

A Comprehensive Study of AI Chat GPT of Education: Benefits, Risks, Applications and Limitations : A Review

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ABSTRACT

As technology continues to evolve at an exceptional pace, the incorporation of AI applications like Chat GPT has become increasingly influential in reshaping educational practices and guiding the trajectory of academic research. Innovations such as robots, chatbots, automated evaluation methods, and intelligent instructional platforms contribute to improving the quality of education and have led to a major transformation in how students learn and how teachers teach. This work reviews a selection of literature on the applications of artificial intelligence in education and scientific research in an attempt to understand the nature of this role and to highlight the educational and technical dimensions that accompany its use in educational settings, whether in general or university education. The methodology is based on a narrative literature review covering studies from recent years. The review identifies both the benefits and challenges of AI in education. Benefits include improved learning experiences, personalized instruction, enhanced research capabilities, real-time feedback, and access to information. However, risks such as overdependence on AI, academic dishonesty, data security concerns, algorithmic bias, and the limitations of AI's lack of emotional understanding are discussed. Drawbacks also involve its dependence on well-structured prompts and inability to replicate human insight. Despite these challenges, Chat GPT's future in education looks promising. With ongoing refinement, stronger ethical standards, and adequate professional development for teachers, AI can serve as a valuable instructional partner and may become a permanent part of modern education through deeper integration into curricula and adaptive learning systems.

1. INTRODUCTION

The term intelligence, which refers to the capacity for perceiving, understanding, learning, and learn new information, is the foundation of AI. Because the word "artificial" is associated with the verb "create" or "make," it refers to anything that is produced via an action or activity, as opposed to things that are already in existence. It describes the capability of employing a computer that simulates and imitates human mental and motor processes for controlling digital devices or robots. As technology has advanced, the idea of AI

has grown to the point where it could now carry out human operations which call for complex tasks like reasoning and analysis, like demonstrating mathematical theories and simulating chess. The theoretical framework regarding AI, one of the contemporary computer-related sciences, is one of the most revolutionary technologies of our time. Additionally, it is among the fastest technological disruptions in history. However, what is AI, and how does it benefit businesses? One of its pioneers, Marvin Minsky, defined AI as the study of having machines perform tasks that might need intelligence if performed by persons. The word was first used in the year 1956

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at a scientific conference held at Dartmouth College. Although the essence of that statement still holds true today, contemporary AI systems have developed the ability to solve problems for activities like visual perception, speech recognition, decision-making, planning, and language translation. Their ability to process terabytes of data and insights in real time demonstrates their adaptability and responsiveness as technologies that enhance human users' abilities and boost workplace productivity, satisfaction, and efficiency. The role of AI in education is unique due to its capacity to innovate and enhance teaching in a number of ways, chief among them being the provision of personalized learning experiences, smart learning systems, the enhancement of learning and teaching effectiveness, and the promotion of educational research and development (Ratnam, 2023). The field of education has seen significant changes recently due to the advancement of communication and information technology (Wang et al., 2024; Maric et al., 2025; Ipek et al., 2023; Murad et al., 2023). Online learning is now more adaptable and accessible because of technological advancements. These days, many different educational institutions mostly employ e-learning to give their students a more interesting and efficient learning environment (Siregar et al., 2023). AI is fast growing in line with technical developments. The text world has become interested in chatbots as one component of AI, as they have been used in various environments aiding and assisting users. A chatbot is a computer application designed to interact with people via chat applications, text messaging, or instant messaging networks (Chauncey & McKenna, 2023). Among the growing and more popular kinds of chatbots is Chat GPT, a Generative Pretrained Transformer (Wang et al., 2024). Motivated the development of Chat GPT was the aim of creating a very sophisticated and flexible AI language model capable of supporting a range of functions, including translating, text synthesis, and data analysis. Chat GPT starts with the design of the transformer architecture. Recently, a technical development developed by Open AI in 2022—Chat GPT—has attracted a lot of interest. Chat GPT: what is it? With the use of natural language, advanced AI bots known as Chat GPT replicate human communication. The language model could respond a broad spectrum of written specialty searches including emails, codes, papers, and social media posts. The Large Language Model (LLM) of Open AI drives a chatbot artificially created. Natural language learning (NLP) helps it to understand inputs and generate excellent, fluid responses to human questions. In the framework of technical education, Chat GPT has the possibility to improve student participation and learning outcomes (Rashel et al., 2024). Students could interact with the chatbot in a range of ways using Chat GPT, including peer-to-peer conversations, rapid feedback, help as well as explanation of the learning materials (Emenike & Emenike, 2023). Apart from this, Chat GPT technology is very important for scientific research; so, this part gives a summary of history, significant events in the development of Chat GPT,

