivity, personalized learning, and clinical support, alongside concerns such as ethical issues, misinformation risks, and lack of originality ([page 24]). The study emphasized the need for careful and responsible use of ChatGPT, addressing ethical and legal issues, and ensuring transparency in its application to promote safe and effective utilization in healthcare education, research, and practice ([page 30]).</p> <p>Study Conclusions:</p> <p>This study emphasizes the inevitable widespread use of Large Language Models (LLMs) like ChatGPT in healthcare education, research, and practice. It further underscores the importance of establishing appropriate guidelines and regulations to ensure the safe and responsible utilization of ChatGPT. It calls for proactive engagement from all stakeholders to address potential ethical and legal issues associated with ChatGPT. The document recommends a science-driven debate to weigh the benefits and risks of ChatGPT, highlighting the need for careful implementation to expedite innovation in healthcare while safeguarding against misleading results and fraudulent research ([page 30]).</p>
A5		<p>Key Findings:</p> <ul style="list-style-type: none"> • ChatGPT shows potential in healthcare, education, and research but has limitations in context, accuracy, and bias. • It can enhance productivity and efficiency in various fields. • Ethical concerns and potential job displacement are drawbacks. <p>Study Conclusions:</p> <ul style="list-style-type: none"> • ChatGPT is an advanced AI model capable of human-like responses. • The technology has vast potential applications but requires careful consideration of its limitations and ethical implications. • Governments should establish regulatory frameworks to mitigate adverse effects and ensure responsible use of ChatGPT.

A6	(Johnston, et al., 2024)	<p>Key Findings:</p> <p>The study found that the majority of students were aware of Generative Artificial Intelligence (GAI) technologies, with half of them having used or considered using them for academic purposes. Students were more supportive of using GAI technologies for grammar help rather than for writing entire essays.</p> <p>Study Conclusions:</p> <p>The study suggests that universities should focus on educating students on best practices for using GAI technologies, promoting integrity, and designing appropriate assessments. Policies should be developed to guide students on the acceptable use of these technologies, ensuring fairness and clarity while not disadvantaging any student groups.</p>
A7	(Khurana & Vaddi, 2023)	<p>Key Findings:</p> <p>The editorial discusses the utility of ChatGPT in academic oral and maxillofacial radiology, highlighting its applications in generating documents like oral radiology reports. It emphasizes the need for appropriate prompts to enhance the tool's effectiveness and the importance of human oversight in editing the generated content for clinical use.</p> <p>Study Conclusion:</p> <p>The editorial concludes by outlining the potential applications and limitations of ChatGPT in academic settings, emphasizing the importance of ethical considerations, validation of content, and the evolving role of large language models in academia.</p>
A8	(Ellis & Slade, 2023)	<p>Key Findings:</p> <p>The study highlights that ChatGPT is capable of defining statistical concepts using various language styles, but may generate inaccuracies and have limitations in tasks like generating references or accommodating non-text prompts. Educators are advised to guide students in critiquing ChatGPT responses to enhance learning and academic integrity.</p> <p>Study Conclusions:</p> <p>Educators should consider responsibly leveraging ChatGPT in statistics and data science education by incorporating exercises that prompt students to interact with ChatGPT, fostering critical thinking and responsible use of AI tools. Despite concerns, the study encourages educators to shape the integration of AI tools in classrooms for enhanced learning experiences.</p>
A9	(Romero-Rodríguez, et al., 2023)	<p>Key Findings:</p> <p>The study on the acceptance of ChatGPT by university students revealed that user experience is a fundamental determinant of acceptance. Factors like usage experience, performance expectancy, hedonic motivation, and habits influence students' behavioral intention to use this AI chatbot prototype.</p> <p>Study Conclusions:</p> <p>The acceptance of ChatGPT by university students is influenced by their perception of its potential use in the learning process. The findings have implications for educational practice, emphasizing the importance of training students in the ethical and responsible use of ChatGPT, as well as the ability to formulate clear questions and verify responses.</p>

A10	(Song & Song, 2023)	<p>Key Findings:</p> <p>The study found that AI-assisted writing instruction using ChatGPT led to significant improvements in EFL students' writing skills, motivation, and engagement. Participants expressed positive perceptions of the innovative and helpful nature of AI feedback, highlighting personalized feedback as a game-changer. However, challenges such as contextual accuracy and over-reliance on AI were acknowledged.</p> <p>Study Conclusions:</p> <p>The integration of AI tools in EFL writing courses can enhance students' writing skills and motivation. Educators should consider incorporating AI tools to provide immediate feedback and personalized assistance, fostering a more engaging and effective learning environment for language learners.</p>
A11	(Mahyoob, et al., 2023)	<p>Key Findings:</p> <p>The study analyzed ChatGPT's language generation in academic writing, revealing deficiencies in logical reasoning, rhetoric, and pragmatics. ChatGPT's limitations in handling common-sense reasoning tasks were evident, cautioning against relying solely on its generated content for academic writing.</p> <p>Study Conclusions:</p> <p>The research proposed a framework to evaluate ChatGPT's academic language production, highlighting the need for caution when using the tool. While ChatGPT can generate human-like language, it falls short in professional academic analysis and writing, particularly in addressing issues related to pragmatics and social norms. The tool serves as a guide but should not be solely relied upon for academic content.</p>
A12	(Imran & Almusharraf, 2023)	<p>Key Findings:</p> <p>This systematic review on ChatGPT as a writing assistant in higher education found that ChatGPT is utilized across various subject areas for academic and scientific writing tasks. The study identified the challenges and opportunities of using ChatGPT, emphasizing the need for human oversight in utilizing this AI tool effectively.</p> <p>Study Conclusions:</p> <p>The study recommends integrating human control with ChatGPT for optimal utilization in writing tasks. It highlights the importance of revisiting training, policy, and assessment methods in writing courses to address issues like plagiarism and AI-generated content. Further research is suggested to enhance AI tools and chatbots in academic writing contexts.</p>

