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A COMPREHENSIVE DISCUSSION ON DARK SIDE AND BENEFITS OF CHATGPT IN HIGHER EDUCATION: A SYSTEMATIC REVIEW

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ABSTRACT

The emergence of sophisticated machine learning models like ChatGPT has spurred considerable progress across various sectors, including education. This paper aims to investigate the impact of ChatGPT on higher education, encompassing both advantageous and detrimental aspects. A thorough review of literature was conducted, drawing from reputable sources. Employing a critical literature review methodology, databases such as the Directory of Open Access Journals (DOAJ), Scopus, ProQuest, Science Direct, PubMed, Google Scholar, Web of Science, Springer Link, and EBSCOhost were utilized. The researcher systematically explored literature concerning ChatGPT's influence on higher education. The analysis adopted descriptive and thematic approaches, highlighting trends and applications of ChatGPT in higher education. Findings suggest that ChatGPT offers numerous benefits in education, such as aiding in curriculum development, formulating lesson plans, facilitating online exam supervision, providing personalized learning experiences, improving students' language proficiency, enhancing teaching methodologies. Nevertheless, there are also drawbacks, including biased learning assessment, jeopardizing academic integrity, dissemination of inaccurate information, challenges in assessing response quality, decline in higher-order cognitive skills, fostering plagiarism, and excessive reliance on ChatGPT. The paper concludes by underscoring the necessity for further research in this domain and furnishing recommendations for educators and policymakers.

KEYWORDS: Benefits, Higher Education, Concerns, Artificial Intelligence, ChatGPT

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1. INTRODUCTION

The landscape of education is in a constant state of evolution, propelled by the emergence of new technologies poised to revolutionize the teaching and learning process (Haleem, Javaid, Qadri &

Suman,2022). Among these technologies is advanced machine learning models like ChatGPT, which has demonstrated significant potential across various domains, including higher education (Sun, 2023). ChatGPT, an Artificial Intelligence (AI) language model developed by OpenAI, utilizes deep learning methodologies to produce human-like responses based on user input. Its proficiency in natural language processing renders it a valuable asset in educational contexts, facilitating tasks such as curriculum development, lesson planning, online exam proctoring, personalized learning experiences, and pedagogical enhancements (Mollick, 2022;Deng & Lin,2022).

Nevertheless, as with any novel technology, there exist potential drawbacks that warrant consideration, such as biased learning assessments, threats to academic integrity, dissemination of erroneous information, difficulties in evaluating response quality, decline in higher-order cognitive skills, promotion of academic dishonesty, and excessive reliance on ChatGPT (Mollick, 2022; Zhai, 2022). The current body of literature lacks a comprehensive systematic review of empirical studies. Hence, this systematic literature review seeks to fill this void by amalgamating existing empirical research on Artificial Intelligence, particularly ChatGPT, within the realm of higher education. It aims to elucidate how ChatGPT has been employed in educational contexts and identify any extant gaps. Additionally, this article endeavours to delve into the discussion surrounding ChatGPT in higher education, encompassing both its benefits and negative implications. This review holds particular relevance for researchers and educators considering the integration of ChatGPT into higher education settings. The following research questions will steer this investigation: (1) what are the concerns and benefits associated with ChatGPT in higher education? (2) What potential solutions exist to address the concerns surrounding the utilization of ChatGPT in higher education?

2. LITERATURE REVIEW

ChatGPT, a software program facilitating real-time conversations with users, has garnered significant attention in higher education for its potential to enhance student learning experiences (Welle, 2023; Schroeven, Buelens & Kirschner, 2023). Its ability to amalgamate diverse information sources, provide immediate responses to queries, and stimulate student engagement has been noted (Tlili, Shehata, Adarkwah, Bozkurt, Hickey, Huang & Agyemang, 2023). Applications of ChatGPT span across computing education, language learning, and mathematics education (Ouyang, Zheng, & Jiao, 2022;Nunes, Primi, Pires, Lotufo, & Nogueira, 2023; Mhlanga,2023; Jeon, 2021). However, criticisms regarding its user-centered design, fictional dialogues, and ethical considerations have also surfaced (Xue, Lei, & Cho, 2023; Murtarelli, 2021). Additionally, scholars have underscored risks and challenges associated with ChatGPT, encompassing ethical and practical dimensions (Kasneji et al., 2023). Concerns about the accuracy of ChatGPT's responses have been raised (Tlili et al., 2023), along with potential biases and ethical dilemmas (Qadir, 2022). Issues such as cheating and plagiarism have also been highlighted (Lecler, Duron & Soyer, 2023).For instance, Rudolph et al. (2023) conducted a review of literature on ChatGPT's