and technical developments that have helped the scientific community find success of this tool. Chat GPT allows researchers to access useful data and direction about the subjects they are looking at. They could draw new ideas or recommendations for further research projects from it. By grammar correction and revision, Chat GPT might also help to raise the quality of scientific writing. Understanding Chat GPT's origins and development is essential to appreciating its value to scientific research. A language model based on the Generative Pre-trained Transformer (GPT) architecture (Qiu & Jin, 2024; Qiu & Jin, 2023; Wu et al., 2023; AlSamhori, 2024) may be mentioned in this context..

2. BACKGROUND

2.1 OpenAI Initiative

Open AI is dedicated to create artificial general intelligence (AGI) for the advantage of humanity. Established in the year 2015 by Sam Altman, Elon Musk, and others, Open AI has led front-edge AI research releasing various novel models like GPT-3, GPT-2, and finally Chat GPT. Building on the success of GPT-3, Open AI kept researching and developing until Chat GPT depending on GPT-4 architecture was produced. Chat GPT is designed to perform exceptionally well on tasks depending on conversations and offers enhancements in contextual understanding, response generation, and overall coherence as compared to GPT-3. Building on GPT-3 success, Open AI continued to study and create Chat GPT, which is based on the GPT-4 architecture (Kalyan, 2024; Roumeliotis and Tselikas, 2023).

2.2 GPT Models

a) GPT-1

Released in 2018, this is the first GPT language version.

b) GPT-2

With 1.5 billion parameters, it has been a notable advance over GPT-1 and among the biggest language models available at the release time.

c) GPT-3

With 175 billion parameters—several times more than GPT-2—it is among the biggest and most potent language models ever produced. GPT-3 was trained on an enormous text corpus.

d) Instruct GPT

Designed on the success of GPT-3 large language model, OpenAI's new language model, Instruct GPT.

e) ProtGPT2

ProtGPT2, recently released research, describes a language model that can understand the protein language and may be used to build and engineer new proteins. ProtGPT2, which is

based on the GPT-2 Transformer design, has 36 layers and a model dimensionality of 1280, making it a powerful model with 738 million parameters. ProtGPT2 exhibits considerable promise for protein engineering and design.

f) Bio GPT

Particularly meant to generate and mine biomedical text, (Lu **et al.**, 2022) have suggested a language model referred to as Bio GPT.

g) Chat GPT

ChatGPT is pre-trained on a large corpus of text data, including books, websites, and papers using a language modeling assignment. Chat GPT could generate realistic and cohesive responses in a discussion because of its pre-training, which teaches it the relationships and patterns between words and phrases in natural language.

h) GPT-4

With the publication of GPT-4, Open AI has made notable advancement in scaling up deep learning (DL). Large multimodal language models like this one could generate text outputs by accepting text inputs and image ones.

i) Chat GPT Orion

OpenAI company is getting ready to introduce “Orion,” its new model.

3. CHAT GPT OBJECTIVES AND FEATURES

Chat GPT offers a wide range of possibilities. Beyond simply posing questions and exploring ideas, some of its key uses are outlined below:

- i. Chat GPT enables the production of cohesive, well-written materials across various writing styles, languages, and subject areas.
- ii. It assists in analyzing issues and identifying effective solutions.
- iii. GPT can generate consistent and appropriate chatbot responses for a variety of situations.
- iv. Chat GPT supports the creation of engaging messages and posts suitable for social media platforms.
- v. GPT also help produce documents such as reports, emails, and other materials to enhance productivity.

