

# ChatGPT in education: Its value, accuracy, and regulation

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## ARTICLE INFO

DOI:10.46223/HCMCOUJS.  
soci.en.15.2.3159.2025

Received: January 02<sup>nd</sup>, 2024

Revised: January 23<sup>rd</sup>, 2024

Accepted: February 02<sup>nd</sup>, 2024

### Keywords:

artificial intelligence; ChatGPT;  
data protection; education;  
Government regulation;  
traditional narrative synthesis  
review

## ABSTRACT

ChatGPT is an AI-based assistant that has revolutionized the education sector. It is a natural language processing technology that uses machine learning algorithms to generate human-like responses to various queries and conversations in real time. The program was launched in 2022 and has proven its value in education. However, the grey area in generative transformer tools such as ChatGPT is enormous, including utilization value, data accuracy, and protection, and government regulations. The primary purpose of this research is to synthesize various published studies since the inception of ChatGPT. This research utilized a traditional narrative synthesis review to capture the value and regulation of ChatGPT and other artificial intelligence concerning education. The results showed that teachers and students benefited from the program, such as personalized learning experiences, teacher-student interactions, increased engagement, and teachers' lesson and assessment planning. However, the level of accuracy of information ChatGPT provides still needs to be 100% accurate since various studies have mixed results on the accuracy of the information given by ChatGPT. The user should be able to delineate which data is incorrect. Furthermore, countries worldwide have passed laws and regulations to ensure that AI tools such as ChatGPT would not harm users. Overall, Chat-GPT has the potential to revolutionize the way we approach education. As this technology becomes more global, it will be essential to continue testing and refining ChatGPT to improve the user experience and maintain ethical considerations.

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## 1. Introduction

Digitalization of education has increased over the last few years, with artificial intelligence being integrated into a variety of educational activities. The Chat Generative Pretrained Transformer, commonly called ChatGPT, has become one of the more well-known artificial intelligence applications. ChatGPT is an innovative technology in natural language processing and has been given great attention for its possible application to education (Abdullah et al., 2022). It is a machine-learning algorithm that tries to mimic human conversations with users using deep neural networks (Jannach & Chen, 2022). Various fields, such as healthcare, customer service, and finance, have used this technology.

It also indicates that it could impact students, teachers, and educational institutions (Firat, 2023). The value of ChatGPT is significant, especially in providing personalized learning experiences to students (Qadir, 2023). To provide students with a specific learning experience, ChatGPT will be able to draw up customized responses to their questions. In addition, Yu (2023) explains that ChatGPT can give students feedback and link them with academic resources to help them achieve their educational objectives.

The ChatGPT can help teachers streamline their teaching activities and provide personalized learning experiences. It can be used to assist with the grading of tasks, attendance monitoring, and evaluation of academic excellence (Massey & Strong, 2023). It can save teachers' time and allow them to concentrate on preparing lessons and working more closely with students.

Despite its numerous benefits for education, there should be appropriate regulation of the use of ChatGPT. Ray (2023) points out that ethical issues such as data protection, security, discrimination, and child safety, in particular, need to be addressed by regulation. The laws and regulations relating to collecting and processing personal data shall align with the design of ChatGPT. Cases have already transpired in the last two years. For instance, in April 2023, OpenAI developers apologized for unintentionally revealing users' titles and conversation prompts without consent. The issue was caused by a bug in a third-party open-source library and has since been fixed (Pimloc, 2023). In addition, The Polish Office for Personal Data Protection has received a complaint claiming that ChatGPT breaches several regulations outlined in the General Data Protection Regulation (GDPR) of the European Union (Blake, 2023).