implications in higher education, revealing a dearth of peer-reviewed articles and an abundance of unreviewed preprints. The reviewed studies explored various applications of ChatGPT, including academic paper composition (Zhai, 2022) and conversational interactions (Gao, Howard, Markov, Dyer, Ramesh, Luo & Pearson, 2022). Other investigations delved into learners' perceptions of ChatGPT in language acquisition (Dowling & Lucey 2023) and its potential support for second language (L2) writing tasks (Yan, 2023). While some studies reported ChatGPT's motivational and pedagogical benefits, others voiced concerns regarding its impact on academic integrity and educational equity (Yan, 2023; Almendingen, Morseth, Gjolstad, Brevik & Torris, 2021).

Given ChatGPT's novelty, empirical research on its educational impacts remains limited. For instance, while some learners observed enhancements in reading and writing skills, concerns persisted regarding its potential adverse effects on academic integrity (Ali et al., 2023).

The SWOT analysis was carried out and became most suitable for researched topic. SWOT analysis is used to evaluate the strengths, weaknesses, opportunities, and threats of a particular concept (Benzaghta, Elwalda, Mousa, Erkan & Rahman, 2021; Leiber, Stensaker & Harvey, 2018). Both positive and negative outcomes were obtained from the analysis, and the following is SWOT analysis for the study.

Table 1 SWOT analysis of ChatGPT in higher Education

Strengths	Weakness
<ul style="list-style-type: none"> Technology can help students, teachers, and stakeholders work together. Data gathering, analysis, and feedback systems can aid assessment and evaluation. Technology supports distance and e-learning. Technology provides learning materials and tools to facilitate personalized instruction and inclusive education. 	<ul style="list-style-type: none"> Some students and higher institutions lack internet and technological access. Technology is expensive and difficult to integrate into the curriculum and education. If misused, technology may distract students.
Opportunity	Threat
<ul style="list-style-type: none"> Technology aids global competence and intercultural understanding. Technology may help STEM abilities grow. Technology aids language learning. Technology may foster 21st-century abilities like critical thinking, problem-solving, and creativity. Technology promotes digital literacy and citizenship. 	<ul style="list-style-type: none"> Technology can cause overuse and disregard of other instructional approaches. Technology may harm students' emotional and physical health if misused. Technology can contribute to the digital divide, as low-income students or ethnic groups may have restricted access to technology.

The current study identified previous studies on using ChatGPT in higher education. Below is the Table2 for previous studies presentation.

Table 2 Previous studies on using ChatGPT in higher education during Covid -19 Pandemic

Title of study	Aims of the study	Author(s)
To Use or not to Use ChatGPT in Higher Education? A Study of Students' Acceptance and Use of Technology	The study aimed to examine the utilization of ChatGPT among higher education students.	Strzeleck & Artur, (2023)
Impact of ChatGPT on Learners in a L2 Writing Practicum: An Exploratory Investigation	The study aimed to examine the potential applicability ChatGPT in L2 writing pedagogy.	Yan & Da, (2023)
ChatGPT: A Revolutionary Tool for Teaching and Learning Mathematics	The study aimed to examine the use of ChatGPT in teaching mathematics.	Wardat, (2023)
Exploring Students' Perceptions of ChatGPT: Thematic Analysis and Follow-Up Survey	The study aimed to explore students' perceptions of ChatGPT and evaluate its possibilities and difficulties.	Shoufan & Abdulhadi, (2023)
Leveraging ChatGPT to Aid Construction Hazard Recognition and Support Safety Education and Training	The study aimed to investigate how the utilization of ChatGPT in the curriculum affects students' hazard recognition.	Uddin, (2023)
Exploring Teachers' Attitudes Towards Using ChatGPT	The study aimed to investigate faculty members' perspectives regarding the utilization of ChatGPT.	Iqbal, (2023)
Aladdin's Genie or Pandora's Box for Early Childhood Education? Experts Chat on the Roles, Challenges, and Developments of ChatGPT	The study aimed to explore the optimal roles, pressing challenges, and future developments of ChatGPT in early childhood education.	Luo, (2023)
ChatGPT Challenges Blended Learning Methodologies in Engineering Education: A Case Study in Mathematics	The study aimed to explore the potential impact of the ChatGPT on learning methodologies in engineering education, specifically in mathematics	Ruiz, (2023)
Exploring the Usage of ChatGPT in Higher Education: Frequency and Impact on Productivity	The study aimed to investigate how instructors utilize ChatGPT in their teaching and the factors influencing their decisions to adopt or avoid it.	Firaina, (2023)
Integration of Artificial Intelligence in Academia: A Case Study of Critical Teaching and Learning in Higher Education	The study aimed to examine the use of ChatGPT in enhancing critical reasoning and journalistic writing competencies among journalism students.	Irfan, (2023)
Large Language Models in Education: A Focus on the Complementary Relationship between Human Teachers and ChatGPT	The study aimed to investigate how ChatGPT and teachers complement each other in the context of education.	Jeon, (2023)
What ChatGPT Means for Universities: Perceptions of Scholars and Students	The study aimed to examine the educational implications of ChatGPT from the viewpoints of both educators and students.	Fist, (2023)