A13	(Ariyaratne, et al., 2023)	<p>Key Findings:</p> <p>The paper discusses the potential impact of ChatGPT in collaborative publishing for academic writing. It highlights the AI tool's ability to facilitate literature review, aid in data collection, and increase research paper throughput. Despite concerns about generating incorrect content, ChatGPT shows promise in enhancing academic research through collaborative efforts.</p> <p>Study Conclusions:</p> <p>The study concludes that while ChatGPT presents challenges such as generating inaccurate information, its benefits in academic writing, particularly in collaborative research, are significant. The AI tool's potential to streamline research processes and improve efficiency suggests a promising future for academic writing with the integration of ChatGPT.</p>
A14	(Mijwil, et al., 2023)	<p>Key Findings:</p> <p>The study evaluated ChatGPT's ability to produce academic writing and found strengths in language quality and structure, but weaknesses in academic writing style, literature summarization, and conclusion clarity. ChatGPT excelled in providing fast, accurate information but fell short of meeting academic publication standards.</p> <p>Study Conclusions:</p> <p>While ChatGPT shows promise in aiding writing tasks, it should be used as a supplementary tool, not a replacement for human effort. Acknowledging AI limitations and using it responsibly as a support tool is crucial in academic writing to maintain quality and integrity.</p>
A15	(Dönmez, et al., 2023)	<p>Key Findings:</p> <ul style="list-style-type: none"> • ChatGPT successfully summarizes content, shortening it without altering meaning. • It can interpret data presented as text, such as analysis tables. • Significant differences in STEM motivation were found between genders in technology and engineering dimensions. <p>Study Conclusions:</p> <ul style="list-style-type: none"> • ChatGPT offers benefits like generating title ideas and shortening text but lacks originality. • Challenges in using chatbots for research include finding a research question, methodology, and data collection. • Ethical concerns arise regarding accuracy, plagiarism, and accountability when using AI for research.
A16		<p>Key Findings:</p> <p>The study evaluated ChatGPT-generated answers for academic writing quality based on critical thinking criteria. Results showed ChatGPT answers were generally clear and relevant but lacked depth, accuracy, and conceptual clarity. Faculty members were fairly confident in identifying ChatGPT-generated answers.</p> <p>Study Conclusions:</p> <p>ChatGPT can produce answers meeting minimum requirements for academic exams, but with limitations in depth, accuracy, and conceptual clarity. While ChatGPT performs well in some areas, it falls short of human capabilities in others. The study highlights the potential and challenges of using AI like ChatGPT in academic settings.</p>

A17	(Mohammed, et al., 2023)	<p>Key Findings: The study on Arab postgraduate students in India revealed that ChatGPT is beneficial for academic writing, aiding in idea generation, organization, and language proficiency improvement. However, not all students fully utilize its benefits due to lack of familiarity. The tool has the potential to enhance productivity and academic performance.</p> <p>Study Conclusions: Arab postgraduate students can leverage ChatGPT to enhance their academic writing quality and productivity. It is recommended that students use ChatGPT in conjunction with their own knowledge and expertise to produce high-quality academic work. Clear guidelines on its appropriate use for academic purposes are essential to maximize its benefits and avoid ethical concerns like plagiarism.</p>
A18	(Koos & Wachsmann, 2023)	<p>Key Findings: The study highlights the challenges and opportunities of using ChatGPT in legal academic examinations, emphasizing limitations in replicating deep legal knowledge, understanding specific legal structures, and evaluating multiple opinions. It also discusses the need for academic institutions to adapt to AI advancements, revise examination methods, and promote responsible AI use.</p> <p>Study Conclusions: The study concludes that academic institutions must address the ethical implications of AI tools like ChatGPT in academic writing, promote awareness of plagiarism issues, and foster a culture of academic integrity. It emphasizes the importance of developing original ideas, critical thinking, and in-depth analysis to maintain the quality and rigor of academic work.</p>
A19	(Ngo, 2023)	<p>Key Findings: University students perceived ChatGPT positively for its time-saving benefits, diverse information provision, and assistance in understanding theories. However, concerns included reliability issues, inability to assess sources, and language limitations.</p> <p>Study Conclusions: The study highlighted students' positive attitudes towards ChatGPT in learning, emphasizing benefits like time-saving and personalized tutoring. Recommendations included verifying ChatGPT responses, using it as a reference tool, providing clear guidelines, and promoting academic integrity for ethical use in academic settings.</p>
A20	(Imran & Lashari, 2023)	<p>Key Findings: The study on the perception of university students about ChatGPT for academic purposes revealed that the majority of respondents found ChatGPT to be a useful AI tool for English writing, with a preference for its use under proper guidance to balance learning new knowledge and creativity.</p> <p>Study Conclusion: The study emphasizes the importance of using AI writing tools like ChatGPT in a controlled environment and under appropriate supervision to balance the benefits of efficiency and error reduction with the need to foster critical thinking, creativity, and originality in academic writing.</p>

A21	(Huang & Tan, 2023)	<p>Key Findings:</p> <ul style="list-style-type: none"> • ChatGPT can enhance scientific writing by improving clarity, precision, and effectiveness, especially for non-native English speakers. • The tool assists in grammar correction, sentence structure suggestions, vocabulary enhancement, and translation support. • While beneficial, ChatGPT should not replace a thorough understanding of the subject matter and requires human oversight to ensure accuracy and coherence. <p>Study Conclusions:</p> <p>The study concludes that ChatGPT offers significant benefits in scientific writing but should be used as a supplement rather than a replacement for human expertise. It emphasizes the importance of reviewing and editing AI-generated text to avoid plagiarism and ensure high-quality manuscripts.</p>
A22	(Perkins, 2023)	<p>Key Findings:</p> <p>The study highlights the challenges academic staff face in identifying text generated by Large Language Models (LLMs) like GPT-2 and GPT-3, with human identification rates barely above chance. As LLMs become more complex, human detection abilities decrease further, posing challenges in identifying machine-generated text. Training can marginally improve identification accuracy, but the rapid evolution of AI tools necessitates updated academic integrity policies to address potential misuse.</p> <p>Study Conclusions:</p> <p>The integration of LLMs and AI tools in education is likely to increase, requiring Higher Education Institutions (HEIs) to consider the implications for policy development. Despite threats to academic integrity, the future use of these tools in classrooms is inevitable, emphasizing the need for updated policies and guidelines to address potential challenges.</p>
A23	(Misra & Chandwar, 2023)	<p>Key Findings:</p> <ul style="list-style-type: none"> • ChatGPT poses challenges in academic writing due to ethical concerns, plagiarism risks, and suboptimal accuracy in content generation and citations (PAGE!4). • ChatGPT offers benefits in improving grammar for non-native English speakers and enhancing efficiency in literature searches (PAGE!4). <p>Study Conclusions:</p> <ul style="list-style-type: none"> • Authors should transparently declare the use of AI tools like ChatGPT in academic writing submissions (PAGE!4). • Journals should consider using AI-detection tools to screen manuscripts and encourage transparent disclosure of AI tool usage by authors to maintain publication integrity (PAGE!5).