Chat GPT is a powerful natural language processing tool. It can generate relevant responses and comprehend the structure of conversations. Additionally, it supports multiple languages including Spanish, German, French, and English. Furthermore, Chat GPT can respond in informal, formal, and even humorous tones depending on the context.

4. CHAT GPT APPLICATIONS

Writing Field : ChatGPT can be used in different types of writing, inclusive writing professional articles, advertisements on social media, translation, and spell checking (AlSamhori, 2024).

Computer and Programming Field: ChatGPT can be used to debug and write code in different programming languages such as Python Python (Programming Language), PHP, C++, etc., or present assistance in fixing a computer malfunction, or even providing an integrated program plan (Qiu & Jin, 2024).

Educational Field: Answering common questions and presenting the necessary information about curricula and lessons. Chat GPT can also be used to develop the learning experience, such as learning languages and grammar, solving complicated mathematical problems, and explaining some concepts that are difficult for the student (Ratnam, 2023).

4. Career Field: such as presenting advice as a development coach, or providing career options that are compatible with your inclinations and desires as well as the requirements of the labor market, in addition to helping you write a CV more professionally (Ipek **et al.**, 2023).

5. Business Field: Through offering automated client and customer chat service, Chat GPT can assist you in the business field. Alternatively, to respond to inquiries and provide required details on your services and products. By means of enhanced customer experience and higher customer satisfaction derived from Chat GPT, sales and customer retention could be raised. Apart from evaluating consumer data and obtaining crucial knowledge applicable for administrative decisions (Obaid **et al.**, 2023).

In another side ChatGPT is also applied in several other domains, including technical fields, healthcare, psychology, marketing, e-commerce, and banking services. Furthermore, it can be used to generate new ideas for student engagement, formulate subject-specific questions, design targeted tasks, and identify key strategies for adapting lessons to better suit students' needs (Wu **et al.**, 2024).

5. CHAT GPT APPLICATIONS IN EDUCATION

Since the emergence of Chat GPT, it has been a subject of controversy among education officials, as many saw it as a tool for developing the educational process, facilitating many tasks, and assisting in development. While others saw it as a means of cheating and fraud, and that it threatens the integrity and honesty that must exist in the educational process.

Therefore, we present the most important advantages of its use in education, as well as its disadvantages.

I. Review and evaluation

Because it could accurately review and translate, it might be utilized to verify and complete the solution regarding mathematical equations and problems. It is a valuable tool for students studying foreign languages because it helps them correct the writing language utilized through students who do not speak the language of study.

II. Preparing research

Chat GPT facilitates the research process for academic researchers at all levels, from undergraduate to graduate. It could be utilized to write scholarly articles and to finish a lot of the papers needed, like those needed to get scholarships.

III. Helping Universities in Community Participation

International and local universities can also use Chat GPT in the process of various community service, which is the role that universities play to serve communities, whether through activities, developing curricula or preparing research that provides solutions to various societal problems. It can be used to determine the demographic characteristics of a place, the geography of a particular place, its location, and the needs of the community in this region. Thus, this facilitates the process of determining the research sample in order to reach issues of interest to a specific group.

IV. Helping Students Develop Their skills

Many believe that Chat GPT is indeed the future, and that there are many tasks and jobs that will depend primarily on the employee's efficient use of it as an important tool at work. Therefore, students in universities using it is one of the most important things that helps them master its use, and thus obtain a skill required in the near future after graduation. In a scientific paper by (Kasneci et al., 2023), it was shown that integrating ChatGPT into educational settings supports the development of essential 21st-century skills, including critical thinking, problem-solving, and digital literacy, while also highlighting the need to understand the limitations of the smart tool to avoid overreliance..

V. Increased Productivity

One of the most important benefits of using artificial intelligence tools, including Chat GPT, is to help in identifying, collecting and sorting information in an organized manner. Therefore, it can be used in the process of continuous evaluation of students, as well as helping in setting grades, in addition to creating integrated curricula, based on teachers' specifications. Which means increased productivity, and the ease of obtaining curricula or organizing information in an easier and faster way.

