

4-16-2024

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Laila Mohebi
Zayed University, laila.mohebi@zu.ac.ae

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Mohebi, Laila, "Empowering learners with ChatGPT: insights from a systematic literature exploration" (2024). *All Works*. 6471.
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Review

Empowering learners with ChatGPT: insights from a systematic literature exploration

Laila Mohebi¹ 

Received: 6 October 2023 / Accepted: 10 April 2024

Published online: 16 April 2024

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Abstract

With the rapid emergence of artificial intelligence (AI) tools in the academic realm, understanding their implications, advantages, and challenges becomes crucial. ChatGPT, a leading AI conversational model, has gained significant traction in educational settings, warranting a comprehensive investigation into its academic impact. This systematic review aimed to elucidate the current state of research regarding implementing ChatGPT in academic cultures, focusing on its applications, challenges, and potential in reshaping contemporary pedagogies. An exhaustive review of 32 peer-reviewed articles from 2023 encompassed categorizing diverse research fields, journals, and studies. The research then delved into the challenges, factors affecting its use, and the myriad opportunities ChatGPT offers within academic settings. An overwhelming 75% of the studies emphasized the relevance of ChatGPT and generative AI tools within higher education, underscoring its importance. Significant challenges identified included pedagogical integration (31.25%) and student engagement (15.63%). However, ChatGPT's potentially inefficient content creation (25.00%) and enhanced personalized learning (21.88%) presented promising avenues for reshaping educational experiences. Furthermore, the tool's adaptability in catering to diverse student needs and fostering collaborative environments was notable. ChatGPT emerges as a transformative force in academia, with vast potential to revolutionize pedagogical practices. Yet, academic institutions must address inherent challenges to harness their full capabilities. Future directions point towards a symbiotic integration, with AI complementing human educators to promote inclusive, dynamic learning.

Keywords Challenges in the implementation of ChatGPT · Forcing factors · Possibilities · Opportunities · Systematic literature review · Academic institutions

Abbreviations

AI Artificial Intelligence

ChatGPT Chat generative pre-trained transformer

1 Introduction

There has been a significant uptick in interest in artificial intelligence (AI) applications and implications in recent years, attributed to AI's increasingly widespread use in education. Particularly noteworthy is the fact that ChatGPT, a generative conversational AI, has been at the forefront of this discourse, as multiple studies have demonstrated. Early proponents such as Adiguzel et al. [1] and Mogavi et al. [2] acknowledged the transformative potential of

✉ Laila Mohebi, laila.mohebi@zu.ac.ae | ¹College of Humanities and Social Sciences, Zayed University, P.O. Box 19282, Dubai, United Arab Emirates.



ChatGPT in revolutionizing education. Crawford et al. [3] emphasized the ethical implications of ChatGPT. Additionally, ChatGPT's involvement in distinct areas of learning, such as programming [4] and teaching foreign languages [5], has expanded its role in the pedagogical sphere. These areas include teaching foreign languages and teaching programming. Despite this, the incorporation of ChatGPT into the academic culture has not been without its share of difficulties and apprehensions, as is typical for introducing new technological developments.

Despite the extensive discourse on incorporating GPT into academic settings, there still needs to be consolidated knowledge about the challenges institutions and educators face in the implementation. Studies such as Lawan et al. [6] discuss strategies to mitigate the adverse effects of generative AI in education, however, there needs to be more systematic research into specific obstacles. Even though it is widely acknowledged that ChatGPT has the potential to improve many facets of education, such as self-study experiences [7] and distance learning [8], there is still a noticeable knowledge gap regarding the factors that make the incorporation of ChatGPT essential in the contemporary educational setting.

The academic world is currently at a pivotal juncture in which it must weigh the undeniable potential of ChatGPT against the ambiguities and challenges associated with its incorporation. Many educators and academic institutions need help with the complexities of effectively integrating it into academic culture even though they recognize its transformative power. Because of these obstacles and the urgent requirement for its incorporation, there is a compelling need for an in-depth investigation to be conducted in order to simplify ChatGPT's incorporation and maximize the benefits it provides for educational environments.

A systematic review of ChatGPT in education literature reveals critical research gaps. First, there are few empirical studies on ChatGPT's long-term effects on education. Adiguzel et al. [1] and Mogavi et al. [2] have begun to explore ChatGPT's transformative potential in education and user perspectives, respectively, but there needs to be long-term research on how it affects student-learning outcomes. This includes understanding how ChatGPT technology interacts differently in K-12, higher education, and vocational training. Kasneci et al. [9] and Lawan et al. [6] have begun to address the opportunities and challenges of large language models in education, but there needs to be more research on the best pedagogical strategies to use with ChatGPT to improve learning.