Despite the numerous benefits of ChatGPT in education, appropriate regulation of its use must be enacted. Ray (2023) pointed out that regulation must address ethical concerns such as data privacy and security, bias and discrimination, and child safety. The design of ChatGPT must align with the laws and regulations governing the collection and treatment of personal data. Mhlanga (2023) was adamant that data protection, privacy, and security regulations must be followed when using ChatGPT to monitor student behavior and activities. Furthermore, educational stakeholders like instructors, administrators, students, and parents must be made aware of and trained on using ChatGPT in the classroom. Stakeholders must possess the necessary skills to utilize ChatGPT effectively and appropriately while being aware of the ethical guidelines that dictate its implementation.

Although it is evident that ChatGPT has the potential for educational benefits, there needs to be more research into how effectively it can be integrated into the education ecosystem. Unexplored research areas include the regulation and administration of this technology in education. The ethical implications of integrating technology in teaching environments must be considered by policymakers and educators alike as technologies advance at an extraordinary rate (Cotton et al., 2024). While some studies have been done on the application of AI in education, further in-depth studies are still required to determine the benefits and potential restrictions of ChatGPT in the classroom. The newness of ChatGPT in teaching and learning makes it full of grey areas and gaps that need to be filled. Hence, this research aims to take a picture of how ChatGPT benefited teachers and students and check the accuracy of ChatGPT. Also, this study aims to investigate the possible effects of ChatGPT on education and how various nations are regulating or intend to regulate this particular technology. This research would yield priceless insights into how best to use ChatGPT while protecting students' privacy and safety, avoiding prejudice and discrimination, and maximizing its educational value. Collecting these research

publications in a narrative synthesis could help educators and school leaders develop policies regarding the use of ChatGPT in schools.

Therefore, the objectives of this research are to identify ChatGPT's benefits in teaching and learning, check its accuracy based on published articles, and determine how ChatGPT and other AI tools are regulated around the globe.

## **2. Theoretical basis**

Two educational theories are aligned with the intervention of Chat GPT in teaching and learning. These are the constructivism and connective approaches. The constructivism approach is a learning theory founded by Piaget in 1964. He believed that learning involves the processes of modeling, transforming, and comprehending how an idea is built. He argued that knowledge is formed from a response to certain stimuli, and in effect, this knowledge is constructed and reconstructed. In Chat GPT, students can interact with the platform, for instance, by asking a question. By doing this, students already have a preformed schema, and the answer of GPT in this query can assimilate or accommodate that schema. Hassani and Silva (2023) supported this by saying that Chat GPT can facilitate this process by providing learners with a conversational and interactive interface where they can ask questions and receive information and guidance.

ChatGPT can facilitate learning through exploration and experimentation in the constructivist framework. For example, a Chat GPT system could guide learners through open-ended questions and prompts, encouraging them to think critically and creatively about a particular topic. The system could also be programmed to provide feedback and support based on the learner's responses, helping them to build their knowledge and understanding over time.

For example, the AI-powered assistant is made to pose open-ended questions that encourage users to consider a subject from multiple angles and think it through thoroughly. Furthermore, ChatGPT can offer feedback that pushes back against users' preconceptions and invites them to think about different angles. By pushing users to challenge their presumptions and consider different viewpoints, this method can aid in developing their critical thinking abilities. Additionally, ChatGPT's capacity to produce text on various subjects promotes exploration by enabling users to investigate novel concepts and gain knowledge on subjects they might not have previously thought about. ChatGPT's constructivist learning methodology is a good fit for its features, and users stand to gain a great deal from interacting with the AI-powered assistant in this manner.

Connectivism, on the other hand, focuses on the importance of connecting with other people and using technology to access knowledge and information. Connectionism recognizes the importance of divergent views and opinions regarding education, as reflected by Reyna (2023). This is designed to make it easier for learners to become more rigorous and comprehensive in their understanding of what they are learning by stimulating active research and interaction with various views. Connectivism acknowledges and values technology's substantial influence on the learning process. It emphasizes how crucial it is to use digital tools, online forums, and other technology resources to effectively gather and share information and actively participate in learning networks (Downes, 2022). According to Reyna (2023), connective theory emphasizes the value of social interaction and teamwork in learning, which can enhance social media platforms and AI-driven collaboration tools. Through the provision of an innovative and cooperative platform for debate and perspective examination, Chat GPT can facilitate connectivity. For instance, ChatGPT can establish chat groups where students with

related objectives or interests can interact and share ideas. These groups may focus on various subjects, including coding, entrepreneurship, or language study. Participants can exchange resources, ask questions, and give each other comments.