VI. Developing Tools for Interacting with Student

Chat GPT can be used to obtain new ideas in the process of interacting with students, such as obtaining questions in a specific specialty, or developing tasks for students to achieve specific goals, as well as using it to extract the most important methods that can be used to adapt lessons to suit students.

VII. Supporting Students in Their Studies

Chat GPT helps students get ideas to start a specific project, whether research or a practical project specific to a specific major. It helps bridge the gap that makes many students unable to know the most appropriate starting point for them, or what helps them complete their project if the obstacle is in the middle of their project. It is also one of the most important means that students with special needs can rely on, by helping them prepare projects and reports, as well as helping professors provide customized learning experiences. A study conducted in Saudi Arabia involving 283 students with special educational needs found that ChatGPT supports learning through flexible communication, guided coaching, immediate feedback, and simplified learning. It also demonstrated significant differences in effectiveness based on disability type, further confirming ChatGPT's value in meeting the diverse needs of students (Alsahli et al., 2025).

VIII. Facilitating Administrative Processes in Universities

Chat GPT can be used to improve the efficiency of administrative processes in universities. This chat helps reduce the time consumed by humans in the administrative process of universities, such as: responding to inquiries from new students, helping students register for study programs, and verifying the requirements that students have fulfilled. Providing administrative information about exams, class schedules, and sending reminders and notifications to students. One of the most important features of using it in administrative operations in universities is that these services will be available 24 hours a day, 7 days a week to students all over the world.

6. CHAT GPT RISKS AND LIMITATIONS

Some risks can come from using Chat GPT, and we list the most important ones:

Inaccuracy: Chat GPT answers may not be accurate enough in some cases, which leads to providing incorrect information to customers, as studies evaluating its performance on specialized exams, such as nursing licensure tests, have shown accuracy rates around 65-68%. This variability can lead to providing incorrect information to customers, highlighting the importance of human verification before fully relying on ChatGPT's responses (Wu et al., 2024).

Dependency: If you rely heavily on Chat GPT, dependency may become a risk element, as it is difficult for you to interact

with customers and communicate with them personally. A study by (Akastangga et al., 2023) found that over-reliance on ChatGPT can diminish students' critical thinking skills, emphasizing the need for balanced use of AI tools.

Liability: You may face some liability if customers trust Chat GPT answers and make decisions based on them, which leads to problems or losses.

Security: Although Open AI restricts many unethical or dangerous actions, they can be bypassed, or even detailed, which could lead to Chat GPT being used to access customer information, which poses a risk to confidentiality and privacy, and this also applies to other AI tools, especially those that are not designed with high security in mind.

7. METHODOLOGY OF THE REVIEW

This review followed a narrative approach, analyzing peer-reviewed articles published between 2022 and 2025, focusing on ChatGPT's applications, limitations, and ethical implications in education and scientific research. These articles were selected based on their relevance, novelty, and thematic contribution of AI to education. Databases such as Google Scholar, Scopus, and Web of Science were used to identify references. Thematic qualitative studies were included to ensure a balanced conceptual understanding.

8. LITERATURES REVIEW

We briefly address the present state of large language models and their uses in the first section. We after that show how such models may be applied for creating instructional content, customize learning environments, and raise student interaction and engagement. (Deng & Lin, 2023) summarized Chat GPT and investigated its pros and disadvantages including cost savings, and improved accuracy and problems including security issues and limited capabilities. Notwithstanding such challenges, Chat GPT is an intriguing AI technology able to automatically facilitate conversations. At last, the researchers came to the conclusion that Chat GPT is a strong NLP tool able to create human-like conversations. Apart from the ethical concerns that must be resolved before Chat GPT chat could be fully utilized in scientific research. (Fütterer et al., 2023) in their paper on Chat GPT, they shed light on people's responses to the release of a revolutionary, new technology and how it affects scientific communication under fast evolving conditions. They discussed Chat GPT's importance in education and examined public Twitter comments on it. (Obaid et al., 2023) investigated the effects of Chat GPT chat on scientific research together as well as its advantages and possible disadvantages. The authors also showed how Chat GPT may be utilized for scanning and condense vast volumes of scientific material, therefore enabling researchers to find new approaches. in their study (Impact of GPT Chat in Scientific Research) observed, nevertheless, several limitations on the usage of GPT chat for scientific research. Depending on

