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The Impact of ChatGPT on Higher Education: A Systematic Review

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Abstract

Purpose: This study systematically reviews the advantages and disadvantages of using ChatGPT in higher education.

Method: This systematic review adheres to PRISMA guidelines. The search was conducted using the terms "ChatGPT" and "chatbot" for the years 2021–2024 in Google Scholar, ResearchGate, Web of Science, and PubMed via Publish or Perish (version 8). A total of 365 records were retrieved, and after screening, 35 relevant studies were included.

Findings: The analysis indicate that 66% of the reviewed studies highlighted the benefits of ChatGPT in higher education, including enhancements in cognitive and learning skills, support for research and writing, improvements in language and communication, and automation of certain tasks to increase efficiency. Additionally, advantages such as 24/7 availability, quick responses, topic diversity, privacy, and easy access to past interactions were

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noted. Among the advantages that received the most attention are optimization of academic training, enhancement of cognitive and learning skills, and assistance in the research and development process. However, 75% of the studies discussed disadvantages, including concerns about plagiarism, ethical issues, negative perceptions, lack of audiovisual communication, absence of human interaction, technical limitations, and restricted multi-dimensional engagement. Among the most prominent disadvantages are ethical concerns, plagiarism, and lack of uniformity in responses.

Conclusion: While ChatGPT offers significant benefits in education, its limitations require careful consideration to ensure responsible and effective use. Specifically, to address these disadvantages, practical measures such as the development of policies and ethical guidelines should be implemented to ensure responsible and optimal use of this technology in education.

Keywords: Artificial Intelligence, ChatGPT, Advantages, Disadvantages, Higher Education

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Introduction

The history of artificial intelligence (AI) as a scientific field date back to the mid-20th century, when it was established as a research domain in 1956 by American scientists John McCarthy and Marvin Minsky during a workshop at Dartmouth College. With the development of machine learning algorithms, it became possible to make decisions based on vast datasets. AI can be defined as a multidisciplinary approach that seeks to create machines capable of performing tasks that typically require human intelligence, such as learning, adapting, reasoning, and understanding abstract concepts (Sallam, 2023). While there is no universally accepted definition of AI, it generally combines two terms: "artificial," which refers to phenomena created by humans, and "intelligence," defined as the ability to make decisions through cognitive processes like understanding, planning, reasoning, and problem-solving. Thus, AI can be seen as the study of how to create machines that can simulate human behavior and perform tasks that require human-like intelligence. Alan Turing, a pioneer in the field, defined AI as the ability of a computer to achieve human-like performance in all cognitive tasks (Turing, 2007). Today, AI, particularly through neural networks, has advanced significantly, enabling capabilities such as natural language processing, voice recognition, and image analysis.

One of the most influential applications of AI is ChatGPT, a chatbot developed by OpenAI and launched in November 2022. ChatGPT, which stands for Generative Pre-trained Transformer, is based on a sophisticated natural language processing system that allows it to understand and generate human-like responses (Halaweh, 2023). This tool has rapidly gained popularity, serving over 100 million users in a short time and eliciting a range of reactions, from concerns about AI replacing human intelligence to optimism regarding its potential to enhance information management and streamline tasks (Hassanzadeh, 2022). ChatGPT can be particularly beneficial in the field of higher education, where it can assist in generating texts, summarizing information, and providing quick access to knowledge. However, its adoption raises several concerns, including issues of bias, privacy, and the potential impact on creativity and critical thinking (Halaweh, 2023). While ChatGPT can facilitate learning and provide valuable insights, it is essential to recognize its limitations and the need for human oversight in the educational context. The absence of a detailed and comprehensive

review of the impact of ChatGPT in higher education highlights the necessity of understanding both its advantages and disadvantages.

Higher education can specifically benefit from ChatGPT as this technology can assist students and researchers in performing academic tasks such as writing papers, conducting research, and gathering information. ChatGPT can simplify complex research processes and accelerate the pace of research. Additionally, this tool can help improve writing and language skills, enabling individuals to compose scientific content more effectively and quickly. However, challenges are also associated with its use. One of the primary concerns is the potential misuse of ChatGPT for plagiarism, which could undermine the academic and ethical integrity of research. Furthermore, excessive reliance on this technology might lead to dependency and a reduction in students' critical thinking and creative skills. Therefore, the use of ChatGPT in higher education requires proper oversight and the establishment of ethical guidelines to maximize its benefits while minimizing the associated risks. This study aims to systematically review these aspects, addressing the question: What are the advantages and disadvantages of using ChatGPT in higher education, and how do they rank in significance? By exploring these questions, we can better understand the role of ChatGPT in shaping the future of higher education.