### **3. Methodology**

This research employed the traditional narrative synthesis review. Fudge et al. (2016) explained that a traditional narrative synthesis review is a literature review commonly used in research studies, particularly in health-related and educational science fields. Weaver et al. (2014) stated that the purpose of a narrative synthesis review is to summarize and interpret relevant literature, in this case, the value and regulation of ChatGPT and other artificial intelligence concerning education. Unlike systematic reviews, narrative synthesis reviews may not follow a strict protocol or use specific inclusion and exclusion criteria for selecting studies. Instead, the selection process is informed by the literature available and the research question being addressed.

The data sources of this traditional narrative synthesis review include primary research studies from various databases such as PubMed, Cochrane Library, Embase, PsycINFO, CINAHL, Web of Science, ERIC, Google Scholar, BASE, SAGE, and SCOPUS. These databases are the most respected repositories of journals in the world to date. In addition, sources such as reference lists and citation indexes were used to identify relevant studies. Grey literature sources such as conference abstracts, government reports, and dissertations were also included in the review process.

On the databases mentioned, different keywords were used, like ChatGPT applications in education, ChatGPT, value, ChatGPT regulations, and artificial intelligence. These keywords were selected due to their relevance to the research questions. Boolean operator “AND” and mathematical operator “+” were used. Using specific words is crucial to evaluate a study thoroughly because it helps to recognize significant concepts, organize the analysis, and enhance consistency and effectiveness.

The review included only studies published in English. The review may include only studies published in the past year after ChatGPT was launched in 2022, which may include quantitative or qualitative studies that report on the value or regulation of ChatGPT in education. The review only included studies reporting specific outcomes, such as academic performance, student engagement, or teacher satisfaction with ChatGPT in education. These outcomes can either be predetermined or emerge from a qualitative study.

Furthermore, all studies that examine ChatGPT in an educational context were included. This includes studies investigating the use of ChatGPT in primary, secondary, and tertiary educational settings. Additionally, studies that explore the use of ChatGPT in formal or informal learning environments were considered for inclusion. Studies that report on the benefits and drawbacks of ChatGPT in education were included. These studies may cover topics such as the effect of ChatGPT on student engagement, learning outcomes, and teacher workload, as well as potential risks associated with using ChatGPT in an educational context. Moreover, studies exploring the regulation of ChatGPT in education were included. This includes investigations into the ethical considerations surrounding the use of ChatGPT in the classroom and the legal and policy frameworks that govern its use.

Including only studies published in English may have been necessary to ensure that the reviewers could access and understand the full text. English is the dominant language in

academic publishing, and many essential studies may only be available in English. Limiting the review to studies published in the past year after ChatGPT was launched in 2022 was intended to focus on the most current research in the field. ChatGPT is a relatively new technology, and its use in education may rapidly evolve. The review may better capture the current research on ChatGPT in education by focusing on recent studies.

## **4. Results and discussion**

### ***4.1. Homework and assignment assistance***

You can get homework and assignment help with your students in various ways through ChatGPT. Biswas (2023) studied that it can act as a virtual tutor or mentor for the student, guiding how to approach specific questions or concepts in their homework. That guidance can cover explanations of key terms or concepts, suggestions on how to solve problems, and learning strategies that would be more effective. ChatGPT can help students comprehend their homework tasks and subsequently achieve better academically by offering this kind of individualized attention.