their results, the writers came to the conclusion that while Chat GPT raises output and promotes the creation of fresh ideas and discoveries, it significantly influences scientific research. With the use of Chat GPT, on the other hand, raises a lot of possible problems including possible bias, domain-specific knowledge requirements, and ethical issues with data privacy and intellectual property. Thus, researchers have to carefully address such difficulties and develop intelligent preventative strategies to guarantee the ethical and appropriate use of Chat GPT in scientific research. (Bettayeb et al., 2024) presented a systematic literature review, this paper looked about how Chat GPT might be included into education. Depending on an analysis of many scientific research publications released between 2022 and 2023, the research answered four major research questions: the challenges and advantages of Chat GPT, safeguards and ethical considerations, its impact on learning outcomes and student engagement, and its impact on teachers. Through tackling issues, developing ethical guidelines, and using Chat GPT's capabilities, the study's conclusion was that educational institutions could enhance learning outcomes, raise student engagement, and properly apply AI in education. This will equip the students for the next generation. (Hakiki et al., 2023) investigated how Chat GPT affects technological learning for a group of University of Muhammadiyah, Muara Bongo, students through which learning outcomes were gathered and evaluated using final test results and investigated utilizing T-test in same year.

From this empirical data, light was highlighted on the advantages of adding Chat GPT into the learning process as well as on the prospects of such chatbots in increasing student learning and the main purpose in student technology education. E-learning is an effective educational experience as it is considered a preferred method for educational institutions. It is worth noting that chatbots such as Chat GPT are receiving attention because of the possibility of supporting users in the educational field. Study of (Hakiki et al., 2023) have importance due to the transformative effect of advances in information technology as well as AI in the field of education. In another side, (Mohamed, 2023) presented in her study on Chat GPT and the extent of the importance of its use in education and the necessity of using artificial intelligence applications in the educational process, but according to special caveats while using these applications that were clarified in her research study. She also emphasized in this study the necessity of making use of sources and the resources in the Chat GPT application support students' ability to innovate and problem-solving skills and support students of determination. In addition, she spoke in part of her study about the emergence of artificial intelligence, its components, types, characteristics, fields, and applications in the educational process, and about the emergence of Chat GPT and its uses in education and the conclusions and recommendations are explained in her study. (Mai, 2024) have used Biggs's Presage-Process-Product (3P)

learning and teaching model for discussing the systematic study subject on Chat GPT use for learning and teaching. The proposed model has been considered as a unique model, which uses a systematic approach to the educational events for the purpose of explaining the way that the students approach learning (Biggs, 2001). Interactions amongst 3P model's 3 elements helped clarifying students' learning ways. Each one of the 3P model levels has been examined for the applications of Chat GPT. It has been decided that through the careful evaluation of its implementation at each learning and teaching level, teachers may make the informed decisions, leveraging the strengths of Chat GPT and resolving its drawbacks for enhancing its integration into the processes of teaching. In this study, (Rane, 2023) also presented the roles and obstacles associated with harnessing the capabilities of Chat GPT and other generative artificial intelligence tools to enhance mathematical efficiency. Through the implementation of these advanced technologies, teachers can provide tailored educational experiences that meet a range of learning styles and steps. He explained in his study that integrating artificial intelligence into education is not without complications, and the ethical use of artificial intelligence also requires careful study, as well as ethical concerns that include issues such as data privacy. Besides, this study highlighted the promising potential of integrating generative artificial intelligence, especially Chat GPT, into the field of mathematics education, so that teachers can harness the power of artificial intelligence to craft rich and effective learning environments and nurture a generation of individuals who are proficient in mathematics and well-equipped to address the complexities of Modern world. This was the conclusion of this study Chat GPT plays a pivotal role in collaborative learning via interactive platforms. Students participate in mathematical discussions in addition to participating in problem-solving strategies and refining their life skills such as communication and critical thinking, enriching the overall learning experience. (Al Shloul et al., 2024) had searched in their research for activity-based learning effects and Chat GPT usage on the academic performance of students inside an educational environment. Research results have shown Chat GPT has very high potential of being one of the helpful supplementary tools for the teachers. This paper had offered a detailed overview of the 5 most significant strategies for the teachers to apply in the planning of lessons. The term assessment indicates multiple tasks like the creation of assessments and evaluation of the student development. This unique group includes tasks like coming up with novel ideas, designing educational resources, and helping with the translation of language. (Elbanna & Armstrong, 2024) examined the potential applications of ChatGPT in content production, assessment, and personalized learning, in addition to strategies for mitigating its disadvantages and addressing some ethical concerns. This study aimed to promote discussion around the effective and responsible use of ChatGPT as a tool for skill development and learning. Based on the findings, ChatGPT can be successfully integrated into the education