Literature Review

Several studies have highlighted the significant benefits of ChatGPT in enhancing learning and research processes in higher education. For instance, Okonkwo and Ade-Ibijola (2021) reported that ChatGPT and similar AI-based tools can improve learning processes by providing personalized and immediate support for students. These tools can enhance skills, boost student motivation, and increase the efficiency and accessibility of educational processes. Additionally, Lund and Wang (2023) noted that this technology could transform information science and libraries by improving information retrieval processes, automating administrative tasks, and supporting academic writing. M Alshater (2022) also pointed out that ChatGPT can play a crucial role in enhancing academic performance by providing instant access to information and facilitating learning through interactive dialogues. Despite these advantages, significant challenges arise in the use of ChatGPT in higher education. One of the primary concerns is the

accuracy of the information generated by these tools. For example, Van Dis et al. (2023) highlighted that large language models like ChatGPT can produce convincing text but often generate incorrect or misleading information, which can contribute to the spread of misinformation in scientific research. This issue can negatively impact scientific integrity and trust in research processes. Furthermore, some studies (Lubowitz, 2023) have raised concerns about the accuracy and reliability of AI-generated texts, particularly in medical research, where high precision and credibility are essential. Another major challenge involves ethical issues and the need for human oversight. Concerns such as plagiarism and the negative consequences of dependency on this technology among students have been discussed in studies like those by Sok and Heng (2024). These studies emphasize the importance of developing policies and ethical guidelines for the use of ChatGPT. According to these findings, human supervision and careful evaluation are crucial to ensure that the information produced by these tools is both accurate and trustworthy.

The studies reviewed in this background primarily focus on the benefits and challenges of using ChatGPT. However, some methodological limitations are observed in certain cases. For instance, most studies have mainly concentrated on the features of the ChatGPT tool in specific areas such as education and research, but empirical analyses and long-term experiments to assess its long-term impacts on higher education have not been extensively developed. These limitations highlight the need for further research to ensure that the use of this technology will have a clear understanding of its effects on educational and research processes in the long run. Regarding the prioritization of benefits and drawbacks, various studies exhibit differences in how they rank these aspects. While some studies, such as those by Okonkwo and Ade-Ibijola (2021), emphasize its advantages in enhancing learning processes and student motivation, others, like Van Dis et al. (2023), focus on the challenges related to the accuracy and reliability of the generated information. These differences indicate that while the benefits of ChatGPT are significant, its drawbacks also require special attention. Consequently, a balanced approach should be taken to address both aspects to ensure the effective and ethical use of this technology in educational and research environments.

Method

Search Strategy and Inclusion Criteria

This systematic review follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Salam, 2023; Moher, 2009). The databases and search engines used for literature retrieval included Google Scholar, ResearchGate, Web of Science, and PubMed. The manual search in ResearchGate was conducted to enhance inclusivity and identify articles that might not have been indexed in formal databases or whose preprint versions were only available on this platform.

The screening of studies was conducted by two trained researchers with expertise in systematic reviews and familiarity with PRISMA guidelines. Prior to initiating the process, they independently conducted a pilot screening phase to assess the level of agreement between them.

The inclusion criteria for selecting articles were as follows:

- The study must be a published article or an accepted preprint (e.g., original research, reviews, communications, editorials, and opinion pieces).
- The study must focus on ChatGPT in the context of higher education, including its applications in academic research, university-level teaching, and student learning.

The exclusion criteria included:

- Studies that did not focus on higher education or academic settings.
- Studies that covered ChatGPT applications outside of the defined eligibility criteria (e.g., its use in healthcare, business, or general AI discussions).
- Articles published in non-academic sources (e.g., newspapers, blogs, and general internet websites).
- Articles written in languages other than English.

The search process concluded on October 18, 2024, and was conducted using the keywords: "ChatGPT," "Chatbot," and "Higher Education" for the years 2021 to 2024. The searches in different databases yielded the following results:

- Google Scholar: 238 records
- PubMed: 4 records
- Web of Science: 23 records
- ResearchGate (manual search): 110 records
- Total Initial Records Retrieved: 375

Additionally, Publish or Perish (version 8) was used to refine and organize the results. Due to the limitations in its database coverage,

ResearchGate was searched manually to identify further relevant studies.

Record Screening and Selection Process

The screening and selection process was conducted systematically to ensure the inclusion of only the most relevant and high-quality studies. The process was as follows:

- Importing records into EndNote: All retrieved records were imported into EndNote reference management software to facilitate screening and duplicate removal.
- Duplicate Removal
- A total of 375 records were initially obtained, including additional records from database searches.
- 150 duplicate records were identified and automatically removed using EndNote's duplicate detection tool.
- A manual verification process was also performed to ensure no duplicates remained.
- Title and Abstract Screening
- The remaining 225 articles underwent title and abstract screening based on the inclusion and exclusion criteria

The following exclusions were made:

- 90 records that were not directly related to higher education were removed. These included studies on ChatGPT applications in healthcare, business, or other non-academic settings.
- 3 records were removed because they were not in English.
- 22 records were identified as being published in non-academic sources (e.g., newspapers, blogs) and were excluded.
- Full-Text Screening
- After the previous screening steps, 3°records remained and were selected for full-text analysis.
- Final Included Studies:
- A total of 35 studies were included in this systematic review.

(There was an inconsistency in the numbers previously reported: 30 in the abstract, 35 in the main text, and 35 in the table. This has been corrected to 35 for consistency.)

Descriptive Criteria for Extracted Studies

Each of the 35 included studies was assessed according to the following research questions:

- Publication Type – Is the study a peer-reviewed research article, preprint, or review article?
- Advantages of ChatGPT – Does the study discuss the benefits of ChatGPT in higher education (e.g., improved learning, efficiency, accessibility)?
- Challenges of ChatGPT – Does the study mention disadvantages and ethical concerns related to ChatGPT usage in academia (e.g., plagiarism, bias, over-reliance)?
- Conclusion and Recommendations – Does the study provide concrete conclusions and recommendations about ChatGPT's role in higher education?