The ethical and practical implications of using ChatGPT in educational assessments and assignments are another significant gap. Kolade et al. [10] have touched on new learning and assessment frontiers, but more research is needed on how ChatGPT is used responsibly and effectively without compromising academic integrity. Baskara [11, 12] and Azaria et al. [13] also note that ChatGPT's potential in language learning has yet to be fully explored. This includes learning how ChatGPT facilitates different learning styles and is integrated into curriculum design to improve critical thinking and problem-solving. Finally, Panagopoulou et al. [14] found little research on ChatGPT's legal and ethical implications in education. Data privacy, student data usage, and AI-generated content ethics in education should be considered. Therefore, the study conducted a systematic literature review to answer the research questions:

- (1) What are the major challenges and obstacles educators and institutions face when implementing ChatGPT in academic settings?
- (2) What key factors drive the need to integrate ChatGPT into academic culture and curricula? and
- (3) What are the potential opportunities and benefits the implementation of ChatGPT could bring to academic culture and learning environments?

The primary objective of this research is to investigate the multifaceted challenges that educators, academic institutions, and students face when attempting to implement ChatGPT within the context of the academic culture. Drawing on the findings of studies such as Spennemann [15] and Farrokhnia et al. [16], the research will dissect the complexities and potential pitfalls associated with such an integration. The goal study aims to determine the underlying factors highlighting the importance and urgency of incorporating ChatGPT into academic frameworks. The purpose of this study is to investigate the myriad possibilities and opportunities that the implementation of ChatGPT heralds for the academic community and to determine the driving forces that underscore the indispensability of ChatGPT in modern academic settings through an examination of works such as Karakose et al. [17] and Rasul et al. [18]. This will be accomplished by exploring works such as Karakose et al. The research will outline the potential avenues that ChatGPT can open for enriching the educational landscape by utilizing the insights from Yilmaz and Yilmaz [4], Lawan et al. [6], and Santos [19]. Finally, the study offers the research objectives:

1. To explore the challenges in the implementation of ChatGPT in academic culture.

2. To identify the factors which make the use of ChatGPT necessary in academic culture.
3. To see the possibilities and opportunities in the implementation of ChatGPT in academic culture.

2 Review of the literature

2.1 ChatGPT and academic institutions

Incorporating ChatGPT into educational institutions has emerged as a transformative move, redefining conventional pedagogical practices and the role of the student in the learning process. According to Adiguzel et al. [1] and Mogavi et al. [2], generative conversational AI enhances learning experiences by providing students with a dynamic and responsive platform for inquiries, discussion, and knowledge acquisition. This is discussed as a tool that can enhance learning experiences. In more specialized fields, ChatGPT has been used to supplement specific learning areas as a learning supplement. For example, Yilmaz and Yilmaz [4] emphasized its potential in programming education and suggested that students could use the platform for instant feedback, code-related inquiries, and problem-solving assistance. This was based on the idea that students could leverage the platform for these purposes. Similarly, Huang and Li investigated ChatGPT's potential role in the instruction of foreign languages. They conceived ChatGPT as a "virtual language partner" that could guide students through acquiring a command of linguistic nuance through real-time conversational drills.

In addition, educational institutions are investigating the use of the tool in contexts other than the traditional classroom setting. Klnc [8] highlighted its significance in distance science education, pointing out that it can overcome geographical barriers and offer consistent educational experiences. The researchers Larsson and Eriksson [7] emphasized the positive impact that ChatGPT has on students' self-study experiences while enrolled in higher education. ChatGPT acts as an on-demand tutor, guiding students through complex topics and clearing up any confusion that they may have. ChatGPT is not only improving the landscape of academic learning through its myriad applications but also reshaping the dynamics of student–teacher interactions and self-directed learning within institutional settings.

2.2 Challenges in the implementation of ChatGPT in academic culture

While ChatGPT's integration into academic institutions holds significant transformative potential, various studies underscore its challenges within the literary culture. Dwivedi et al. [20] and Kolade et al. [10] explore the nuanced ethical concerns of relying on generative conversational AI for research and educational assessment. There needs to be more clarity about ensuring academic integrity and the risk of students depending on AI-generated content, possibly undermining the critical thinking and originality that form the foundation of scholarly pursuits. Similarly, the work by Lawan et al. [6] on the modified flipped learning approach reflects concerns about the adverse effects of generative AI on education, emphasizing the risk of students becoming overly reliant on AI-driven tools, thus potentially diminishing the development of independent cognitive skills.