sector to automate repetitive tasks and enhance students' learning experiences, ultimately boosting efficiency, productivity, and adaptive learning. Also (Gill & Kaur, 2023) presented in their study applications for Chat GPT, its advantages, and ethical issues when using this application, in addition to current trends and future dimensions in using Chat GPT. In their study, they talked about the origins of the Chat GPT, it's types, and its role in the field of study and education and it's role in medical studies, journalist and media, business and finances and in analyzing programming language information and how can Chat GPT help programmers to enhance the reliability and dependability of their programmers by pointing out possible errors and suggesting solutions. (Walter, 2024) have discussed AI's transformative impacts in the educational environments, based upon 3 basic skills that are necessary for future of education in AI-dependent world, this was explored through a case study at a Swiss university, relying on practical experiences of lecturers at the University of Applied Sciences regarding the best ways to integrate AI into higher education classrooms. It was suggested that such skills and tools could also benefit younger learners. (Wardat et al., 2023), in their research on ChatGPT, explored the perspectives of students and teachers regarding the use of AI in math instruction, particularly after the launch of ChatGPT. The study employed a qualitative case study methodology divided into two phases: user experience research and interview content analysis. According to this study first phase, Chat GPT is well-known for its improved mathematical capabilities and capacity to boost academic achievement through giving users basic knowledge of a variety of areas, including mathematics. Moreover, ChatGPT could offer structured guidance in learning geometry, and many users on social media expressed enthusiasm for using ChatGPT in educational settings. However, some were cautious about its use in education. In the second phase of the research, three instructional scenarios helped to expose a range of issues related to user experiences. Chat GPT cannot clear misunderstandings and lacks knowledge on geometry. Depending on the results of the research, he advised several research paths to be explored in order to guarantee the safe and competent integration of chatbots—especially Chat GPT—into math education. Chat GPT could, he concluded, answer increasingly challenging mathematical issues including derivatives, integrals, and differential equations. To guarantee their accuracy, it is therefore advisable to verify the results using a calculator or another source even if the Chat GPT application might not often provide the most useful and efficient solution. (Vieriu & Petrea, 2025) explores how AI technologies affect students' academic performance and learning processes, with an emphasis on their perceptions and the difficulties in utilizing AI. Second-year students who had firsthand experience in AI-enhanced learning settings participated in this study, which was carried out at the National University of Science and Technology Politehnica Bucharest. Data were collected using a structured questionnaire with 11 items—four