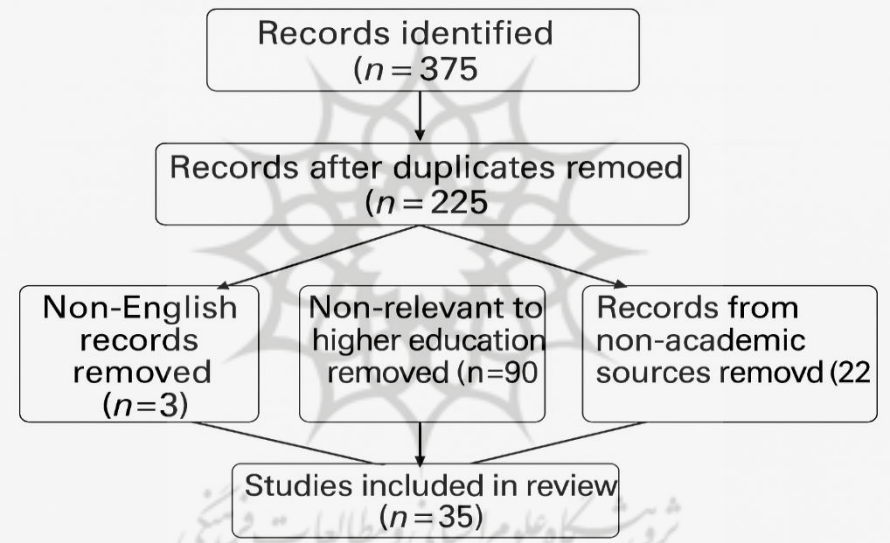

Figure 1. PRISMA Flow Diagram

In general, the classification of advantages (applications) of ChatGPT is as follows: 1. Educational benefits in higher education, such as improving the learning process, facilitating learning, saving time and money, 2. Advantages of academic/scientific research (e.g., creating text, summarizing, and improving writing), 3. Advantages in scientific research (e.g., efficient analysis of large data sets, code generation in research), 4. Advantages in the performance of higher education (e.g., improving the educational process, documenting, and producing reports).

The classification of disadvantages and concerns of ChatGPT is also as follows: 1. Ethical issues (e.g., the risk of bias, discrimination based on the quality of educational data, plagiarism), 2. Illusion (production of false scientific content), 3. Transparency issues, 4. The risk of reducing the need for human expertise and increasing unemployment, 5. Providing long and redundant content, 6. Privacy issues, 7. The risk of reducing skills such as critical thinking and problem solving ability, 8. Legal issues (e.g. Copyright), 9. Issue of Interpretability, 10. The risk of Fraud in Academic Research, 11. Presentation of false content.

Findings

A summary of the advantages and disadvantages of ChatGPT in the field of higher education is shown in the table below.

As a matter of fact, a summary of the main conclusions of approved articles on the application of ChatGPT in the field of higher education has been presented. According to the backgrounds mentioned in the table below, it can be concluded that the advantages of ChatGPT in the context of academic and scientific writings and the field of higher education appeared in 22 of the mentioned backgrounds which equals to 66%.

As an example, the following can be mentioned: improving cognitive and learning skills, helping the research and development process, improving the quality of writing, creating and accelerating the innovation process, optimizing the university educational process, improving the skills of professors, and the competence of students. Furthermore, the use of ChatGPT can bring limitations and disadvantages, and from the set of backgrounds studied in this research, 75% mentioned the disadvantages of this type of chat. Some of these disadvantages include increasing the possibility of plagiarism, ethical issues, such as abuse, negative attitude of users in using this robot, inadequacy of correct educational methods, lack of clear and explicit answers to questions, overlaps, and similar cases. Of course, actions and suggestions are also mentioned in the mentioned backgrounds. More precisely, 19 backgrounds, equals to 57%, expressed suggestions that should be considered and investigated in the ChatGPT field.

Various studies have pointed out that although ChatGPT can contain errors and biases, it can increase learning. According to Wollny et al. (2021), ChatGPT can be used mainly to support skill improvement and increase training efficiency by automating some tasks, and it can

also improve learning experiences and facilitate training. Therefore, it can be said that academics should adapt teaching and learning methods in a world where AI is freely available. They should also focus on teaching how to use ChatGPT and similar tools in ethical ways that foster critical thinking (Smith, 2023). Education will witness the greatest impact from AI agents. Learning by doing has always been an organizational challenge. AI agents will be available to help people and will allow them to perform troubleshooting and correction while doing the work. Taking help from intelligent agents in different ways, such as simulating the learning process, providing exercises according to the learning capacity, displaying with the help of virtual reality capabilities, etc., deepens learning. Providing instant feedback is one of the capabilities of intelligent agents that help deepen learning (Hassanzadeh, 2022).