In addition, Panagopoulou et al. [14] dive deep into the legal and ethical implications surrounding the use of tools like ChatGPT in the educational domain, bringing forth the issues of data privacy, potential biases in AI responses, and the challenges in ensuring equal access to such technologies. Spennemann's [15] exploration of ChatGPT's interpretation of cultural heritage values raises questions about the model's understanding and potential misrepresentation of cultural nuances, highlighting the necessity for a critical approach in utilizing AI in fields that demand profound cultural sensitivity. These studies collectively paint a picture of caution, urging academic institutions to navigate the integration of ChatGPT thoughtfully and responsibly, considering the broader implications on student learning, cultural understanding, and the overall educational ethos.

2.3 Factors which make the use of ChatGPT necessary in academic culture

It is impossible to deny that the artificial intelligence (AI) era has begun in educational institutions, and ChatGPT has emerged as a crucial instrument in revolutionizing various aspects of education. According to Adiguzel et al. [1], the incorporation of AI, in particular ChatGPT, can significantly improve personalized learning experiences by providing real-time responses tailored to individual students' specific requirements. This is especially useful in accommodating various

learning tempos and approaches, making the educational experience more welcoming to a broader range of students. In addition, the research conducted by Yilmaz and Yilmaz [4] on the application of augmented intelligence in the learning of programming indicates that ChatGPT has the potential to serve as a helpful mentor, assisting students in comprehending complex programming concepts and potentially filling gaps where human mentors may be unavailable or limited.

In addition, Santos's [19] comparative case study on the enhancement of chemistry learning reveals that tools like ChatGPT can act as powerful cognitive agents, further emphasizing the necessity of ChatGPT in academic settings. Not only do they assist in transmitting knowledge, but they also stimulate critical thinking by presenting students with various perspectives and methods of approaching problem-solving. In addition, Bentley et al. [21] argue for the necessity of AI education and suggest that integrating tools such as ChatGPT into classrooms provides students with the knowledge and abilities necessary to navigate a future increasingly digital. In an era characterized by rapid technological advancements and global connectivity, ensuring that students are AI-literate is crucial. This makes incorporating platforms like ChatGPT beneficial and necessary for a forward-looking academic culture.

2.4 Possibilities and opportunities in the implementation of ChatGPT in academic culture

The incorporation of ChatGPT into academic institutions paves the way for a wide variety of possibilities that have the potential to be transformative. According to Adiguzel et al. [1], the utilization of ChatGPT has the potential to redefine personalized learning by optimizing the educational trajectory for each student based on the specific requirements and learning patterns unique to that student. This not only promises more individualized educational experiences but also increases the amount of engagement and retention that takes place. Research conducted by Yilmaz and Yilmaz [4] on the application of augmented intelligence in programming demonstrates, once again, the potential utility of ChatGPT as a platform for teamwork. Students can interact with an AI in this space to have their questions answered, gain coding experience, or even investigate more advanced topics, broadening the scope of their knowledge beyond the confines of traditional educational curricula.

On the other hand, the research conducted by Santos [19] demonstrates how ChatGPT can be utilized as an advanced cognitive agent in fields such as chemistry, thereby encouraging inquiry-based learning and motivating students to question established dogma. Thanks to ChatGPT's role as a dynamic educational assistant, learners can develop deeper comprehension and analytical skills. ChatGPT can pose challenging questions, simulate real-world scenarios, and provide instant feedback. In addition, the research conducted by Baskara [11, 12] in the field of English language education highlights the numerous opportunities presented by using ChatGPT in simulations spanning multiple disciplines. These applications can be of tremendous use to language students because they enable students to engage in conversational practice, understand cultural nuances, and improve their language skills. When taken as a whole, these studies highlight the plethora of opportunities ChatGPT offers, thereby holding out hope for a revitalized, innovative, and interactive academic culture in the years to come.