The above table discussed about the swot analysis of ChatGPT, the following section discusses about the positive implications of ChatGPT in higher education.

3.1 Positive Implications of ChatGPT

3.1.1 Curriculum development

Utilizing Artificial Intelligence through ChatGPT presents opportunities for educators to enhance curriculum development processes. By leveraging data on student performance and identifying knowledge gaps, ChatGPT can aid in updating curricula to align with industry demands and recommend new content (Banihashem, Noroozi, van Ginkel, Macfadyen & Biemans, 2022). Moreover, the potential for simplifying curricula to focus on real-life relevance is promising (Biswas, 2023). Speculated advancements like "invisible devices" could further revolutionize learning by decentralizing content from traditional curricula, allowing student's access to virtual tutors for specific queries, particularly aiding in memorization-centric subjects (Gupta, Raturi & Venkateswarlu, 2023). This approach promotes active learning, facilitating better retention and application of knowledge (Nunes, Primi, Pires, Lotufo & Nogueira, 2023). Consequently, Choi, Hickman, Monahan & Schwarcz, 2023). Highlighted that educators can allocate more time to fostering critical thinking and practical knowledge application, particularly beneficial in disciplines prone to rote learning, such as introductory science courses. ChatGPT-driven systems can identify key concepts, interrelations, and personalized learning paths, addressing individual student needs effectively (Caldarini, Jaf & McGarry, 2022). Analysing learner performance data enables the system to pinpoint areas of difficulty, offering tailored learning resources and activities, thereby enhancing the overall learning experience (Nerdel, Pfeffer, Poquet, Sailer, Schmidt & Kasneci, 2023).

3.1.2 Developing Lesson Plans

Artificial Intelligence integrated with ChatGPT offers valuable assistance to educators in crafting lesson plans (Mann, 2023; Mizumoto & Eguchi, 2023). By suggesting relevant teaching materials, assessments, and activities, ChatGPT can streamline the lesson planning process (Kung, Cheatham, Medenilla, Sillos, De Leon, Elepano, Madriaga, Aggabao, Diaz-Candido, Maningo & Tseng, 2022). Educators can tailor learning activities to suit the unique characteristics of their student cohorts, optimizing instructional effectiveness (Sobania, Briesch, Hanna & Petke, 2023). This efficiency in planning allows educators to allocate more time to familiarizing themselves with ChatGPT and exploring innovative ways to integrate it into their teaching methods, thereby enriching the student learning experience (Bayat, Banihashem & Noroozi, 2022). With access to a diverse range of learning activities, educators can identify and implement the most effective approaches to achieve desired learning outcomes (Mann, 2023; Mizumoto & Eguchi, 2023). Moreover, collaborating with students to co-create learning activities using ChatGPT fosters a sense of agency among students, potentially enhancing their motivation and engagement in the learning process (Zhuo, Huang, Chen & Xing, 2023).

3.1.3 Easy Online Exam Invigilation

In higher education, invigilation software, also known as proctoring software, serves to monitor online exams or assessments, particularly in distance or online learning environments where students take exams remotely (Qadir, 2022). These tools employ various monitoring methods such as video, audio, screen sharing, and keystroke logging to observe students' behavior and prevent academic misconduct (Sobania, Briesch, Hanna & Petke, 2023).