A24	(AlZaabi, et al., 2023)	<p>Key Findings:</p> <ul style="list-style-type: none"> • ChatGPT expedites academic writing, improves writing style, aids non-native English speakers, and assists in summarizing scientific articles. • Concerns include potential erosion of writing quality, biases, privacy issues, and credibility challenges. <p>Study Conclusions:</p> <ul style="list-style-type: none"> • ChatGPT offers benefits in academic writing but should not replace human expertise. • Recommendations include establishing ethical policies, transparency in AI tool usage, and collaboration between researchers and technology experts for responsible AI integration in scientific research.
A25	(Fergus, et al., 2023)	<p>Key Findings:</p> <p>The study evaluated ChatGPT-generated responses in chemistry assessments, noting variations in answer quality and limitations in handling complex analysis. Redesigning assessments to include problem-solving questions was suggested to enhance assessment beyond knowledge-based queries.</p> <p>Study Conclusions:</p> <p>ChatGPT demonstrated potential in generating well-written responses but faced challenges with complex analysis and nontext information. Ongoing developments with ChatGPT could lead to rich discussions and considerations for learning and assessment practices, highlighting the need for educators to review and adapt assessment approaches in light of technological advancements.</p>
A26	(Livberber & Ayvaz, 2023)	<p>Key Findings:</p> <p>The study revealed that ChatGPT can be a valuable tool in scientific research and education, aiding in idea generation and research quality. However, ethical concerns such as plagiarism and disinformation were raised among academics. The research highlighted the potential benefits and challenges of integrating AI like ChatGPT in academia.</p> <p>Study Conclusion:</p> <p>The study concluded that while ChatGPT shows promise as an assistant tool in academia, ethical considerations must be addressed. Future research should focus on utilizing AI effectively, conducting generalizable studies, and ensuring diversity in research approaches to maximize the benefits and minimize the challenges of AI integration in academia.</p>

A27	(Meyer, et al., 2023)	<p>Key Findings:</p> <ul style="list-style-type: none"> • Large Language Models (LLMs) like ChatGPT offer significant potential to enhance academic work efficiency but raise ethical concerns regarding fair use and inherent bias. • Researchers should be cautious of the limitations of LLMs, such as presenting false information as truth, known as “hallucination.” <p>Study Conclusions:</p> <ul style="list-style-type: none"> • Embrace the use of LLMs for academic writing, education, and programming to increase efficiency. • Quantify bias in LLMs and discuss inherent bias as a limitation when utilizing LLM outputs. • Use of LLM outputs does not constitute plagiarism, but users must be aware of potential inaccuracies.
A28	(Yu, 2023)	<p>Key Findings:</p> <p>The paper discusses the impact of Chat GPT in education, highlighting benefits such as improved learning efficiency and communication, but also addressing concerns like potential academic dishonesty. It emphasizes the need for educators to adapt teaching methods to cultivate critical thinking and problem-solving skills in students.</p> <p>Study Conclusions:</p> <p>The study concludes that the integration of Chat GPT in education presents both opportunities and challenges. It suggests the importance of regulating the use of AI technologies like Chat GPT to ensure fair and transparent implementation in education. Additionally, the paper advocates for the exploration of new educational models to meet the evolving needs of modern society.</p>
A29	(Rowland, 2023)	<p>Key Findings:</p> <p>The paper discusses the use of ChatGPT in academic writing, highlighting its potential benefits and challenges. It emphasizes the importance of clear language, connecting studies to the main argument, and providing proper citations. The study also addresses the need for students to be cautious about potential biases in AI-generated content and to verify the reliability of sources (PAGE!53).</p> <p>Study Conclusions:</p> <p>The study concludes that while ChatGPT can offer valuable feedback and assistance in academic writing, users should exercise caution and critical thinking when utilizing AI tools. Proper guidance on acknowledging AI tool use and ensuring academic integrity is essential in leveraging these tools effectively (PAGE!53).</p>

A30	(Firat, 2023)	<p>Key Findings:</p> <p>The study identified nine main themes related to the implications of ChatGPT in education, including the evolution of learning systems, changing roles of educators, and impact on assessment and evaluation. Scholars and students believe that AI technologies, such as ChatGPT, will significantly influence education practices.</p> <p>Study Conclusions:</p> <p>The study emphasizes the potential benefits and challenges of integrating AI, like ChatGPT, in education. It suggests developing policies for ethical AI use, focusing on critical skills integration, encouraging personalized learning environments, conducting further research on AI integration effects, and establishing accreditation systems for AI-supported learning. Collaborative efforts are needed to maximize AI's potential in education while addressing associated challenges.</p>
A31	(Tarisayi, 2024)	<p>Key Findings:</p> <p>The study explores the integration of ChatGPT in South African universities, emphasizing the need for responsible assimilation to enhance academic rigor while expanding technical capacities. It highlights the slow uptake of ChatGPT in developing countries due to various challenges. Academics can utilize ChatGPT to create structure for academic writing, offering benefits in simplifying the writing process and grading assessments.</p> <p>Study Conclusions:</p> <p>The study advocates for a balanced approach in aligning disruptive innovations like ChatGPT with academia's purposes, emphasizing upholding integrity while expanding access and insight. It recommends updating policies and protocols to foster responsible usage of AI tools, ensuring human oversight remains paramount. Adopting a socio-technical perspective can enhance academia's capabilities without compromising academic integrity.</p>
A32	(Chauke, et al., 2024)	<p>Key Findings:</p> <p>The key findings of the study on postgraduate students' perceptions of using ChatGPT for academic success include the benefits of refining research topics, enhancing academic writing, generating research ideas, and saving time in literature review. Postgraduate students at historically disadvantaged universities in South Africa found ChatGPT valuable for these purposes. The study concludes that integrating ChatGPT enhances academic success and research outcomes, particularly benefiting non-native English-speaking students. It recommends the development of an AI ethical use policy in historically disadvantaged universities to ensure responsible integration of AI tools like ChatGPT into research processes.</p> <p>Study Conclusions:</p> <p>The study concludes that integrating ChatGPT into research significantly enhances the academic success and research outcomes of postgraduate students enrolled in historically disadvantaged universities in South Africa. Particularly, non-native English-speaking postgraduate students at these universities benefit from incorporating ChatGPT in their research journey. The AI tool proves instrumental in overcoming language barriers and improving the quality of academic writing produced by postgraduate students. The study recommends the immediate development of an innovative AI ethical use policy in historically disadvantaged universities in South Africa to ensure responsible and effective integration of AI tools like ChatGPT into research outputs and contribute to academic success.</p>