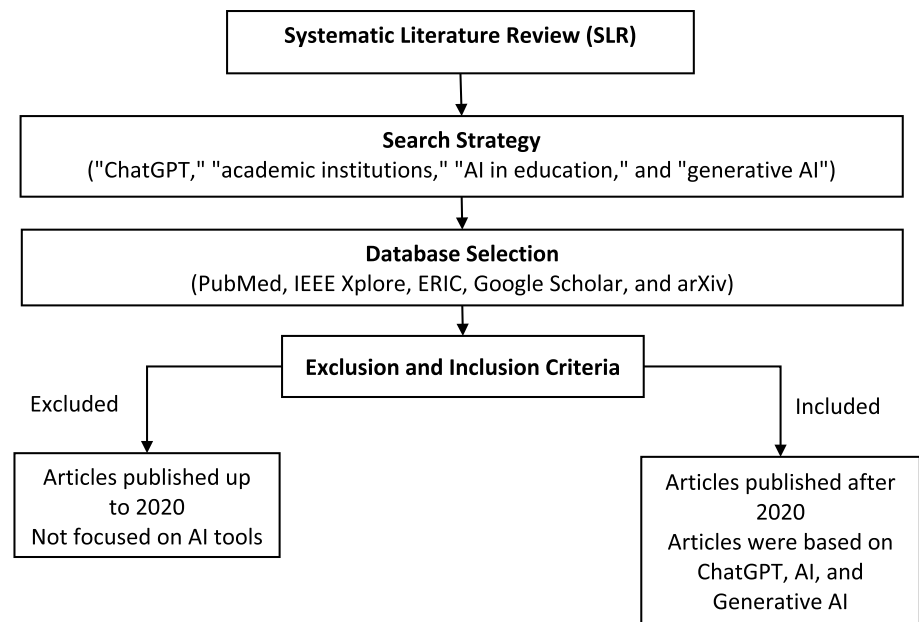
3 Research methodology

This study followed the principles of a systematic literature review so PRISMA diagram in Fig. 1 shows the procedure of conducting the study.

3.1 Search strategy

The study identifies the main keywords and terms related to the research question or topic. For the study on ChatGPT in academic culture, this includes terms such as "ChatGPT," "academic institutions," "AI in education," and "generative AI." The terms identified from literature studies such as those from Adiguzel et al. [1] and Mogavi et al. [2], were used as the key principles to conduct the SLR. The study searched those articles that were published after 2020 and focused on ChatGPT, AI and Generative AI tools used in educational contexts.

Fig. 1 PRISMA diagram



3.2 Database selection

After applying the search strategy, the study identifies an appropriate academic and professional database that contain relevant literature. Databases like PubMed, IEEE Xplore, ERIC, Google Scholar, and arXiv (considering preprints like [2] and [19]) were used for this review. Total of 988 articles were found based on the keywords, however, the irrelevant articles other than from educational contexts, were removed from the sample. In order to finalize the sample, the study used only the papers that were totally based on ChatGPT, AI and Generative AI tools in educational contexts.

3.3 Inclusion and exclusion criteria

The study used the clear criteria for which studies to include or exclude based on relevance, publication date, type of publication, etc. For instance, only articles after 2020 were considered to ensure the latest perspectives on ChatGPT in academic settings. This often involves a two-step process:

- Title and abstract screening: Eliminate irrelevant articles from their title and abstract.
- Full-text screening: Read the full texts of the shortlisted articles to ensure they are pertinent to the research question.

3.4 Data extraction

Once the final list of literature is decided, extract relevant data from each study. This could be the methods they used, the main findings, the study context, etc. The depth of insight from articles like those of Dwivedi et al. [20] and Kasneci et al. [9] will provide comprehensive views on ChatGPT's roles and implications. Evaluate the quality of each study, considering the methodology used, sample size, potential biases, and so forth. Some studies, significantly peer-reviewed articles from journals like "Contemporary Educational Technology" or "International Journal of Information Management," may naturally carry more weight due to rigorous review processes.

3.5 Synthesis of findings

Group findings under thematic areas has been followed using six steps of Braun and Clarke [22]. For instance, the opportunities of ChatGPT in academia might be one theme, while challenges could be another. The diversity of topics, ranging from the perception of ChatGPT, as seen in Mogavi et al. [2], to its role in foreign language teaching as in Huang and Li [5], can provide a rich tapestry of insights. A systematic literature review based on the 27 literature references would require a structured, rigorous, and transparent approach to ensure the findings are comprehensive, unbiased, and informative.

4 Results

4.1 Descriptive statistics

Table 1 provides an overview of academic research conducted in 2023 concerning the role and implications of ChatGPT and generative artificial intelligence in education and beyond. The predominant trend suggests that ChatGPT, a significant representative of advanced AI, has garnered considerable attention in the academic sector. Numerous studies have explored its multifaceted applications in areas ranging from revolutionizing general education to its potential in specialized domains like chemistry learning and language acquisition. The broad array of journal names reflects that the research is interdisciplinary, encompassing educational technology, information management, individual learning differences, and cultural heritage interpretation. Additionally, the predominance of research in education-focused journals indicates a growing consensus on the transformative potential of AI tools in reshaping pedagogical approaches and learning environments.