ChatGPT can potentially render traditional invigilation software less essential or even obsolete (Rudolph et al., 2023). AI-powered solutions utilizing ChatGPT offer advanced capabilities to identify faces, voices, and instances of cheating with greater sophistication (Qadir, 2022). For instance, AI can analyze student behavior during exams, including eye movements, typing patterns, and response times, to detect possible cheating attempts (Zhai, 2022). Furthermore, ChatGPT can analyze exam responses to uncover plagiarism or collusion patterns that may elude manual detection methods (Yan, 2023; Almendingen, Morseth, Gjolstad, Brevik & Torris, 2021). Moreover, ChatGPT facilitates personalized exams and assessments tailored to individual learner preferences and needs, reducing the incentive for academic dishonesty while enhancing learner engagement and motivation (Haleem, Javaid, Qadri & Suman, 2022). Mann, (2023) supported that encouraging students to take ownership of their learning aligns with the goal of developing lifelong learners who can independently navigate their professional development beyond their academic endeavors.

3.1.4 Personalized Learning Experiences

ChatGPT's adaptability and capacity to learn from interactions make it a versatile conversational agent (Shen et al., 2023). By remembering and incorporating previous conversations into its responses, ChatGPT maintains context, enabling more natural and coherent interactions with users over time (Haque, Dharmadasa, Sworna, Rajapakse & Ahmad, 2022). Leveraging extensive training data, ChatGPT can deliver personalized responses tailored to the context of a given prompt (Haque et al., 2022). Moreover, ChatGPT can generate responses with varied tones and structures, catering to users' preferences and requirements (Aljanabi & ChatGPT, 2023). This functionality enables users to engage in conversations that feel authentic and personalized, fostering a sense of genuine dialogue with the chatbot that evolves with each interaction (Aljanabi, 2023).

3.1.5 Enhancing Student's Language Skills and Abilities

ChatGPT serves as a potent tool for enhancing students' language skills and abilities (Mucharraz yCano et al., 2023). By simulating real-life conversations, students can practice their language skills in a supportive and non-judgmental setting (Jiang, Cheng, Yang & Gao, 2022). This environment allows students to experiment with diverse phrases, grammatical structures, and expressions without the fear of making errors (Caldarini, Jaf & McGarry, 2022). ChatGPT offers personalized feedback on students' language usage, pinpointing areas for improvement and suggesting strategies to enhance language proficiency (Sinha, Roy, Kumar, Mondal & Sinha, 2023). Furthermore,

ChatGPT facilitates conversational practice, enabling students to bolster their confidence and fluency in speaking the language (Jiang, Cheng, Yang & Gao, 2022). This interactive practice aids in improving listening and comprehension skills as students are exposed to various conversational patterns and speech styles (Mucharras y Cano et al., 2023). Overall, leveraging ChatGPT as a language-learning tool proves highly effective in advancing students' language skills and capabilities, empowering them to attain their language-learning objectives (Sinha, Roy, Kumar, Mondal & Sinha, 2023).

3.1.6 Enhancing Teaching Practices

ChatGPT plays a pivotal role in enhancing teaching practices by offering valuable insights into students' learning processes (Khan, Khan, & Moin, 2021). Sinha, Roy, Kumar, Mondal & Sinha, (2023) highlighted that through the analysis of student responses, ChatGPT enables teachers to pinpoint areas requiring improvement and provides feedback accordingly. Moreover, ChatGPT significantly reduces the time educators spend on class preparation by swiftly generating automated responses, lesson plans, assessments, quizzes, and other teaching materials (Latifi, Noroozi & Talaei, 2021). (Roose, 2023). This efficiency is particularly advantageous for teachers inundated with administrative duties and grading responsibilities (Wang, Miao, Li, Wang & Lin, 2023).

ChatGPT facilitates real-time feedback on student responses, enabling educators to promptly identify areas of difficulty and adjust teaching methodologies as needed (Roose, 2023). Additionally, the system tailors personalized learning experiences for students based on their unique learning styles and preferences, allowing teachers to allocate more time to provide individualized support to students (Wang, Miao, Li, Wang & Lin, 2023). By streamlining administrative tasks and offering personalized learning experiences, ChatGPT empowers teachers to work more efficiently and effectively, ultimately enhancing the quality of education for students (Kumar, 2023).

3.2 Negative Implications of ChatGPT

3.2.1 Unfair Student Learning Assessment

The advent of AI-generated tools like ChatGPT introduces concerns regarding the fairness of student assessment, potentially leading to biased evaluations (Lecler, Duron & Soyer, 2023). Scholars have highlighted the difficulty in distinguishing between textual outputs generated by ChatGPT and those produced by humans (Cotton et al., 2023; Else, 2023; Shiri, 2023; Shoufan & Abdulhadi, 2023). Mhlanga (2023) argued that teachers are worried about students utilizing ChatGPT to outsource their assignments due to its capability to swiftly generate appropriate essays. Accordingly, students leveraging this advanced tool may attain higher scores compared to their peers who do not use it (Kumar, 2023). Notably, a study by Lecler, Duron & Soyer, (2023) observed instances where students used ChatGPT to write essays and claimed credit for the resulting high grades, thereby potentially undermining the integrity of assessments. Additionally, reports of

ChatGPT achieving high scores in practice exams raise concerns about the reliability of assessment outcomes (Kumar, 2023). Such practices could adversely affect students' emotions and the credibility of educational institutions, emphasizing the need to address potential biases in assessment processes (Lecler, Duron & Soyer, 2023).