A33	(Cox, et al., 2024)	<p>Key Findings:</p> <ul style="list-style-type: none"> • The study focused on engaging medical students in creating open educational resources using ChatGPT. • Students developed critical AI digital literacy skills in prompt crafting, fact-checking, and ethical considerations. • The collaboration between students and educators showcased the power of student co-creation in education. <p>Study Conclusions:</p> <ul style="list-style-type: none"> • The study emphasized the importance of institutional support for AI-powered technology in education. • It highlighted the need for critical AI digital literacy programs for students and educators. • The study recommended evolving institutional reward systems to recognize innovative teaching approaches involving AI tools and student co-creation.
A34	(Govender, 2024)	<p>Key Findings:</p> <p>The journal article discusses the integration of AI tools like ChatGPT in mathematics education, emphasizing the importance of refining AI models for effective teaching. It highlights the potential benefits of AI in providing personalized feedback and assistance to students, particularly in solving mathematical problems. However, it also raises concerns about over-reliance on AI tools leading to a decline in critical thinking skills and educational disparities.</p> <p>Study Conclusion:</p> <p>The study concludes that while AI tools like ChatGPT offer advantages in mathematics education, a balanced approach is necessary to leverage these benefits effectively while addressing potential challenges such as maintaining students' critical thinking abilities and ensuring educational equity.</p>
A35	(Singh, 2023)	<p>Key Findings:</p> <p>The study explores the impact of ChatGPT on plagiarism and scholarly writing in South African universities. It highlights the challenges of maintaining academic integrity, the role of technology in teaching and learning, and the need for educators to adapt to new tools like ChatGPT.</p> <p>Study Conclusions:</p> <p>The study emphasizes the importance of educators developing their technical skills to incorporate technologies like ChatGPT effectively in teaching. It suggests that while generative technologies like ChatGPT can be beneficial for language and writing development, they require oversight to ensure accuracy and authenticity in academic work. Ultimately, the study encourages a proactive approach to integrating technology in higher education while upholding academic standards.</p>

A36	(Tarisayi, 2023)	<p>Key Findings:</p> <p>The study analyzed South African university plagiarism policies and identified gaps in addressing AI-generated content. Current policies were deemed inadequate for the AI era due to a focus on traditional plagiarism definitions. The study highlighted the need for redefining plagiarism to encompass AI-generated content and emphasized the importance of educational approaches in policy enforcement.</p> <p>Study Conclusions:</p> <p>The author recommended a redefined definition of plagiarism that includes AI-generated content to ensure fair treatment and proper attribution. Additionally, the study emphasized the importance of educational approaches over policing in addressing plagiarism issues in the context of AI technologies.</p>
A37	(Senekal & Brokensha, 2023)	<p>Key Findings:</p> <ul style="list-style-type: none"> • ChatGPT's responses on South African political topics showed a bias towards the left, with most responses being moderately biased but not extremely so. The sentiment of responses was mostly neutral, with some positive and negative responses. • ChatGPT generally provided truthful responses to South African conspiracy theories, except for one instance of false information regarding the first heart transplant. <p>Study Conclusion:</p> <p>The study highlights the importance of critically evaluating ChatGPT's responses, considering its biases and potential for misinformation. It emphasizes the need for updated and representative training data to ensure accuracy and reliability in information dissemination.</p>
A38	(Kanyane, 2023)	<p>Key Findings:</p> <p>The study highlighted that academic staff in historically disadvantaged institutions in South Africa face challenges in adapting to digital technologies, leading to a high failure rate among students. The lack of digital skills and resistance to change hinder effective teaching and learning practices.</p> <p>Study Conclusions:</p> <p>The study concludes that there is a need for targeted curriculum and learning opportunities to help academic staff cope with digitalization challenges. Additionally, the integration of digital technologies in education requires a national effort to support academic staff and students in transitioning to online teaching and learning effectively.</p>

A39	(University of Pretoria, 2022)	<p>Key Findings:</p> <ul style="list-style-type: none"> • ChatGPT can enhance teaching and learning activities by providing personalized assistance and generating responses on various topics. • It can be used for tasks such as creating lesson plans, generating questions, and providing feedback on written work. <p>Study Conclusions:</p> <ul style="list-style-type: none"> • ChatGPT offers valuable support for educators and students in higher education. • It is essential to use ChatGPT ethically, respecting privacy, acknowledging sources, and critically evaluating the advice provided. • By following guiding principles and utilizing ChatGPT effectively, it can be a beneficial tool for teaching and learning at universities.
A40	(Moonasamy & Naidoo, 2022)	<p>Key Findings:</p> <p>The study focused on innovative teaching methods and integration of technology. Key findings include insights on innovative teaching methods, student engagement strategies, and the impact of technology on education.</p> <p>Study Conclusions:</p> <p>The study concludes that incorporating innovative teaching approaches, enhancing student engagement, and leveraging technology can significantly improve the teaching and learning experience. These conclusions highlight the importance of continuous improvement in educational practices to meet the evolving needs of students and educators.</p>

Table 2: Synthesis Table.

Findings

Overview

Findings of this study are presented in line with the study objectives, which were:

- *RO 1:* To investigate the limitations and potential risks associated with the use of ChatGPT in producing academic content.
- *RO 2:* To assess the advantages of using ChatGPT in academic writing.
- *RO 3:* To explore the ethical implications of using ChatGPT in academic contexts.
- *RO 4:* To formulate guidelines and best practices for the use of ChatGPT in academic writing and research.
- *RO 5:* To highlight gaps in current research, particularly in the South African context, and suggest areas for further study.

Investigating Limitations and Potential Risks (RO 1)

The studies collectively highlight several limitations and risks associated with using ChatGPT in producing academic content. Lew (2023) found that while ChatGPT can emulate human lexicographers' defining styles, it struggles with generating high-quality original examples, underscoring the need for system fine-tuning. Similarly, Mahyob et al. (2023) revealed deficiencies in logical reasoning, rhetoric, and pragmatics, cautioning against sole reliance on AI for academic writing. Mijwil et al. (2023) echoed these sentiments, noting weaknesses in academic writing style, literature summarization, and conclusion clarity. Dönmez et al. (2023) also raised concerns about the accuracy of AI-generated content and ethical issues like plagiarism and accountability.

Ethical concerns were a significant focus of several studies. Hosseini et al. (2023) argued against naming LLMs as authors due to their lack of free will and accountability, while Sallam et al. (2023) stressed the importance of addressing ethical and legal issues in healthcare applications, highlighting risks such as misinformation and lack of originality. Senekal & Brokensha (2023) found biases in ChatGPT's responses on South African political topics, indicating the potential for misinformation and highlighting the need for updated and representative training data.