open-ended questions about expectations, experiences, and concerns, and seven closed-ended questions evaluating usage, perception, and effectiveness of AI tools. Quantitative data were analyzed using frequency and percentage calculations. The results indicated significant benefits of AI, such as improved academic outcomes, personalized learning, and increased student engagement. (Chan & Tsi, 2023) showed that despite the increasing adoption of AI in education, students still value and respect human teachers. The study provides a roadmap for universities, teachers, and students, which includes building personal connections, enhancing teaching capabilities, and developing curricula that balance the benefits of AI with the role of human educators. Ultimately, the future of education will depend on the collaboration between AI and teachers. (Chiu, 2023) conducted a qualitative survey study to explore how AI affects school education from the viewpoints of teachers and administrators. The study covered four domains: learning, teaching, assessment, and management, and involved 88 participants from diverse educational backgrounds. (Yinping & Yongxin, 2023) provided strategic suggestions on how ChatGPT could promote digital transformation in education, improve student knowledge and professional skills, and foster cultural development. In their research, (Lund & Wang, 2023) summarized the main concepts related to Chat GPT and the technologies supporting it. For this work, an interview concerning Chat GPT prospective impact on academia was conducted. The interview discussed Chat GPT benefits, including improved search and reference tools. The offered paper addresses the technology and history of GPT, including its generative pretrained transformer model, capability for completing various language-based tasks, and how Chat GPT uses such technology to operate as a sophisticated chatbot. Along with ethical issues that should be taken into account, it also encompasses indexing, information, metadata generating, and content development. (Micheni et al., 2024) showed how AI might increase the efficacy of instruction and give students individualized, interesting learning environments in 2024. The successful and ethical use of AI in the educational system is ensured by carefully analyzing the technological, ethical, and other issues surrounding its use in learning and teaching. Suitable procedures are then developed for addressing such issues. Research on the effects and possibilities of Chat GPT in education, particularly in the area of business education, was given by (Kumar et al., 2024) that same year. A comprehensive examination of the literature, academic interviews, as well as textual analysis regarding opinion posts on professional platforms make up the three stages of the approach used in this research. The degree to which GPT chat is used in instructional activities and the concurrent development of students' technical and artistic abilities are significantly correlated. Higher education can benefit greatly from Chat GPT, and students will receive a well-rounded education if AI and human-led pedagogical approaches are balanced. For students' skills to be developed holistically,

AI must be used. The second section shows the possible advantages and difficulties related to the implementation of broad language models in education, from the viewpoints of teachers and students. (Baidoo-Anu & Owusu Ansah, 2023; Lo, 2023) Chat GPT's exceptional capabilities in performing complex tasks in the field of education have raised awareness. (Qadir, 2023) although impressive, Chat GPT represents a current stage of generative AI technology that has flaws. To guarantee that the upcoming generation of engineers could take advantage of the advantages provided by generative AI while limiting any drawbacks, it is critical that engineering educators comprehend the implications of this technology and consider how to modify the engineering education ecosystem. (Perkins, 2023) in 2023, the evolution of such AI tools is examined, and the potential benefits of large language models for enhancing student learning in digital writing and other areas are highlighted. (Thurzo et al., 2023) examined the application of AI in dental education but there is a need to train dental educators on the application of this technology in their field in order to safely and responsibly implement AI in dental education. (Bargavi & Jucunda, 2025) explored the transformative role of ChatGPT. (Wu et al., 2024) investigated ChatGPT in management education, focusing on ethical considerations and a human-centered approach to realize its full potential in medical education. (Wu & Yu, 2023) examined how intelligent chatbots impact learning outcomes in higher education compared to primary and secondary education. Future designers and educators should strive to improve student learning outcomes by equipping intelligent chatbots with human personalities. (Shoufan, 2023) the study provides insights into the capabilities and limitations of Chat GPT in education and informs future research and development. (Yang, 2025) the study included a detailed analysis of the structure of the GPT model and its applications in various educational contexts, its role in automating assessment processes, and its ability to produce effective and engaging educational content. (Al-Jahwari & Yousif, 2025) This review highlights Chat GPT's educational applications in four main areas: (1) educational applications, (2) assistance in academic research, (3) ethical challenges and concerns, and (4) future directions in AI-enhanced education. empirical research by (Chiu et al., 2023) backed up (Li et al., 2023) claim that students need teacher support in order to use Chat GPT for learning. (Younis, 2024) in three learning environments that incorporate Chat GPT, this research looks at students' self-regulation abilities, confidence in online learning, and perceptions of the value and satisfaction of online courses. Concerns over low participation might be raised by (Dindorf et al., 2024) Chat GPT. For academic work, students can be tempted to rely too much on AI, which could compromise their integrity and learning. (Huesca et al., 2024) student interests, affective and cognitive engagement, as well as learning motivation, may be impacted by the employment of Chat GPT.

8.1 Critical Analysis

The reviewed studies provide a comprehensive account of ChatGPT's applications in education and scientific research, but most remain descriptive rather than analytical. On the other hand, many studies indicate the tool's ability to generate intelligent educational content, facilitate personalized learning, and facilitate interaction in the learning environment, but fewer include comparative evaluations or theoretical synthesis of different disciplines or research methodologies.