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Table 1. Summary of the Advantages, Disadvantages and Conclusion on ChatGPT in the Field of Higher Education

Author	Title	Advantages	Limitations (Disadvantages)	Proposed Action, Conclusion	Type of Research	Name of the Publication
Okonkwo, Ade-Ibijola (2021)	Chatbots applications in education: A systematic review	Improving students' cognitive and learning skills in the field of education and learning; helping the management process, such as evaluation, scoring, providing feedback to students; evaluating and analyzing the students' learning ability by teachers, giving academic advice and helping to make better decisions; helping the research and development process, such as helping students in retrieving information from various sources, such as Wikipedia, content integration; quick access to content; increase motivation and participation; simultaneous multi-user access to the system; supporting students	Ethical issues, such as invasion of privacy, lack of transparency; abuse of trust; the lack of impact of chat evaluation on its effectiveness, usefulness and ability; the problem of the type of attitude of users towards chat, negative attitude leading to non-use and positive attitude as an accepted innovation; programming problem (how to understand and analyze and interpret and provide the correct and accurate answer); the issue of monitoring and coordination to the issue of chat, the expectation of the audience to provide accurate and correct answers through chat, which requires a continuous process of continuous monitoring and maintenance.	---------- ---------- ----	Conceptual	Computers and Education: Artificial Intelligence 2

Rudolphet al. (2023)	ChatGPT: Bullshit spewer or the end of traditional assessments in Higher Education?	Educational personalization; improve personalized adaptive learning performance; helping teachers to facilitate innovative teaching and learning; strengthening writing skills, improving the quality of writing, creating innovation in educational strategies	Plagiarism; lack of understanding in sharing and evaluating the accuracy of information; inadequacy of correct educational methods	---------- ---------- ----	Conceptual	Journal of Applied Learning & Teaching
Stokel-Walker (2023)	ChatGPT listed as author on	---------- ----------	Risk of plagiarism; unresponsive; concerns about abuse at universities	ChatGPT should not be considered as the author	Conceptual	Nature
Van Dis et al. (2023)	ChatGPT: Five priorities for research	Helping accelerate innovation; Increasing efficiency in publishing; making science fairer; increasing the diversity of scientific perspectives; Increasing free time for pilot projects; optimizing academic training	jeopardizing the quality of research; transparency issues; risk of disseminating false information; inaccuracy in content, risk of bias and plagiarism; ethical concerns; possible future monopoly; lack of transparency	Banning ChatGPT will not be effective. Developing rules for accountability, honesty, transparency and integrity. Consider carefully which academic skills are necessary for researchers. Expansion of discussion at the university; an initiative to address the development and responsible use of LLM 5 for research is needed	Conceptual	Nature

Chen (2023)	ChatGPT and Other Artificial Intelligence Applications Speed up	ChatGPT helps overcome language barriers that promote equality in research.	Ethical concerns (ghostwriting); questionable accuracy; citation problems	Accept this innovation with an open mind. Authors should have proper knowledge of how to exploit AI 6 tools	Conceptual	*Journal of the Chinese Medical Association*
Thorp (2023)	ChatGPT is fun, but not an author	----------	The content is not original. Incorrect answers that seem acceptable. Referral issues and risk of plagiarism	Reviewing educational assignments published in scientific journals, using ChatGPT is considered a scientific violation.	Conceptual	Science
Lubowitz (2023)	ChatGPT, An Artificial Intelligence Chatbot, Is Impacting Medical Literature	----------	incorrect content; risk of bias; dissemination of false information and false information; absence References; redundancy in the text	Authors should not use ChatGPT to write part of a scientific paper. However, it can be used under strict human supervision to ensure the integrity and authenticity of scientific work.	Conceptual	Arthroscopy

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Nature editorial (2023)	Tools, such as ChatGPT threaten transparent science; here are our ground rules for their use	ChatGPT can help summarize research papers. It is useful for generating computer codes.	Ethical issues; transparency issues	LLM 7 tools will be accepted as authors. If LLM tools are to be used, they should be documented in procedures or approvals. It supports transparency in methods and honesty and truth from researchers.	Conceptual	Nature
Gordijn and Have (2023)	ChatGPT: Evolution or revolution	----------	Risk of actual inaccuracy; risk of plagiarism; risk of fraud; possibility of copyright infringement	In the near future, the LLM will be able to write articles with the ability to peer review. Therefore, the scientific community should be ready to address this serious issue.	Conceptual	Health Care and Philosophy
Aljanabi et al. (2023)	ChatGPT: Open Possibilities	ChatGPT can facilitate academic writing. It is also useful in code generation.	Inaccurate content including inability to perform mathematical calculations reliably	ChatGPT will be of increasing interest in the scientific community.	Conceptual	Computer Science and Mathematics
Lund and Wang (2023)	Chatting about ChatGPT: How may AI and GPT impact	It is for literature review; it can help in data analysis. It can help with translation.	Ethical concerns, privacy and data security issues; risk of bias; transparency issues	ChatGPT has the potential to advance the university. Consider how to use ChatGPT responsibly and ethically.	Experimental	Library Hi Tech News

Cotton et al. (2023)	Chatting and Cheating. Ensuring	----------	Risk of plagiarism; academic dishonesty	Paying attention to the use of ChatGPT as an educational evaluation tool	Experimental	Innovations in Education and Teaching International
Aczel and Wagenmakers, E (2023)	Transparency Guidance for ChatGPT Usage in	----------	Authenticity issues, transparency issues	It is necessary to provide sufficient and completely valid information about the use of ChatGPT.	Conceptual	Innovations in Education and Teaching International
Lin (2023)	Why and how to embrace AI such as ChatGPT in your academic life	Adaptation	Illusion (false information that appears scientifically plausible); fraudulent research; risk of plagiarism; copyright issues	ChatGPT has long-term transformative potential. Embrace ChatGPT and use it to empower human potential. However, adequate guidelines and codes of conduct are urgently needed.	Conceptual	----------
Elham Tajik, Fatemeh Tajik(2023)	A comprehensive Examination of the potential application of	Learning optimization, educational, summarization, creating an interactive environment	Inability to reason, bias and discrimination, writing and grammatical errors, lack of self-awareness, plagiarism, transparency, and reliability		Experimental	----------
Aithal and Aithal (2023)	Effects of AI-Based ChatGPT on Higher Education	Answer questions, save time, access in all situations, reduce maintenance costs, create a digital repository of resources, and enhance user experience.	Threat of information sources, lack of unity to the quality of information provided, threat to privacy and security of information, job relocation		Experimental	Management, Technology, and Social Sciences