3.2.2 Threatening Academic Integrity

The rise of ChatGPT has sparked concerns about the security of online assessments and the potential for cheating, particularly in higher education contexts where online exams are increasingly common (Garg & Goel, 2022). ChatGPT's ability to generate human-like text poses a significant risk to the integrity of online exams (Susnjak, 2022). Studies have demonstrated ChatGPT's proficiency in responding to exam questions in various fields, including medicine and law (Kung et al., 2022; Choi et al., 2023).

Empirical research by Fijacko et al. (2023) revealed that ChatGPT's answers to life support exams were consistently relevant, accurate, and aligned closely with resuscitation guidelines compared to other AI tools. This performance underscores ChatGPT's potential to undermine academic integrity, particularly in higher education settings (Cotton et al., 2023). As a result, safeguarding academic integrity against the threat posed by ChatGPT remains a pressing concern for educational institutions.

3.2.3 Inaccurate Information

The inherent limitations of ChatGPT pose risks of encountering misleading information for both students and teachers (Bayat, Banihashem & Noroozi, 2022). Numerous researchers have highlighted the potential for factual errors in the information generated by ChatGPT (Al Rawashdeh, Mohammed, Al Arab, Alara & Al-Rawashdeh, 2021; Bakpayev, Baek, Van Esch, & Yoon, 2022; Qadir, 2022; Welle, 2023). Instances of such errors include the invention of non-existent articles and the production of inaccurate responses. This can have detrimental effects when students or teachers rely on this information for tasks, potentially leading to misunderstandings (Rusilowati & Wahyudi, 2020).

Qadir (2022) suggested that false information generated by ChatGPT may arise from various factors, such as user prompts, the quality of training data, and the limitations of the application itself. Consequently, Lecler, Duron & Soyer, (2023) it is crucial for teachers and students to critically evaluate the responses generated by ChatGPT to ensure their accuracy and reliability. Rusilowati & Wahyudi, (2020) pointed out that adopting a discerning approach to utilizing ChatGPT can mitigate the risks associated with inaccurate information and optimize its effectiveness and efficiency in educational settings.

3.2.4 Challenges in Evaluating the Quality of Feedback

One of the challenges associated with ChatGPT is its inability to assess the credibility of the data it was trained on, which hampers its capacity to evaluate the accuracy of generated information (Lecler et al., 2023; Sallam, 2023). While ChatGPT may produce responses that align with widely accepted information, such as the 'flat-earth theory' (Grawitch, 2023), its lack of access to the internet and limited knowledge of events beyond 2021 pose significant limitations (Stokel-Walker & Van Noorden, 2023).

As knowledge continues to evolve, Grawitch, (2023) ChatGPT may inadvertently provide outdated or inaccurate responses. For example, when prompted to include current references, ChatGPT may fabricate sources that appear plausible but lack real-world credibility (Choi et al., 2023). Consequently, assessing the quality of feedback from ChatGPT becomes challenging, necessitating scrutiny and verification of information provided by the system (Choi et al., 2023).

3.3.5 Decrease in High-Order Cognitive Skills

Over-reliance on ChatGPT can detrimentally impact students' higher-order cognitive skills, including creativity, critical thinking, reasoning, and problem-solving (Grawitch, 2023). Relying on ChatGPT for answers may simplify the process of obtaining information, potentially diminishing students' motivation to engage in independent research and formulate their conclusions or solutions (Kasneci et al., 2023).

3.2.6 Encouragement of Plagiarism in Higher Education

Ethical concerns surrounding ChatGPT include its potential to encourage plagiarism and cheating (Gasevic et al., 2023) and its susceptibility to errors such as providing false information (Tlili et al., 2023). While ChatGPT does not produce exact copies of specific texts, it synthesizes training data to generate responses, raising the possibility of producing content like existing sources. Recent tests have shown significant similarity between ChatGPT-generated content and existing sources, raising concerns about its potential to democratize plagiarism (Gasevic et al., 2023; Welle, 2023).