There are studies, such as those conducted by (Mai, 2024 & Bettayeb et al., 2024), on the role of ChatGPT in enhancing creativity and achieving engagement, in line with Biggs' three-dimensional model of learning. However, this study, with its optimistic perspective, contradicts the findings of (Dindorf et al., 2024 & Huesca et al., 2024), in taking into account the cautious decline or absence of academic integrity and excessive reliance on this smart tool in the academic work environment

From a methodological perspective, most scientific and research studies rely on a qualitative approach that includes interviews, case studies, and cognitive-based cases include this type of studies (Vieriu & Petrea, 2025; Chiu et al., 2023; Chan & Tsi, 2023). Regardless of the richness of their information, such approaches lack conclusive, generalizable evidence, and this deficiency limits the provision of experimental studies or a controlled study that expresses an understanding of the impact of ChatGPT on the retention of cognitive or learning behavior and independence in learning. Moreover, ethical issues remain, despite their frequent mention in studies such as (Muhammad, 2023; Rane, 2023; Wu et al., 2024), and their dimensions have not been adequately studied in practice. This creates concerns and caution among many authors regarding data privacy, intellectual property, and the bias of this modern technology. As technology becomes increasingly integrated into education systems, there remains a critical and urgent need for guidelines on how to use it, especially in high-stakes areas such as assessments at a time when smart technology has become an exciting thing to learn in the educational environment .

9. Research Gaps in the Use of ChatGPT in Education

In this section, we list the most important observations that lead to several major research gaps:

1. Insufficient empirical validation of ChatGPT's impact across different disciplines and learning stages.
2. Limited focus on different learner groups, including students with special needs or from diverse linguistic and cultural backgrounds.
3. Insufficient analysis and study of cognitive dimensions and long-term behavioral effects, particularly with regard to

motivating students and preparing them for independent learning.

4. Lack of models for applying ethics in a way that achieves a balance between supporting artificial intelligence, academic integrity, and human supervision.

10. Recommendations for Future Research

To build a more critical and constructive understanding of ChatGPT in education and scientific research, future studies should:

- Use thoughtful, data-driven methodologies to evaluate actual learning gains.
- Evaluate the effectiveness of ChatGPT in disciplines such as science, technology, engineering, and mathematics (STEM) vs the humanities and in contexts such as online learning vs hybrid learning.
- Develop comprehensive ethical guidelines and teacher training programs to ensure the responsible and safe use of AI.
- Investigating the behavioral and psychological effects of integrating the positive dimensions of artificial intelligence on students' autonomy, engagement, and problem-solving abilities.
- Exploring hybrid models of AI-human collaboration in classrooms to preserve the irreplaceable value of teachers while leveraging AI technologies. This recommendation is crucial, as teachers are the primary trainers who educate, train, and prepare a promising generation capable of innovating these technologies.

From this study, which included features, benefits, challenges, and then analyzing the literature and concluding with conclusions and future recommendations, Researchers and educators can make ChatGPT more effective in a rapidly advancing and technologically evolving educational environment.

Conclusion

Last but not least, ChatGPT holds great promise to Last but not least, Chat GPT technology has a great deal of potential to develop academia and librarianship in novel and fascinating ways. Yet, it is crucial to think about how to use such technology in an ethical and responsible manner, as well as how we, as professionals, might collaborate with it to enhance our work in order to produce new academic knowledge and train future professionals. Chat GPT is a helpful educational tool. Aside from this, Chat GPT technology is thought to be a helpful tool for scientific research and for enhancing the caliber of scientific writing; nevertheless, it must be utilized with prudence, and standards for safe use must be created. It could be utilized to produce new ideas and obtain information and

direction. This review used a narrative approach to analyze recent studies on Chat GPT's benefits and challenges in education and research, highlighting gaps and recommending evidence-based guidelines and ethical frameworks. Chat GPT is one of the most important tools that many institutions, companies, and individuals around the world will need, and therefore, it will have a major role in changing the educational process and university policies in the future.

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