Tlili et al. (2023)	What if the devil is my guardian angel: ChatGPT as a case study of using chatbots in education	Creating educational transformation by providing instructions and modifying the learning process; quality of response (reasonableness and reliability); being useful and effective; Improving the skills of teachers, and improving the competence of students	Inaccuracy in answers; failure to provide alternative answers, conflicting answers about the same issue; limited ability to provide specific contextual information; having a limited knowledge base; plagiarism and scientific plagiarism; fraud; tendency to create laziness among employees; bias or providing false information; reducing critical thinking; disclosure of private information through repeated interactions.	----------	Experimental	Smart Learning Environments
Emenike and Emenike (2023)	Was This Title Generated by ChatGPT?	Generating text for articles, presenting laboratory reports; summarizing information; providing accurate and correct answers; generating text for evaluation items;	----------	It is recommended to strengthen the skills of information literacy and AI literacy among people.	Experimental	Chemical Education
Veletsianos et al. (2023)	ChatGPT and Higher Education: Initial Prevalence and Areas of Interest	Contributing to the development of text generation technology; user interaction and familiarity with topics of interest in the higher education landscape; helping to show teaching methods and using conceptualization methods by professors; increasing organizational speed (reacting quickly)	----------	----------	Conceptual	EDUCAUSE Review

Dempere et al. (2023)	The impact of ChatGPT on higher education	Research support, automatic grading, increased computer-human interaction	Data security, plagiarism, negative social and economic effects, job displacement, digital literacy gap, misinformation, abuse	----------	Experimental	Frontiers in Education
Alexander Gale (2023)	ChatGPT Threatens University Education, Academics Warn	----------	Plagiarism, undermining the educational purpose, fraudulent use of ChatGPT for editing articles and assignments, poor quality of the produced content.	----------	Conceptual	----------
Hasanein and Sobaih (2023)	Drivers and Consequences of ChatGPT Use in	Quick access to information, personalized support, improvement of language skills, assistance with assignments and academic writing.	Ethical issues and academic dishonesty, reliance on inaccurate information, overdependence on artificial intelligence, challenges related to bias and impartiality.	----------		
Malinka et al. (2023)	On the Educational Impact of ChatGPT: Is Artificial Intelligence	Accelerating the learning process; improving student performance; accelerating the learning process of new technology;	The threat of the issue of integrity in the academic field, plagiarism, fraud, poor quality of academics	Cultivating desirable characteristics in students, such as critical thinking, creativity, and being innovative.	Conceptual	----------
Atlas (2023)	ChatGPT for Higher Education and Professional Development: A Guide to Conversational AI	Helping the research and development process; helping to do research and homework; summarizing; translating text; using it in creating interactive tests; writing reports and producing presentations; making improvements in knowledge work; making improvements in sustainability	----------	----------	Conceptual	University of Rhode Island

Shirii (2023)	ChatGPT and Academic Integrity	Ability to produce text; expressing definitions and explanations and ideas; writing essays and abstracts, stories and poems; compiling assignments and providing specific instructions based on topics; providing suggestions for feedback on assignments; providing feedback on a text; providing solutions to improve it; providing computer code based on a set of instructions;	Not accepting images, diagrams and videos as input; threatening the integrity of the academic environment; reducing students' critical thinking; reducing learning experiences	----------	Conceptual	Information Matters

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Halaweh (2023)	ChatGPT in education: Strategies for responsible implementation	Helping the process of gathering and summarizing information; saving the user's time, money, and energy; helping to edit texts and improve writing; helping to find and create ideas about a topic, and familiarizing with different aspects	Plagiarism and scientific plagiarism, dishonesty of the university	Cultivating skills such as critical thinking, problem solving ability, creative thinking, cooperative work skills, technology skills including digital and information literacy; employing and considering five strategies that should be implemented simultaneously when using chat, including transparency, credibility, academic integrity, and authentic learning	Experimental	Contemporary Educational Technology

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Sullivan et al. (2023)	ChatGPT in Higher Education: Considerations for academic integrity and student learning	Strengthening and improving students' learning; adapting teaching and evaluation methods to the existing situation; fair and ethical use; providing innovative teaching and learning methods; ensuring fair access to educational opportunities; supporting students' learning; providing suitable opportunities for increasing academic success; increasing interaction and participation of students	Plagiarism in the media and fraud; weakening of integrity; limitation and weakness in the output of ChatGPT;	A clear and transparent instruction should be created for university staff and students on how to use ChatGPT in appropriate ethical ways.	Conceptual	Applied Learning and Teaching
Parker et al. (2024)	Graduate instructors navigating the AI frontier	Providing quick and accurate responses, aiding the development of critical thinking skills, facilitating the learning process, and improving written content	elivering incorrect information, creating excessive dependency on AI, ethical challenges, and reducing students' effort in deep learning.		Conceptual	Computers and Education Open
Sok and Heng (2024)	Opportunities, challenges, and strategies for using	Facilitating the learning process, personalizing education, enhancing writing skills and creative thinking, and fostering research skills	Providing inaccurate information, enabling cheating and plagiarism, and reducing critical thinking.			Journal of Digital Educational Technology
Jensen et al. (2025)	Generative AI and higher education:	Facilitating research, saving time, creating opportunities for learning, enhancing analytical skills, and developing innovative teaching methods.	Generating inaccurate content, enabling cheating, and fostering dependency on artificial intelligence.			