Students may unwittingly resort to ChatGPT due to its capabilities, unaware of the risks of plagiarism. Moreover, empirical studies have demonstrated ChatGPT's ability to generate research studies and scientific abstracts, potentially bypassing detection by reviewers (Dowling & Lucey, 2023; Gao et al., 2022). This capability may lead to increased reliance on ChatGPT for academic essays, exacerbating the prevalence of plagiarism in academia. Additionally, ChatGPT's propensity for generating incorrect information heightens the risk of misinformation dissemination in scientific publications (Liebrenz et al., 2023).

3.2.7 Over-Reliance on ChatGPT

Shiri, (2023) over-reliance on ChatGPT poses a significant concern, particularly among students who may resort to this tool as a shortcut for completing assignments, especially under time constraints. This over-reliance may hinder the development of essential skills such as critical thinking, problem-solving, imagination, and research abilities (Kasneci et al., 2023; Mhlanga, 2023; Shiri, 2023).

By relying solely on ChatGPT for generating work, students may bypass the need for analytical thinking and decision-making skills, thereby stunting their cognitive development (Kasneci et al., 2023; Shiri, 2023). The lack of engagement in critical thinking and problem-solving processes may lead to a dearth of innovation and poor decision-making abilities among students (Shah, 2019). Since these skills are pivotal for both academic and professional success, the over-reliance on ChatGPT may result in adverse consequences for students' future endeavors (Mhlanga, 2023). The Table below presents the previous studies associated with concerns using ChatGPT.

Table 3 Studies on the concerns associated with using ChatGPT in the education field:

Title of study	Concerns	Author(s)
Using ChatGPT to Teach Enhanced Clinical Judgment in Nursing Education	Plagiarism Students' abilities for synthesizing evidence into their own words underdeveloped	Seney et al., (2023)
What if the devil is my guardian angel: ChatGPT as a case study of using chatbots in education	Cheating, honesty, and truthfulness Privacy misleading Manipulation	Tlili et al., (2023)
Generative AI and the future of education: Ragnarök or reformation? A paradoxical perspective from management educators	Academic misconduct (unethical and dishonest practices and behaviors)	Lim et al. (2023)
ChatGPT-Reshaping medical education and clinical management	Plagiarism and cheating	Khan et al., (2023)
To use or not to use ChatGPT in higher education? A study of students' acceptance and use of technology	Without a formal review process	Strzelecki, (2023)
he exciting potential for ChatGPT in obstetrics and gynecology	Plagiarism	Grünebaum et al. (2023)
ChatGPT as an Educational Tool: Opportunities, Challenges, and Recommendations for Communication, Business Writing, and Composition Courses	Ethical concerns Human unintelligence and unlearning	Alafnan et al. (2023)
Impact of ChatGPT on learners in a L2 writing practicum: An exploratory investigation	Academic honesty Educational equity	Yan, (2023)
The role of an open artificial intelligence platform in modern neurosurgical education: a preliminary study	Absence of citations for scientific queries	Sevgi et al. (2023)
Exploring Students' Perceptions of ChatGPT:	The accuracy of given answers	Shoufan, (2023)

Thematic Analysis and Follow-Up Survey		
The ChatGPT Storm and What Faculty Can Do	Academic integrity	Sun and Hoelscher, (2023)
Chatting and cheating: Ensuring academic integrity in the era of ChatGPT	Academic integrity and honesty Plagiarism	Cotton et al., (2023)
Leadership is needed for ethical ChatGPT: Character, assessment, and learning using artificial intelligence (AI)	Plagiarism and academic integrity	Crawford et al., (2023)
“So what if ChatGPT wrote it?” Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy	Disruptions to practices Threats to privacy and security	Dwivedi et al., (2023)
A SWOT analysis of ChatGPT: Implications for educational practice and research	Ethical concerns and cheating	Farrokhnia et al., (2023)
ChatGPT: Disruptive Educational Technology	The erosion of students’ accountability to learn	Frith, (2023)
ChatGPT has Aced the Test of Understanding in College Economics: Now What?	Academic dishonesty	Geerling et al., (2023)
How Does ChatGPT Perform on the United States Medical Licensing Examination? The Implications of Large Language Models for Medical Education and Knowledge Assessment	insufficient information	Gilson et al., (2023)
Scientific novelty beyond the experiment	Reinforces concerns about slowing innovative activity	Hallsworth et al., (2023)
Are ChatGPT’s knowledge and interpretation ability comparable to those of medical students in Korea for taking a parasitology examination? a descriptive study	The value of the assessments and the overall quality of the university program diminished	Huh, (2023)
Holy or Unholy? Interview with Open AI’s ChatGPT	Lack of originality and novelty Students’ critical thinking reduced	Iskender (2023)
Large language models in education: A focus on the complementary relationship between human teachers and ChatGPT	Inappropriate or unethical student behavior	Jeon and Lee (2023)
Reclaiming the technology of higher education for teaching digital writing in a post—pandemic world	Students’ autonomy and literacy skills The ability of teachers to hear student voices	Johinke et al. (2023)
Chatbots in Education and Research: A Critical Examination of Ethical Implications and Solutions	Ethical concerns Lack of empathy	Kooli (2023)
Revolutionizing radiology with GPT-based models: Current applications, future possibilities and limitations of ChatGPT	Lack domain expertise Unreliable results Inconsistent or nonsensical answers	Lecler et al. (2023)
Collaborating With ChatGPT: Considering the Implications of Generative Artificial Intelligence for Journalism and Media Education	Ethical issues the question of accountability	Pavlik (2023)
Academic Integrity considerations of AI Large	Academic integrity	Perkins (2023)