Furthermore, while most of the studies discuss the benefits, opportunities, and applications of ChatGPT in learning, there is also a concern about its challenges and implications. Articles like those by Lawan et al. [6] and Panagopoulou et al. [14] focus on the adverse effects and legal considerations of such AI tools in education. This suggests a balanced academic discourse, recognizing the advancements AI promises and the cautions required in its application. Notably, there is an ongoing interest in the more specialized roles of ChatGPT, with studies on topics such as digital leadership, technology integration, and the development of critical thinking skills highlighting the tool's expansive reach and potential. In sum, 2023 has been a year of substantial academic reflection on ChatGPT, acknowledging its multifaceted impact on the educational landscape.

4.2 Studies categorization

In the provided systematic literature review, an overwhelming majority of studies, precisely 24 out of 32, are concentrated on the context of higher education (Fig. 2). This accounts for 75% of the research, highlighting the substantial focus and perceived importance of ChatGPT and generative AI tools within universities and colleges. On the other hand, the school level is notably underrepresented, with just one study constituting a mere 3.125% of the total research. This suggests that primary and secondary education sectors still need to be a significant focal point for such investigations. Additionally, "Other Contexts" accounts for 7 studies or 21.875% of the total, indicating a broader interest in ChatGPT's application beyond mainstream educational settings. The data underscores the pressing relevance of AI in higher education while also pointing to the potential areas that might need further exploration in the future.

4.3 Challenges in the implementation of ChatGPT in academic culture

Table 2 offers an overview of the prevailing concerns and obstacles associated with incorporating ChatGPT in academic settings. At the forefront of these challenges is the "Pedagogical Integration" issue, with a significant 31.25% of the studies highlighting the difficulties of seamlessly embedding ChatGPT into existing educational frameworks. Such a concern underscores the importance of aligning technological advancements with teaching methods to ensure effective learning outcomes. Additionally, both "Student Engagement and Motivation" and "Educator Preparedness and Training" occupy

Table 1 Descriptive analysis

Year	Research field	Journal names	No. of articles	Sources
2023	Revolutionizing education with AI	Contemporary Educational Technology	1	Adiguzel et al. [1]
2023	User perspectives on chatgpt	arXiv preprint	1	Mogavi et al. [2]
2023	Perspectives on generative conversational AI	International Journal of Information Management	1	Dwivedi et al. [20]
2023	Opportunities and challenges of large language models for education	Learning and Individual Differences	1	Kasneci et al. [9]
2023	Adverse Effects of Generative Artificial Intelligence on Education	Education Journal	1	Lawan et al. [6]
2023	ChatGPT as a virtual learning environment	Proceeding of International Conference on Innovations in Social Sciences Education and Engineering	1	Baskara [11]
2023	Ethical ChatGPT & Leadership	Journal of University Teaching & Learning Practice	1	Crawford et al. [3]
2023	Augmented intelligence in programming learning	Computers in Human Behavior: Artificial Humans	1	Yilmaz and Yilmaz [4]
2023	Generative Artificial Intelligence in Education	Sustainability	1	Ruiz-Rojas et al. [23]
2023	Chemistry Learning with ChatGPT	arXiv preprint	1	Santos [19]
2023	Distance Science Education & ChatGPT	-	1	Kilinc [8]
2023	Generative artificial intelligence in university teaching	Computers and Education: Artificial Intelligence	1	Kohnke et al. [24]
2023	Digital Leadership and Technology Integration with ChatGPT	Administrative Sciences	1	Karakose et al. [17]
2023	ChatGPT impact on blended learning	International Journal of Data and Network Science	1	Alshahrani [25]
2023	Responsible AI Education	Available at SSRN	1	Bentley et al. [21]
2023	English Language Learning with ChatGPT	International Conference on Language and Language Teaching	1	Baskara [12]
2023	AI, ChatGPT, and Critical Thinking in Academic Assignments	-	1	Marbun [26]
2023	SWOT analysis of ChatGPT	Innovations in Education and Teaching International	1	Farrokhnia et al. [16]
2023	Role of ChatGPT in higher education	Journal of Applied Learning and Teaching	1	Rasul et al. [18]
2023	Chatbots in higher education	Journal of Applied Learning and Teaching	1	Rudolph et al. [27]
2023	Impact of ChatGPT on Self-Study in Higher Education	-	1	Larsson and Eriksson [7]
2023	ChatGPT interpretation of cultural heritage values	-	1	Spennemann [15]
2023	Technology for Developing Critical Thinking Skills	Journal of Educational Technology Systems	1	Mejia & Sargent [28]
2023	Applied Translation for Language Learning in AI era	Hispania	1	Muñoz-Basols et al. [29]
2023	Adaptive Systems with AI	End-User Development: 9th International Symposium	1	Fischer [30]
2023	Integrating AI, NLP in STREAM Education	-	1	Abu-Ghuwaleh & Saffaf [31]
2023	ChatGPT for Experts	arXiv preprint	1	Azaria et al. [13]
2023	Research Thesis in Engineering Programs in Digitalization Era	Sustainability	1	Cacciottolo et al. [32]
2023	Legal and ethical considerations of ChatGPT in education	arXiv preprint	1	Panagopoulou et al. [14]