Johnston et al. (2024) found that while students are aware of GAI technologies and often use them for grammar help, there is reluctance to use them for more substantive tasks like writing entire essays. This indicates a need for better education on the appropriate uses and limitations of these tools. Collectively, these findings underscore the importance of understanding ChatGPT's limitations and the potential for misinformation, bias, and inaccuracies. Human oversight is crucial to mitigate these risks effectively.

Assessing the Advantages (RO 2)

Despite its limitations, ChatGPT offers substantial advantages that enhance academic productivity and support learning. Zamfiroiu et al. (2023) highlighted ChatGPT's potential in education, healthcare, and scientific writing, enhancing productivity and efficiency. Johnston et al. (2024) found that students prefer using GAI technologies for grammar assistance, reflecting its utility in improving writing quality. Song & Song (2023) and Mohammed et al. (2023) provided empirical evidence showing significant improvements in writing skills, motivation, and language proficiency among students using ChatGPT.

ChatGPT's potential in collaborative academic writing was discussed by Ariyaratne et al. (2023), who noted its usefulness in aiding literature review, data collection, and increasing research paper throughput. Chauke et al. (2024) found that postgraduate students in historically disadvantaged universities benefit significantly from ChatGPT, particularly in refining research topics, enhancing academic writing, and generating research ideas. Educational enhancement was another area of advantage, with Ellis & Slade (2023) suggesting that educators guide students in critiquing ChatGPT responses to enhance learning and academic integrity. Song & Song (2023) recommended incorporating AI tools to provide immediate feedback and personalized assistance, fostering a more engaging and effective learning environment for language learners.

These advantages demonstrate that ChatGPT can enhance writing skills, streamline the writing process, and provide personalized feedback, making it a valuable supplementary tool for students and researchers.

Exploring Ethical Implications (RO 3)

The ethical implications of using ChatGPT in academic contexts are widely discussed, with a focus on transparency, accountability, and the potential for bias. Hosseini et al. (2023) and Sallam et al. (2023) argued against naming AI as authors, emphasizing the lack of accountability and the importance of human oversight. Perkins (2023) and Misra & Chandwar (2023) advocated for transparent disclosure of AI use in academic writing, emphasizing the need for updated policies to address AI-generated content. Ethical concerns also include biases in AI-generated responses, as highlighted by Senekal & Brokensha (2023), and the risk of misinformation, which necessitates careful validation and critical evaluation of AI outputs.

These ethical considerations highlight the need for transparency, integrity, and accountability in using AI tools in academia. The studies collectively call for ethical guidelines and proactive engagement from stakeholders to ensure responsible use.

Formulating Guidelines and Best Practices (RO 4)

The synthesis of findings from the studies leads to the formulation of several guidelines and best practices for using ChatGPT in academic writing and research. Johnston et al. (2024) and Song & Song (2023) recommended educating students on best practices for using GAI technologies and promoting integrity through clear guidelines. Perkins (2023) and Misra & Chandwar (2023) emphasized the need for transparent AI usage policies and ethical standards to guide AI integration in academia. Khurana & Vaddi (2023) and Ellis & Slade (2023) underscored the importance of human oversight in editing and validating AI-generated content to maintain quality and

ethical standards. These guidelines ensure that ChatGPT is used responsibly and effectively, maximizing its benefits while mitigating associated risks.

Highlighting Gaps (RO 5)

This investigation, through rigorous critical analysis of literature, found four glaring gaps in relation to the use of GenAI, particularly ChatGPT in academic writing. These are presented with an in-depth perspective below.

Digital Adaptation Challenges in Historically Disadvantaged Institutions

The integration of AI tools like ChatGPT in South African educational institutions reveals significant digital adaptation challenges, particularly in historically disadvantaged contexts. Many educators in these institutions lack the necessary digital skills and access to technology, and there is often a resistance to adopting new technologies. This issue is compounded by existing disparities in resources and infrastructure, making it difficult for these institutions to keep pace with technological advancements.

The implications of these digital adaptation challenges are profound. If not addressed, they could hinder the effective use of AI tools like ChatGPT, preventing both educators and students from reaping the potential benefits. This scenario risks widening the educational divide, leaving students in historically disadvantaged institutions further behind their peers in more resourced environments. Such a disparity would not only affect immediate educational outcomes but could also have long-term socio-economic consequences, entrenching cycles of disadvantage and limiting opportunities for upward mobility.

Policy Gaps in Addressing AI-Generated Content and Plagiarism

Current plagiarism policies at South African universities do not adequately address AI-generated content. Traditional definitions of plagiarism may not cover the nuances introduced by AI tools like ChatGPT, creating a grey area in academic integrity policies. This lack of clear guidelines can lead to the misuse of AI-generated content, as students might use these tools to produce work without proper attribution, either unintentionally or deliberately.

The implications of this policy gap are severe for academic standards and integrity. Without updated policies, there is a risk of inconsistent enforcement, which can undermine trust in the educational system. It can also create confusion among students and educators about what constitutes acceptable use of AI tools, potentially leading to increased incidents of academic misconduct. This situation necessitates urgent attention to policy reform to clearly define and regulate the use of AI in academic work.

User Experience and Ethical Training Influence on Acceptance

The acceptance and effective use of ChatGPT among students are heavily influenced by their user experience and the ethical training they receive. Studies indicate that comprehensive training programs are essential to educate students on the ethical and responsible use of AI tools. Without such training, students might misuse these technologies, over-relying on AI-generated content and neglecting the development of critical thinking skills.

The consequences of poor user experience and lack of ethical training are significant. Misuse of AI tools can lead to ethical breaches, diminished academic rigor, and compromised learning outcomes. Students may become overly dependent on AI, which can hinder their ability to engage deeply with learning material and develop essential analytical skills. Therefore, it is crucial to integrate ethical training into the curriculum to foster a balanced and responsible approach to using AI tools.

Slow Uptake of ChatGPT in Developing Countries

The slow uptake of ChatGPT and similar AI technologies in developing countries, including South Africa, presents another gap. This slow adoption is attributed to challenges such as infrastructure deficiencies, limited accessibility, and low levels of digital literacy. The delayed integration of these technologies means that students and educators in developing countries miss out on the advancements

and efficiencies that AI can offer.

The implications of this slow adoption are far-reaching. It could widen the gap between developed and developing countries in terms of educational quality and research output, further marginalizing students and researchers in developing regions. This gap limits their opportunities and competitiveness on a global scale, exacerbating existing inequalities.

Discussion

A Global Perspective of Challenges, Benefits and Opportunities of GenAI

This section discusses the findings from 22 countries represented by articles analysed. These perspectives from various countries provide a comprehensive understanding of how ChatGPT is viewed globally, highlighting both its potential benefits and the challenges that need to be addressed for its effective and ethical integration in academia. Figure X below provides a graphical representation of the countries and key issues (benefits/challenges) per country.