Language Models in the post-pandemic era: ChatGPT and beyond		
Can ChatGPT improve communication in hospitals?	Ethical concerns, provide seemingly credible but inaccurate responses	Santandreu-Calonge et al. (2023)
Using ChatGPT to Teach Enhanced Clinical Judgment in Nursing Education	Plagiarism Students' abilities for synthesizing evidence into their own words underdeveloped	Seney et al. (2023)
Unlocking the Power of ChatGPT: A Framework for Applying Generative AI in Education	The untested effectiveness of the technology Limitations in the quality of data Ethical and safety concerns	Su and Yang (2023)
To use or not to use ChatGPT in higher education? A study of students' acceptance and use of technology	Without a formal review process	Strzelecki (2023)
The role of an open artificial intelligence platform in modern neurosurgical education: a preliminary study	Absence of citations for scientific queries	Sevgi et al. (2023)

4. RESEARCH DESIGNS AND METHODOLOGY

The methodology employed in this article utilized a critical literature review approach, involving the analysis and synthesis of existing literature on the impact of ChatGPT in higher education institutions.

4.1 Search Strategy and Databases

To comprehensively cover the body of literature related to ChatGPT's impact on higher education, several databases were utilized, including Directory of Open Access Journals (DOAJ), Scopus, ProQuest, ScienceDirect, PubMed, Google Scholar, Web of Science, SpringerLink and EBSCOhost.

The researcher systematically searched for literature on ChatGPT's impact on higher education, prioritizing peer-reviewed articles, prominent media outlets, and English publications while excluding tangential mentions of ChatGPT chatbots. The selection criteria focused on peer-reviewed articles, prominent media outlets, and English publications, excluding tangential mentions of ChatGPT chatbots. Data extraction primarily focused on authors, study design, and primary findings.

The analysis utilized both descriptive and thematic approaches, emphasizing patterns and applications of ChatGPT in higher education. The chosen databases were selected for their extensive coverage of scientific and scholarly publications across various disciplines, including technology, computer science, artificial intelligence, and education.

The search strategy was systematic, incorporating relevant keywords such as "ChatGPT," "AI chatbot," "Artificial Intelligence," "ChatGPT in education," and "impact of AI chatbots on higher education." Refinement of the search strategy was conducted to ensure the retrieval of the most relevant articles for the scoping review (Saunders et al., 2019).

4.2. Inclusion and exclusion criteria

To streamline the process and uphold the quality and relevance of the study, the researcher established explicit criteria for inclusion and exclusion. Inclusion criteria encompassed published peer-reviewed articles focusing on the precise impact of Artificial Intelligence, akin to ChatGPT, on higher education. Additionally, articles from reputable media outlets like Forbes, studies providing both qualitative and quantitative evidence regarding ChatGPT's utilization in higher education, and articles published in English were included. Exclusion criteria entailed articles that only tangentially referenced AI chatbots without delving into their intersection with higher education, as well as secondary sources not published in English.