Silva et al. (2024)	ChatGPT: Challenges and Benefits in Software Programming for Higher	Accelerating the learning and programming process, helping to understand complex concepts, facilitating debugging and improving quality, and increasing creativity in problem-solving	Incorrect or inefficient information, reducing motivation for learning, fostering dependency on AI tools, and cheating			Sustainability
Hwang and Chang (2021)	A review of opportunities and challenges of chatbots in education	Impacting on the learning behavior of students and users; improving students' speaking performance, improving learning plans based on chatbots	----------	The performance of professors and learners should be analyzed from different angles, including the analysis of learning behavior provided by chatbots in the educational system and the use of chatbots to improve the learning process.	Conceptual	Interactive Learning Environments
Michael et al. (2023)	We Need to Talk About ChatGPT": The Future of	Reducing uncertainty in the field of regulations	Quality weakness in scientific writings, plagiarism	The combined use of plagiarism check and AI detection tools should be considered.	Conceptual	----------

M. Alshater (2022)	Exploring the Role of Artificial Intelligence in Enhancing Academic Performance: A Case Study of ChatGPT	Increasing the efficiency and effectiveness of academic research; helping to edit and rewrite different parts of an article	Dependence on data quality (output quality depends on input data quality); limited range of thematic knowledge; ethical considerations (possibility of abuse); being limited to the technological infrastructure; repetitive or general and irrelevant response provided; lack of transparency in accountability; negative impact on employment; lack of accuracy and reliability	----------	Experimental	Business School, Philadelphia University, Jordan.
Miah et al. (2024)	ChatGPT in Research and Education: Exploring Benefits and Threats	ChatGPT can serve as a tool for providing personalized feedback, improving information access, and facilitating the learning process in research and education	he use of ChatGPT may lead to low accuracy of information, cheating in exams, a reduction in critical thinking skills, and issues in evaluating student performance.	----------	Experimental	Computer Vision and Pattern Recognition

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Okonkwo, Ade-Ibijola (2021)	Chatbots applications in education: A systematic review	Improving students' cognitive and learning skills in the field of education and learning; helping the management process, such as evaluation, scoring, providing feedback to students; evaluating and analyzing the students' learning ability by teachers, giving academic advice and helping to make better decisions; helping the research and development process, such as helping students in retrieving information from various sources, such as Wikipedia, content integration; quick access to content; increase motivation and participation; simultaneous multi-user access to the system; supporting students	Ethical issues, such as invasion of privacy, lack of transparency; abuse of trust; the lack of impact of chat evaluation on its effectiveness, usefulness and ability; the problem of the type of attitude of users towards chat, negative attitude leading to non-use and positive attitude as an accepted innovation; programming problem (how to understand and analyze and interpret and provide the correct and accurate answer); the issue of monitoring and coordination to the issue of chat, the expectation of the audience to provide accurate and correct answers through chat, which requires a continuous process of continuous monitoring and maintenance.	----------	Conceptual	Computers and Education: Artificial Intelligence 2
Rudolph et al. (2023)	ChatGPT: Bullshit spewer or the end of traditional assessments in Higher Education?	Educational personalization; improve personalized adaptive learning performance; helping teachers to facilitate innovative teaching and learning; strengthening writing skills, improving the quality of writing, creating innovation in educational strategies	Plagiarism; lack of understanding in sharing and evaluating the accuracy of information; inadequacy of correct educational methods		Conceptual	Journal of Applied Learning & Teaching

Stokel-Walker (2023)	ChatGPT listed as author on research	---------- ----------	Risk of plagiarism; unresponsive; concerns about abuse at universities	ChatGPT should not be considered as the author	Conceptual	Nature