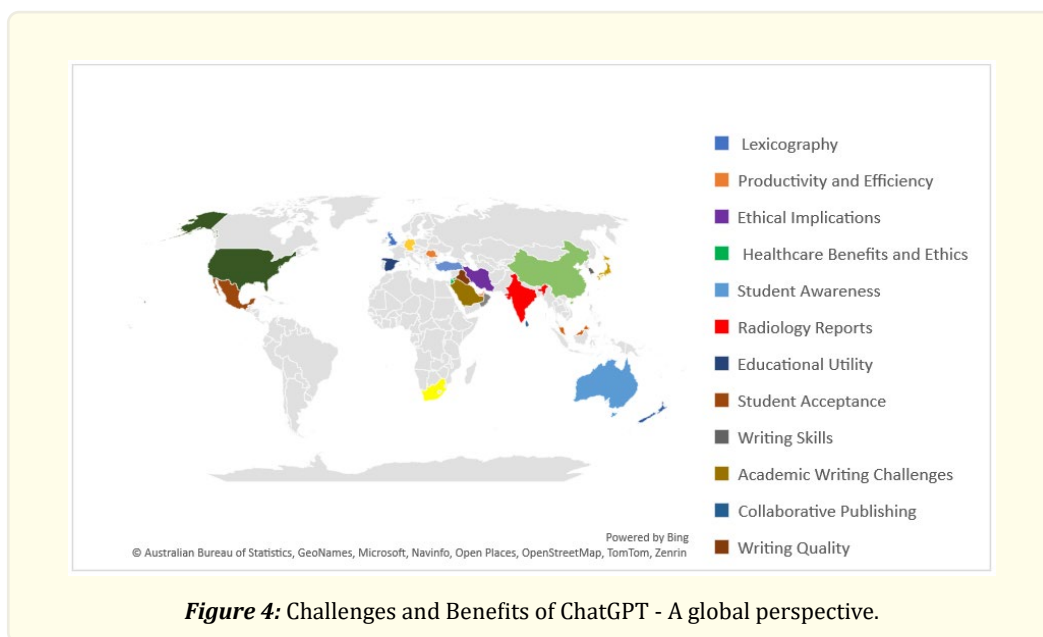


Figure 4: Challenges and Benefits of ChatGPT - A global perspective.

United Kingdom (UK) - ChatGPT Utilization: Challenges and Benefits

In the United Kingdom, Lew (2023) demonstrates that ChatGPT can produce dictionary definitions in the COBUILD style, which is comparable to human lexicographers' work. However, while the AI shows promise in emulating specific defining styles, its generated examples are less impressive than those created by professionals. This indicates a cautious optimism about the potential of AI in lexicography, with an acknowledgment of its current limitations. The UK perspective highlights both the promising capabilities of AI in augmenting lexicographical work and the need for further refinement to match human quality.

Romania - Enhancing Productivity and Efficiency with Ethical Considerations

Zamfiroiu et al. (2023) highlight the potential of ChatGPT in various fields, including education, healthcare, and scientific writing, within the Romanian context. The model is seen as a tool that can enhance productivity and efficiency across these sectors. However, there is also an emphasis on the need for responsible and ethical use due to limitations such as inaccuracies in generated responses. The Romanian perspective underscores the importance of balancing AI's benefits with ethical considerations to ensure its responsible deployment.

Iran - Ethical Implications in Scholarly Writing

In Iran, Hosseini et al. (2023) discuss the ethical implications of using AI tools like ChatGPT in scholarly writing. The primary concern is the challenge of responsible authorship and accountability, arguing against naming LLMs as authors due to their lack of free will and inability to take responsibility. This reflects a critical stance towards the ethical use of AI in academic contexts, emphasizing the need for clear guidelines and ethical standards to govern AI-assisted writing.

Jordan - Dual Perspectives in Healthcare and Education

Sallam et al. (2023) in Jordan conduct a systematic review on ChatGPT in healthcare, highlighting both its benefits and ethical concerns. While the AI tool is recognized for improving productivity, personalized learning, and clinical support, there are significant worries about ethical issues, misinformation risks, and a lack of originality. This dual perspective underscores the importance of careful and responsible use in healthcare and educational applications, advocating for ethical guidelines to manage these concerns.

Australia - Balanced View on AI Use in Education

Johnston et al. (2024) explore the awareness and use of Generative Artificial Intelligence (GAI) technologies among Australian students. They find that while students are generally aware of these technologies and use them for grammar help, they are more cautious about using them for more substantive academic tasks like writing entire essays. This indicates a balanced view that appreciates the utility of AI for specific tasks but remains wary of its broader application in academic writing, highlighting the importance of educating students about responsible AI use.

India - Utility in Academic Radiology with Human Oversight

In India, Khurana & Vaddi (2023) discuss the utility of ChatGPT in academic oral and maxillofacial radiology. They highlight its applications in generating documents like oral radiology reports but emphasize the need for appropriate prompts and human oversight to ensure the content's clinical relevance and accuracy. This reflects an acknowledgment of AI's potential benefits, tempered by a recognition of its limitations and the necessity for human intervention to maintain quality and reliability.

Spain - Educational Utility and Accuracy Concerns

Ellis and Slade (2023) highlight ChatGPT's capability in defining statistical concepts, emphasizing its use in Spanish educational settings. They note that while the AI can provide useful definitions, it may generate inaccuracies, especially in tasks like generating references or accommodating non-text prompts. Educators are advised to guide students in critiquing AI-generated responses to enhance learning and academic integrity, reflecting a view that AI can be a valuable educational tool when used with proper oversight.

Mexico - Acceptance Influenced by User Experience

Romero-Rodríguez et al. (2023) examine the acceptance of ChatGPT by university students in Mexico. The study reveals that user experience is a fundamental determinant of acceptance, with factors like usage experience, performance expectancy, hedonic motivation, and habits influencing students' behavioral intention to use the AI chatbot. This reflects a generally positive attitude towards AI, contingent on its perceived usefulness and the quality of the user experience, highlighting the importance of user-friendly design and ethical training.

South Korea - Enhancing Writing Skills with Contextual Challenges

In South Korea, Song & Song (2023) evaluate AI-assisted writing instruction using ChatGPT, finding significant improvements in EFL students' writing skills, motivation, and engagement. Participants express positive perceptions of the AI's feedback, particularly its personalized nature. However, challenges such as contextual accuracy and over-reliance on AI are acknowledged, indicating a nuanced view that recognizes both the benefits and limitations of AI in education. This suggests the need for a balanced approach that

integrates AI while addressing its contextual limitations.