Fig. 2 Number of studies and categorization

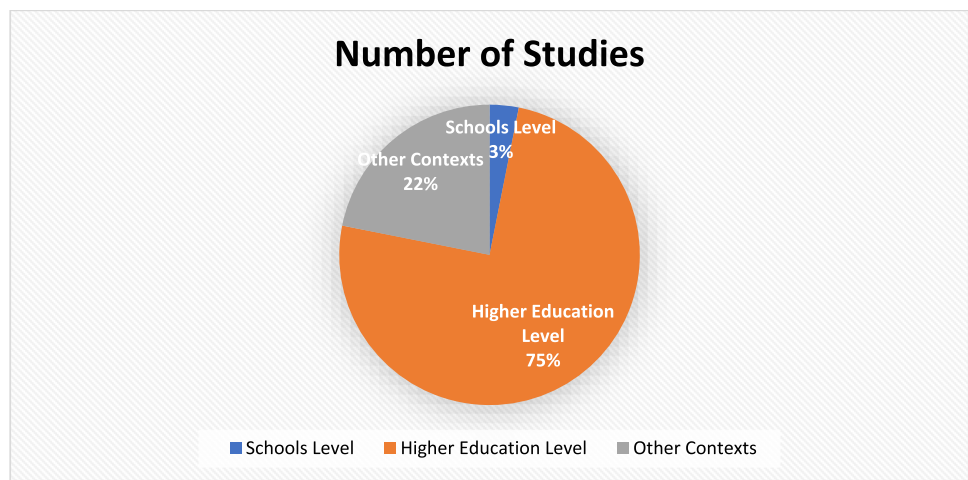


Table 2 Challenges in the implementation of ChatGPT in academic culture

Challenges in implementing ChatGPT in academic culture	Number of studies	Total studies (%)
Ethical considerations and bias	3	9.38
Pedagogical integration	10	31.25
Student engagement and motivation	5	15.63
Educator preparedness and training	5	15.63
Privacy and data security	2	6.25
Language proficiency and communication	3	9.38
Assessment and evaluation	5	15.63
Cultural sensitivity and diversity	2	6.25
Technological infrastructure	1	3.13
Collaborative learning	1	3.13
Others	0	0.00
Total	32	100

an equal share of the concerns at 15.63%, highlighting a symbiotic relationship: educators' need proper training to exploit the capabilities of ChatGPT, while students require motivation to utilize this tool effectively.

On the other hand, "Technological Infrastructure" and "Collaborative Learning" are on the lower end of the spectrum, with only 3.13% of studies highlighting these challenges. It might suggest that while the fundamental technical infrastructure is becoming commonplace in academic institutions, the real challenge lies in how the tool is integrated and used rather than mere access to it. Moreover, "Ethical Considerations and Bias" and "Language Proficiency and Communication" are not overlooked, considering the inherent biases AI models might have and the necessity for clear communication in educational settings. In conclusion, while ChatGPT presents promising educational potential, addressing these challenges is paramount to realizing its full benefits in fostering an enriched academic culture.

4.4 Factors affecting the use of ChatGPT in academic culture

Table 3, titled "Factors affecting the use of ChatGPT in academic culture," offers insights into the potential advantages and drivers pushing for adopting ChatGPT in academic environments. Dominating the list is "Efficient Content Creation and Delivery" at 25.00%, suggesting that educators and institutions see a significant value in leveraging ChatGPT for efficiently curating and disseminating academic content. This is closely followed by "Enhanced Personalized Learning" at 21.88%, reflecting a growing demand in educational settings for tailored experiences that cater to individual learning paces and styles. "Accelerated Research and Writing," also at 21.88%, echoes the advantages of AI in streamlining the research process, pointing towards the tool's potential in simplifying academic writing tasks and enhancing research capabilities.