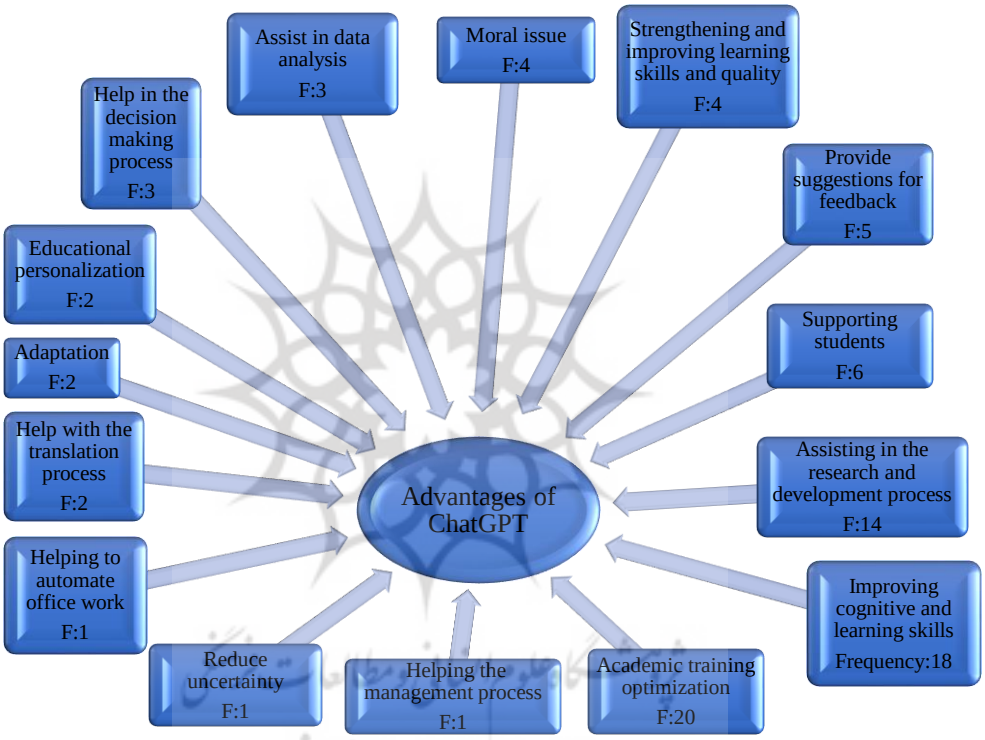

Figure 2. Advantages of ChatGPT

According to Figure 2, it can be concluded that the benefits extracted for ChatGPT from the background study can be divided into 15 categories, which consist of improving cognitive and learning skills, helping the management process, helping the research and development process, strengthening and improving writing skills and quality, educational personalization, helping the decision-making process, adaptability, reducing uncertainty, ethical issue, providing suggestions

for feedback, helping the process of automating administrative tasks, helping data analysis, helping the translation process, academic training optimization, and support. Based on the above figure, it can be said that the most important advantage of ChatGPT, which has been studied and emphasized in most of the articles and has been repeated and investigated more, is the improvement of cognitive and learning skills. Therefore, it can be concluded that ChatGPT can have an important and significant impact on the cognitive and learning process in the educational context. Additionally, this intelligent agent can be effective in the field of reducing uncertainty, helping management processes, and helping the process of automating administrative work, which has been mentioned in some resources.

Figure 3. Disadvantages of ChatGPT

According to the information in Figure 3, which is related to the disadvantages of ChatGPT, it can be claimed that the disadvantages include the following 20 categories: Moral concern, inadequacy of correct educational methods, lack of generalizability, citation problems, negative impact on employment, disclosure of private information, limitation of technological infrastructure, poor quality, refusing images, videos, diagrams as input, lack of sufficient resources, fraud, reduction of critical thinking, reduction of learning experiences, lack of uniformity in response, type of users' attitude, plagiarism, having limited flexibility, and the issue of transparency. Among the above-mentioned disadvantages, plagiarism and non-uniformity in answering were mentioned in most of the reviewed articles and are among the most frequent disadvantages. As a result, it is expected that the researchers will take the necessary measures to eliminate these disadvantages. Disadvantages, such as limited adaptability, negative attitude of users, negative impact on employment, citation problems, lack of generalizability, inadequacy of correct educational methods are among the disadvantages that have been mentioned in some researches. These cases can also be considered as new disadvantages.

The prominence of certain advantages or disadvantages can be attributed to the fact that they have been frequently addressed in previous scholarly literature.

Conclusion

ChatGPT is a large language model. In fact, the large language model is a type of AI that is a part of deep learning (a form of machine learning) which is used to process and generate natural language texts. In other words, it can be said that these models are trained on a huge amount of data, and they are also allowed to learn the nuances and complexities of human language. The development and advancement of the ChatGPT platform represents significant progress in the field of natural language processing and AI, which paves the way for more innovations. One of the important benefits of these language models is their power and ability to understand a given prompt (question) and create appropriate answers. Another important aspect is their ability to produce high quality text that makes it difficult to distinguish it from human writing. ChatGPT is one of the most powerful chatbots ever made, and amazingly, this type of chatbot is able to perform various tasks, such as creating code snippets, performing complex operations,

editing articles, stories and poems, etc. ChatGPT is used in many different fields, including scientific research, business, health, education, and consulting, and it also helps a lot in these fields. Due to its high power and accuracy, as one of the most important and best tools of AI are known. ChatGPT is considered as a revolutionary tool for scientific research both in the field of academic research and in the research process itself. Using this tool in the context of research leads to saving more efforts of HI. In addition, the use of ChatGPT includes language improvement and a better ability to express and communicate ideas and research results, which ultimately accelerates the publication process and faster access to research results. On the other hand, the use of ChatGPT in the context of research is accompanied by limitations, which in turn can endanger the quality of research. At first, simple content can be considered, which may be considered due to the shortcomings in the use of ChatGPT in scientific writings. In the same way, the discussion of ethical issues can also be raised, which can put the production of content at risk in the field of ChatGPT application. Thus, although the content produced by ChatGPT can be useful and efficient, it is necessary to carefully examine it before using.