Saudi Arabia - Cautious Optimism with Ethical Concerns

Mahyoob et al. (2023) and Imran & Almusharraf (2023) provide insights from Saudi Arabia. Mahyoob et al. (2023) analyze ChatGPT's language generation in academic writing, revealing deficiencies in logical reasoning and rhetoric. Imran & Almusharraf (2023) conduct a systematic review on ChatGPT as a writing assistant in higher education, identifying both challenges and opportunities. The studies reflect a cautious optimism about AI's potential, coupled with concerns about its current limitations in academic contexts, emphasizing the need for ethical standards and human oversight.

Sri Lanka - Collaborative Publishing and Academic Enhancement

Ariyaratne et al. (2023) discuss the impact of ChatGPT in collaborative publishing for academic writing in Sri Lanka. The AI tool is viewed as beneficial for facilitating literature reviews, aiding data collection, and increasing research paper throughput. Despite concerns about generating inaccurate content, the potential for enhancing academic research through collaborative efforts is recognized, highlighting the need for responsible use and accuracy verification.

Iraq - Promising Assistant with Quality Concerns

In Iraq, Mijwil et al. (2023) evaluate ChatGPT's ability to produce academic writing, finding strengths in language quality and structure but weaknesses in academic writing style and literature summarization. The AI tool is seen as a promising assistant for writing tasks but not as a replacement for human effort, highlighting the need for responsible use to maintain academic quality and integrity.

Turkey - Balancing Benefits and Ethical Challenges

Dönmez et al. (2023) and Firat (2023) provide perspectives from Turkey. Dönmez et al. (2023) explore ChatGPT's role in summarizing content and interpreting data, noting benefits like generating title ideas and shortening text but also raising ethical concerns. Firat (2023) identifies themes related to the implications of ChatGPT in education, suggesting that AI technologies will significantly influence educational practices. These studies reflect an understanding of both the potential benefits and ethical challenges associated with AI use in academic settings.

United Arab Emirates (UAE) - Improving Writing Skills with Ethical Concerns

AlZaabi et al. (2023) discuss the integration of ChatGPT in academic writing within the UAE, emphasizing its benefits for non-native English speakers in improving writing style and summarizing scientific articles. However, concerns about the erosion of writing quality, biases, privacy issues, and credibility challenges are also highlighted. This reflects a balanced view that acknowledges both the advantages and potential drawbacks of AI in academia, advocating for ethical use and oversight.

South Africa - Addressing Digital Adaptation and Policy Gaps

Several studies focus on South Africa, including Tarisayi (2024), Chauke et al. (2024), Singh (2023), Tarisayi (2023), and Senekal & Brokensha (2023). These studies explore the integration of ChatGPT in South African universities, highlighting both benefits and challenges. While ChatGPT is seen as valuable for enhancing academic success and overcoming language barriers, concerns about digital adaptation challenges, policy gaps, and ethical issues are prominent. The overall view is that while AI tools have significant potential, their integration must be managed carefully to address existing disparities and ethical considerations.

Koos and Wachsmann (2023) highlight the challenges and opportunities of using ChatGPT in legal academic examinations in Germany. The AI tool is seen as useful for generating initial drafts and summaries, but its limitations in replicating deep legal knowledge and evaluating multiple opinions are emphasized. This indicates a cautious approach that values AI's assistance but recognizes its current

limitations in specialized fields like law, advocating for careful integration and human oversight.

United States - Pragmatic View on Utility and Reliability

Ngo (2023) studies university students' perceptions of ChatGPT in the United States, finding that while the AI is appreciated for its time-saving benefits and diverse information provision, there are concerns about reliability issues and language limitations. This reflects a pragmatic view that recognizes the utility of AI tools but remains aware of their limitations and the need for careful evaluation of AI-generated content to ensure accuracy and reliability.

China - Supplementing Scientific Writing with Human Oversight

Huang and Tan (2023) evaluate ChatGPT's impact on scientific writing for non-native English speakers in China. The AI tool is seen as beneficial for improving clarity, precision, and effectiveness in writing. However, the need for human oversight to ensure accuracy and coherence is emphasized, indicating a view that AI should supplement rather than replace human expertise in scientific communication, ensuring high standards of academic integrity.

New Zealand - Addressing Academic Integrity Challenges

Perkins (2023) discusses challenges in identifying text generated by LLMs like ChatGPT among academic staff in New Zealand. The difficulty in detecting AI-generated content highlights the need for updated academic integrity policies and training to address potential misuse. This reflects a concern about the implications of AI on academic integrity and the necessity for proactive measures to ensure responsible use and maintain academic standards.

Malaysia - Balancing Benefits and Ethical Considerations

Misra and Chandwar (2023) address challenges and benefits of ChatGPT in academic writing in Malaysia. The AI tool is recognized for improving grammar for non-native English speakers and enhancing efficiency in literature searches. However, concerns about ethical issues and suboptimal accuracy in content generation are also noted. This balanced view underscores the importance of transparency and ethical considerations in the use of AI tools in academia, advocating for responsible and informed use.

Oman - Positive Reception with Guided Use

Imran and Lashari (2023) examine university students' perception of ChatGPT for academic purposes in Oman. The majority of respondents find ChatGPT to be a useful AI tool for English writing, with a preference for its use under proper guidance to balance learning new knowledge and creativity. This indicates a positive reception, tempered by the need for supervised use to maximize benefits and minimize potential drawbacks, ensuring effective learning outcomes.

Japan - Careful Approach to AI Integration

Rowland (2023) discusses the use of ChatGPT in academic writing in Japan, highlighting its potential benefits in providing clear language and generating proper citations. However, the need for caution due to potential biases in AI-generated content and the importance of verifying the reliability of sources are emphasized. This reflects a careful approach that values AI's assistance but recognizes the necessity of critical evaluation and ethical use to maintain academic standards and integrity.

Conclusion

The integration of ChatGPT and similar generative artificial intelligence (GAI) tools in academic writing offers both remarkable opportunities and notable challenges. This study underscores the transformative potential of ChatGPT in enhancing productivity, providing personalized assistance, and supporting non-native English speakers. It can significantly streamline academic tasks such as literature reviews, grammar corrections, and idea generation, ultimately aiding in the production of high-quality academic content.

However, this potential is tempered by critical concerns. Ethical issues, including the risk of plagiarism, biases in AI-generated content, and the reliability of information, necessitate a cautious approach. The study emphasizes the importance of human oversight and ethical training to ensure that the use of ChatGPT supplements rather than replaces human expertise. Updated policies and guidelines are essential to address the nuances of AI-generated content and maintain academic integrity.