4.3. Data extraction and analysis

Data extraction commenced following the final selection of articles based on the stipulated inclusion and exclusion criteria. From each document, the researcher extracted crucial details such as authors, publication year, study design, specific ChatGPT under scrutiny, context of application in higher education, primary findings, and conclusions. Data analysis followed a narrative synthesis approach due to the diverse nature of the included studies (O'Donovan et al., 2019). Both descriptive and thematic analyses were conducted. Descriptive analysis focused on bibliometric aspects like the number of studies, countries of origin, publication years, and the particular ChatGPT platforms investigated (Peters et al., 2020). Thematic analysis involved categorizing findings into recurring themes, including specific applications of ChatGPT in higher education, their advantages, drawbacks, ethical considerations, and avenues for future research. This methodical approach ensured the thoroughness and rigor of our scoping review, effectively capturing the research landscape regarding the impact of ChatGPT on higher education learning.

5. RESEARCH FINDINGS

Upon conducting a critical literature review, several positive and negative implications of ChatGPT in education have emerged. Positive aspects include enhanced student engagement, personalized learning experiences, and improved teaching practices. However, concerns have been raised regarding privacy, academic integrity, and potential bias. It is evident that while ChatGPT holds promise as an educational tool, caution must be exercised, and safety guidelines for its usage in educational settings are imperative (Mucharraz y Cano et al., 2023; Tlili et al., 2023). Furthermore, there is a pressing need for ethical policies to prevent the incorporation of AI-generated texts in scientific papers. Failure to distinguish between authentic and AI-generated research poses significant challenges (Sun, 2023). Hence, measures should be implemented to inform editors and

reviewers about AI-generated texts and ensure the authenticity of published research, safeguarding the integrity of scholarly publications.

6. DISCUSSION

The findings underscore the transformative potential of ChatGPT in higher education, particularly in improving engagement, personalizing learning, and refining teaching methods. However, concerns regarding privacy, academic integrity, and bias must be addressed. This necessitates careful consideration by educators, researchers, and policymakers, along with the implementation of mitigative measures to counteract adverse effects. It is crucial to acknowledge the possibility of ChatGPT misuse, such as facilitating cheating, and to adapt accordingly (Tlili et al., 2023). Initiatives like Cambridge University Press's guidelines aim to navigate these challenges by promoting transparency, originality, and accountability in research utilizing generative AI tools like ChatGPT. Such guidelines serve to balance the opportunities presented by large language models with the imperative to uphold academic standards and integrity in scholarly endeavors.

7. LIMITATIONS AND FUTURE DIRECTIONS

The constraints of this study review are as follows:

Primarily, certain recommendations proposed in the included articles relied on researchers' intuitive beliefs rather than empirical data. For instance, scholars like Su and Yang (2023), Almendingen, Morseth, Gjolstad, Brevik & Torris (2021), and Cotton et al. (2023) suggested crafting assessment tasks centered on creativity and critical thinking. However, concrete strategies to achieve this objective were not consistently elaborated upon. Consequently, more rigorous investigations are warranted to furnish evidence-based guidelines for employing ChatGPT in higher education.

Secondly, some researchers utilized ChatGPT to generate content or suggestions, resulting in recurrent ideas across articles. For instance, different researchers queried ChatGPT about its potential benefits for teaching and learning, yielding similar responses such as personalized learning and language translation, as seen in works by Strzelecki (2023), Tlili et al. (2023), and Iqbal (2023). This trend underscores the need to discourage the direct incorporation of ChatGPT- or AI-generated texts as original ideas in research papers, alongside Thorp's (2023) apprehensions regarding "plagiarism of existing works." When ChatGPT is enlisted as a co-author, it may generate comparable points across disparate articles without acknowledging each other, akin to self-plagiarism. Should researchers opt to involve ChatGPT in the writing process, additional scrutiny of its contributions is imperative.

Lastly, scant studies empirically assessed ChatGPT's impact on student performance and behavior. For instance, Seney et al.'s (2023) findings suggested that utilizing ChatGPT to aid student writing may not enhance performance but could exacerbate plagiarism issues. Further investigation is

warranted to assess both the benefits and potential drawbacks of ChatGPT-assisted learning for students.

8. SUMMARY

In summary, ChatGPT holds promise for transforming higher education. Our analysis highlights its potential benefits, including aiding curriculum development, lesson planning, and online exam monitoring, personalized learning, language skill enhancement, and improved teaching practices. However, there are notable concerns such as biased assessment, threats to academic integrity, misinformation, difficulty in evaluating responses, and decline in critical thinking, plagiarism encouragement, and overreliance on ChatGPT. Further research is crucial to comprehensively understand ChatGPT's impact on education. Educators, researchers, and policymakers must weigh its benefits and drawbacks, implementing ethical and effective usage measures.

9. Ethical Considerations

This article adheres to ethical standards in research.

10. Conflict of Interest

The authors affirm that no commercial or financial affiliations could influence the research.

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