As mentioned, higher education is one of the most prominent sectors that use ChatGPT. Based on the findings, it can be claimed that using ChatGPT in the environment and society, especially in the current research community, is inevitable. But it should be noted that the use of this type of chatbot, like other areas, will also have advantages and disadvantages (risks), and it seems necessary to think of solutions for that. One of the applications of this type of chatbot is to support the improvement of skills and increase the efficiency of training by automating some tasks. Based on the reviewed backgrounds, it can be concluded that this type of chat can improve students' learning experiences and make the education process easier. In addition, ChatGPT is able to generate new texts and answer questions with high accuracy and speed. The benefits of using ChatGPT include constant availability; ChatGPT is available anytime, anywhere; fast response: ChatGPT responds instantly and in real time; diversity in topics: ChatGPT answers about different topics; privacy: Since ChatGPT is done online and without the need to face-to-face; easy access to previous information: ChatGPT allows you to easily access your chat

history and refer to your previous questions and the answers you received. We also see positive effects that can be significantly accelerated with the help of stakeholders. The final goal of this paper is to open the debate about the appropriate adoption of this technology in higher education. However, academic perspectives on ChatGPT to date have not identified AI tools as a major threat to higher education. Other responses have been more nuanced, suggesting that while ChatGPT can contain inaccuracies and biases, it can enhance student learning. Consequently, academics must adapt teaching and assessment practices to embrace the new reality of living, working and studying in a world where AI is freely available. These tools, in short, provide an opportunity to rethink the focus on producing writing assignments instead of focusing on what students regularly do to develop critical thinking skills. They also enable students to learn complex concepts in simple language and improve inclusion for people with communication disabilities. As such, universities and relevant academics should focus on teaching how to use ChatGPT and similar tools in ethical ways that foster critical thinking. Disadvantages of using ChatGPT are as follows: Inability to answer complex questions: ChatGPT is often used to answer low-level and common questions; impossibility of audio and video communication: ChatGPT is only a text interface and does not provide the possibility of audio and video communication with your advisor or respondent; lack of a human interface: in ChatGPT you are communicating with a computer program and not with a real human being; some technical problems: Like any other technical system, ChatGPT may also face some technical problems; limitations in multi-dimensional interactions: ChatGPT is designed for two-dimensional interactions and has limited possibilities for multi-dimensional interactions. On the other hand, concerns have been raised regarding the possible bias based on the data set used in ChatGPT training, which can limit its capabilities and lead to inaccuracy. In addition, security concerns and the possibility of cyber-attacks by spreading false information using LLM should also be considered. While there are general concerns about the use of AI technology, there are specific concerns about the use of ChatGPT, specifically in educational settings related to plagiarism and academic integrity when writing reports,

essays, theses, and software code. The most discussed topics are usually the malicious use of AI (cheating, plagiarism) and its effects (loss of critical thinking, etc.). In general, AI and its impact on learning have been researched for decades. More recent systematic reviews focusing on AI in higher education show that studies mainly consider AI as a tool to improve homework feedback and help with administrative tasks. However, concerns about academic integrity and success are also discussed.

Given the rapid integration of AI in higher education, policymakers must establish clear guidelines on the use of ChatGPT in academic environments. Universities should develop frameworks that balance AI adoption with academic integrity. For example, educational institutions could design AI-assisted learning modules that encourage students to use ChatGPT for idea generation and writing improvement while emphasizing the importance of originality. Furthermore, assessment methods should shift toward enhancing critical thinking, problem-solving skills, and the practical application of knowledge rather than relying solely on content reproduction. For educators, adapting teaching methodologies to effectively leverage AI is essential. Instead of traditional essay-based evaluations, assignments can be designed to require deeper analytical engagement, peer collaboration, and the practical application of knowledge. By promoting AI-assisted learning while maintaining ethical standards, higher education can maximize the benefits of ChatGPT while mitigating its risks. In the final analysis, the prominence of certain advantages or disadvantages associated with the use of ChatGPT can be largely attributed to cultural perspectives, disciplinary orientations, and differing institutional attitudes. In some academic fields, this technology has been readily embraced, while in others it has been approached with caution. Furthermore, the perceived impact and manageability of each benefit or drawback play a central role in determining their prioritization. For instance, advantages such as enhanced access to resources and improved writing skills have been widely acknowledged due to their substantial influence and ease of implementation. In contrast, concerns like violations of academic integrity and overreliance on machine-generated content despite their critical importance demand more strategic policymaking and oversight.

key stakeholders including universities, policymakers, and academic instructors are urged to take a proactive role in developing ethical frameworks, designing AI-integrated educational models, and fostering digital literacy. Through such coordinated efforts, the integration of AI tools like ChatGPT into higher education can not only streamline learning processes but also serve as a catalyst for transformative change in teaching and research.

For proper use of ChatGPT in higher education, recommendations are made as follows:

- Giving assignments to students that lead to strengthening and activating their critical thinking
- Informing them about the dangers and limitations of using ChatGPT
- Using ChatGPT only to improve and strengthen individual competences and capabilities
- Proper and ethical use of ChatGPT in your training courses
- Apply the right and correct policies and instructions to use ChatGPT
- Holding training courses on how to use ChatGPT correctly for people in the organization

Directions for Future Research

AI-Augmented Learning: Investigating how ChatGPT can be integrated into adaptive learning platforms to personalize education.

Academic Integrity and AI: Exploring effective strategies to prevent plagiarism and maintain ethical AI use in student assessments.

Cognitive and Behavioral Effects: Analyzing the influence of AI tools on students' critical thinking, creativity, and learning habits.

Faculty Perspectives: Studying how educators perceive and adapt to AI-driven transformations in teaching and assessment.

AI Policy Development: Examining the effectiveness of institutional and governmental policies on AI governance in higher education.

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