Moreover, the study highlights significant gaps, particularly in historically disadvantaged institutions where digital adaptation challenges persist. Addressing these disparities is crucial to prevent widening educational divides and ensure equitable access to AI's benefits. While ChatGPT presents substantial advantages in academic writing, its integration must be managed responsibly. The proposed OTHA Framework—Openness, Transparency, Honesty, and Accountability—provides a comprehensive policy model to guide the ethical and effective use of AI in academia. By embracing these principles, higher education institutions can leverage AI tools to enhance learning and research while safeguarding academic standards and integrity.

Recommendations

Proposition and Justification for the OTHA Framework

This investigation found that the integration of Generative Artificial Intelligence (GAI) tools, such as ChatGPT, into academic writing and research presents both opportunities and challenges for higher education institutions. To navigate these complexities, the OTHA Framework, based on the principles of Openness, Transparency, Honesty, and Accountability, is proposed as a comprehensive policy model. This framework aims to ensure the ethical and effective use of AI applications in academia, fostering an environment where technology enhances education without compromising integrity.

Openness

Openness in AI integration involves fostering a collaborative and inclusive approach. This principle emphasizes the need for higher education institutions to engage all stakeholders, including faculty, students, IT specialists, and administrative staff, in the planning and implementation process. Studies by Johnston et al. (2024) highlight the importance of a collaborative approach in maximizing the benefits of AI tools like ChatGPT. By involving diverse perspectives, institutions can better identify potential applications and address concerns related to AI use.

Furthermore, encouraging local innovations and supporting research and development of AI applications tailored to specific educational contexts is crucial. Huang and Tan (2023) demonstrate the value of ChatGPT in bridging language barriers, promoting inclusivity, and enabling a broader range of students to participate effectively in academic discourse. Providing resources and support for faculty and students to explore new AI applications can lead to innovative solutions that address unique challenges within the institution.

Transparency

Transparency is essential for maintaining trust and ensuring ethical AI use. Developing and communicating comprehensive policies for AI use in education, as suggested by Imran and Almusharraf (2023), is a critical step. These policies should address data privacy, ethical use, and the management of AI-generated content, ensuring that all stakeholders are aware of the guidelines and expectations.

Disclosure is another key aspect of transparency. Users must disclose the extent of AI's involvement in their academic work, including standardized disclosure statements in all submissions involving AI-generated content. Hosseini et al. (2023) argue that transparency in AI use is crucial for maintaining academic integrity and preventing misuse. By clearly communicating the role of AI in academic outputs, institutions can uphold the principles of honesty and accountability.

Honesty

Honesty in AI integration revolves around ethical training and quality assurance. Providing training on the ethical use of AI tools, emphasizing the importance of academic integrity, and highlighting the risks of plagiarism are vital components of this principle. Misra

and Chandwar (2023) stress the need for institutions to develop policies that ensure AI-generated content does not undermine the originality required in academic work.

Quality assurance involves implementing a rigorous review process that includes human oversight to ensure the reliability and validity of AI outputs. Lew (2023) underscores the necessity of human oversight to maintain the quality and accuracy of AI-generated content. Regular audits of AI-generated content can help identify and mitigate biases, promoting fairness and inclusivity in academic work. By ensuring that AI tools are used ethically and responsibly, institutions can maintain high academic standards and foster a culture of integrity.

Accountability

Accountability is crucial for ethical AI integration. Establishing governance structures to oversee the use of AI, such as committees or working groups responsible for monitoring AI integration and compliance with ethical guidelines, is essential. Nazer et al. (2023) suggest that regular audits and checks can help ensure that AI-generated content is fair and non-discriminatory.

Monitoring and evaluation processes are necessary to assess the impact of AI integration. Conducting ongoing assessments, as recommended by Johnston et al. (2024), can provide valuable insights into the effectiveness of AI applications and inform decisions on how to improve their use. Clear attribution of AI-generated content is also a critical aspect of accountability. Ensuring that authorship is transparent and properly attributed helps prevent misuse and promotes academic honesty.

The OTHA Framework, based on the principles of Openness, Transparency, Honesty, and Accountability, provides a comprehensive model for the ethical and effective integration of ChatGPT and related AI applications in higher education. By fostering collaboration, ensuring transparency, promoting ethical use, and maintaining accountability, institutions can leverage the benefits of AI while mitigating its risks. This framework not only enhances educational quality but also upholds the integrity and inclusivity of academic work, aligning with the broader goals of higher education.

OTHA Framework Template/Guide

Stage	Description	Elements	
One	Openness	Collaborative Approach <ul style="list-style-type: none"> Engage all stakeholders, including faculty, students, and IT specialists, in the planning and implementation process. Foster an environment where diverse perspectives are considered to enhance AI integration. 	Encouraging Innovation <ul style="list-style-type: none"> Support local innovations by encouraging research and development of AI applications tailored to specific educational contexts. Provide resources and support for faculty and students to explore new AI applications.
Two	Transparency	Clear Policies <ul style="list-style-type: none"> Develop and communicate comprehensive policies for AI use in education, addressing data privacy, ethical use, and AI-generated content. Regularly review and update these policies to keep pace with technological advancements. 	Disclosure <ul style="list-style-type: none"> Ensure that users disclose the extent of AI's involvement in their academic work. Include standardized disclosure statements in all submissions involving AI-generated content.

<i>Three</i>	<i>Honesty</i>	<i>Ethical Training</i>	<i>Quality Assurance</i>
		<ul style="list-style-type: none"> • Provide training on the ethical use of AI tools, emphasizing the importance of academic integrity and the risks of plagiarism. • Incorporate discussions on AI's ethical implications into the curriculum. 	<ul style="list-style-type: none"> • Implement a rigorous review process that includes human oversight to ensure the reliability and validity of AI outputs. • Regularly audit AI-generated content to identify and mitigate biases.
<i>Four</i>	<i>Accountability</i>	<i>Governance Structures</i>	<i>Monitoring and Evaluation</i>
		<ul style="list-style-type: none"> • Establish governance structures to oversee the ethical and effective use of AI. • Set up committees or working groups responsible for monitoring AI integration and compliance with ethical guidelines. 	<ul style="list-style-type: none"> • Conduct ongoing monitoring and evaluation to assess the impact of AI integration. • Use data from pilot tests and regular assessments to inform decisions and improve AI applications.
		Clear Attribution	
		<ul style="list-style-type: none"> • Ensure AI-generated content is properly attributed and that authorship is clear. 	<ul style="list-style-type: none"> • Develop policies to prevent misuse and promote a culture of academic honesty.

Table 3: OTHA Framework for Managing Chatgpt.

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