Moreover, "Support for Diverse Learning Needs" and "Collaborative Learning," both standing at 15.63%, underline the versatility of ChatGPT in catering to a variety of learners and promoting group-based learning, respectively. "Language

Table 3 Factors affecting the use of ChatGPT in academic culture

Factors that make the use of ChatGPT necessary and desirable in academic culture	Number of studies	Total studies (%)
Enhanced personalized learning	7	21.88
Efficient content creation and delivery	8	25.00
Support for diverse learning needs	5	15.63
Language support and translation assistance	4	12.50
Accessibility and inclusivity	3	9.38
Collaborative learning	5	15.63
Development of critical thinking skills	6	18.75
Creative problem solving	3	9.38
Accelerated research and writing	7	21.88
Innovative assessment methods	4	12.50
Enhanced student engagement and motivation	6	18.75
Academic support and tutoring	2	6.25
Others	1	3.13

Support and Translation Assistance" at 12.50% emphasizes the global nature of education today, where language barriers are continuously being broken down. Surprisingly, "Academic Support and Tutoring" only accounts for 6.25% of the studies, suggesting that while ChatGPT is a supplementary tool for academic help, it might not be the primary go-to solution for many. In conclusion, the multitude of factors advocating for adopting ChatGPT in academia underscores its versatility and potential to enhance various facets of the learning process, making it a significant asset in the ever-evolving educational landscape.

4.5 Possibilities and opportunities in the implementation of ChatGPT in academic culture

Table 4 sheds light on the myriad of possibilities and opportunities that arise from implementing ChatGPT in the academic realm. The leading chance, as seen by "Efficient Content Creation and Delivery," garnering 25.00%, indicates an educational shift where educators recognize the advantages of using ChatGPT to facilitate a more streamlined and timely dissemination of content. Following closely is the "Enhanced Personalized Learning" factor with 21.88%, underlining the capability of ChatGPT to provide tailored educational experiences, catering to unique learner demands and augmenting individual learning trajectories. Another notable element is "Accelerated Research and Writing," which stands at 21.88%, suggesting that the academic community acknowledges ChatGPT's potential in bolstering research endeavors and simplifying writing processes.

Table 4 Possibilities and opportunities in the implementation of ChatGPT in academic culture

Possibilities and opportunities in the implementation of ChatGPT in academic culture	Number of studies	Total studies (%)
Enhanced personalized learning	7	21.88
Efficient content creation and delivery	8	25.00
Support for diverse learning needs	5	15.63
Language support and translation assistance	4	12.50
Accessibility and inclusivity	3	9.38
Collaborative learning	5	15.63
Development of critical thinking skills	6	18.75
Creative problem solving	3	9.38
Accelerated research and writing	7	21.88
Innovative assessment methods	4	12.50
Enhanced student engagement and motivation	6	18.75
Academic support and tutoring	2	6.25
Others	1	3.13

Additionally, aspects such as "Support for Diverse Learning Needs" and "Collaborative Learning," both at 15.63%, highlight ChatGPT's adaptability in addressing a wide range of student profiles and fostering collaborative learning environments. "Enhanced Student Engagement and Motivation" and "Development of Critical Thinking Skills," with percentages of 18.75%, each emphasize the tool's capability to invigorate student enthusiasm and instill higher-order cognitive skills. The lesser focus on "Academic Support and Tutoring" at 6.25% hints that while ChatGPT is appreciated for its supplementary educational roles, it might not be the mainstay for intensive academic assistance. Table 4 encapsulates a promising future for ChatGPT in the academic sector, where its multifaceted advantages can be harnessed to revolutionize contemporary educational practices and pedagogies.

5 Discussion

The findings of the systematic literature review make it clear that ChatGPT has become increasingly popular and has been incorporated into the academic sphere as a direct result. The findings from Adiguzel et al. [1] and Kasneci et al. [9], which looked at the transformative potential of ChatGPT and the opportunities and challenges presented by large language models in education, are consistent with the current research, which emphasizes the pedagogical integration of ChatGPT as a dominant theme. The current analysis reveals a high incidence of studies focusing on pedagogical integration (31.25%), which supports the previously identified imperative that educational institutions modify their teaching strategies to utilize AI's potential fully. Lawan et al.'s [6] investigation of modified flipped learning to reduce the possible adverse effects of artificial intelligence illustrates this, indicating that educators are actively looking for ways to integrate ChatGPT into pre-existing educational frameworks.

Furthermore, as 21.88% and 25.00% of studies have indicated, ChatGPT's contribution to personalized learning and effective content delivery significantly drives its necessity in academic culture. These features align with the opinions expressed by users regarding ChatGPT's educational applications, as highlighted by Mogavi et al. [2]. The focus on individualized learning aligns with the findings of Yilmaz and Yilmaz's [4] study on using augmented intelligence in programming instruction, which shows that ChatGPT's flexibility can accommodate different learning preferences and requirements.

The current study identifies ethical issues, educator readiness, and student involvement as significant concerns regarding the difficulties in implementing ChatGPT. These findings are consistent with Crawford et al. [3] on ethical leadership with AI and Kohnke et al. [24] on university instructors' readiness for AI. According to Karakose et al. [17], in their discussion of digital leadership, 15.63% of studies that concentrated on educator training and readiness highlight the need for professional development to give educators the tools they need to use ChatGPT in an academic setting.

Last, the current findings and earlier research highlight the potential benefits of ChatGPT's application in academic cultures, such as collaborative learning and developing critical thinking abilities. Mejia and Sargent's [28] claims regarding using technology to develop critical thinking skills are supported by the 18.75% of studies in the current analysis that focus on this skill's development. Similar to how 15.63% of studies report that ChatGPT facilitates collaborative learning, Azaria et al. [13] provide evidence of ChatGPT's effectiveness as an expert tool, which may promote higher-order collaboration and knowledge construction within academic communities.

5.1 Policy implications

The study offers policy implications for academic institutions. The significant focus on "Efficient Content Creation and Delivery" suggests that ChatGPT and similar AI tools can be integrated into curriculum design. Educational institutions should consider leveraging AI in formulating and updating course content. Educators can create a more dynamic, up-to-date, and relevant curriculum. Policies should thus promote training and workshops that introduce educators to the potentials and methodologies of such integration. Given the concerns related to "Pedagogical Integration" and "Educator Preparedness and Training," institutions should prioritize continuous professional development for educators in AI. This includes technical training and methodologies to incorporate AI tools into their teaching strategies seamlessly. A holistic understanding will enable educators to maximize the benefits of AI, thus enhancing student engagement and learning outcomes.

Institutions should develop comprehensive ethical guidelines for AI use, with "Ethical Considerations and Bias" being a recognized challenge. This would address potential biases and data privacy issues and ensure that the AI tools align with the institution's values and larger educational goals. It's imperative that while embracing AI, institutions also maintain the

trust of students, educators, and stakeholders. Although "Technological Infrastructure" was less concerned, institutions must ensure a robust technological backbone to support widespread AI integration. This goes beyond mere access to the technology but also includes providing technical support, periodic maintenance, and regular updates. The potential for "Enhanced Personalized Learning" should be harnessed by creating policies that encourage the development of personalized learning pathways. These pathways, powered by AI, can adapt to students' needs in real-time, ensuring that every learner is catered to individually, optimizing their learning journey. ChatGPT's "Collaborative Learning" capability suggests that institutions should foster environments that promote group-based activities and collaborative projects, with AI tools as facilitators. Such policies will harness the potential of AI to enhance team dynamics and student cooperative efforts.

Incorporating these policy implications will not only harness the potential benefits of AI in academia but also address the challenges, ensuring a comprehensive and effective integration of tools like ChatGPT into the academic culture.

5.2 Limitations and future directions

Introducing artificial intelligence (AI) tools like ChatGPT into educational institutions has limitations. The currently available AI models have the potential to unintentionally perpetuate biases that are already present in their training data, which raises concerns about the neutrality and fairness of the content that is generated. A dependency on technological infrastructure also exists, which may prevent organizations with limited resources from taking advantage of these advancements. In addition, putting less stock in artificial intelligence can obscure essential human components of education, such as mentorship, experiential learning, and empathy. When looking to the future, it is necessary to make investments in AI systems that are objective and open to scrutiny, in addition to providing extensive training for educators. The way forward should center on a symbiotic integration in which artificial intelligence serves as a supplement to human educators rather than a replacement for them, and it should promote an inclusive, dynamic, and comprehensive learning environment.

Acknowledgements I have no acknowledgments to include in this publication.

Author contributions The sole author, Laila Mohebi, designed the study, conducted all experiments, analyzed the data, and authored the manuscript in its entirety.

Funding This research was conducted without funding.

Availability of data and materials I confirm that all data and materials used in this study are readily available upon request to interested researchers.

Declarations

Competing interests The author declares no competing interests that could potentially influence the interpretation of the research findings presented in this article.

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