Yue et al. (2023) have shown that by providing additional sources and information, students can participate in homework and other tasks using ChatGPT. For example, it may recommend articles or research documents that could help the student better understand a topic and link to an Internet tool or calculator, which can be beneficial for dealing with specific problems. ChatGPT can help students save time and effort on their homework and assignments by gathering and organizing this material. ChatGPT can assist students with difficulties in mathematics, physics, chemistry, and other topics that need calculations or numerical answers, according to Mhlanga (2023). Students can receive a comprehensive solution using ChatGPT when given particular parameters.

Additionally, according to Rudolph et al. (2023), ChatGPT can help students work more productively with their teachers and peers. For instance, it can help students connect with others grappling with the same issues or working on related tasks. This way, they can exchange ideas and methods and receive feedback. According to Mhlanga (2023), ChatGPT can also help students and teachers communicate by offering a practical and approachable forum to ask questions and receive task feedback.

By giving prompt feedback and incentives, ChatGPT can support students in maintaining their motivation and engagement with their tasks and homework (Lee, 2023). For instance, it might make schoolwork enjoyable and exciting by gamifying it, or it may provide students with constant feedback on how they are doing so they can monitor their progress and find areas where they need to improve. Cain (2023) highlighted that ChatGPT can assist in keeping students motivated and involved by making homework more dynamic and interactive, ultimately improving academic performance.

One possible direction for future study is to examine how ChatGPT-based support affects student learning results. It is necessary to look at how scalable chatGPT-based learning support is and to create plans for implementing these models in various learning environments.

### ***4.2. Personalized learning***

The one-on-one tutelage of ChatGPT is one of the most outstanding AI programs developed in recent history. The program can answer individual questions with differentiated abilities. For instance, if you are searching for a formula for mathematics and its derivation, you can let ChatGPT know that you are a high school student, and this process will give the

program a signal to customize the derivation for a high school student's understanding. ChatGPT is an AI assistant designed to respond to queries and perform different duties. It can personalize instruction and learning. ChatGPT functions as a language model that analyses student language input to determine the student's comprehension level (Ausat et al., 2023). ChatGPT can then adjust its response and explanations to the student's needs based on the assessed level of knowledge.

Based on the particular requirements of every student, ChatGPT's extensive database allows it to provide tailored learning materials (Biswas, 2023). For example, ChatGPT may recommend various films or other resources that would benefit a student's learning style if that student needed help with a mathematics concept. According to Rudolph et al. (2023), ChatGPT can continuously communicate with educators and students to learn about their interests and skills. Teachers can use this information to design lessons tailored to each student's requirements and learning style.

Students may track their performance and enhance their academic results by using ChatGPT, which can give them quick feedback on how they are studying. It may evaluate each student's advantages and disadvantages and offer suggestions for how to raise their level of performance. According to De Angelis et al. (2023), ChatGPT's AI can employ machine learning techniques to find trends in how students use the platform. This can assist in pinpointing problem areas and offering focused encouragement and feedback.

ChatGPT can identify syntax, grammar, punctuation, and spelling errors in student essays and articles and offer improvement ideas (Marron, 2023). Students will gain from receiving tailored writing comments to develop their writing abilities. Furthermore, ChatGPT can use its Natural Language Processing (NLP) skills to deliver dynamic and exciting learning experiences, as discovered by George and George (2023). For instance, it can produce conversational, interactive exercises that let pupils practice language in a lively, engaging way.

Future studies should investigate enhanced Natural Language Processing (NLP) approaches, adding flexible machine learning algorithms, creating more advanced techniques for user profiling, utilizing personalized learning analytics, and implementing motivational strategies to increase their efficacy further. ChatGPT and personalized learning platforms can become valuable instruments for promoting tailored and exciting learning experiences and enhancing learning outcomes by tackling these study areas.

### ***4.3. Lesson planning for teachers***

Lesson planning is one of teachers' most popular actions when preparing lessons. ChatGPT can be used as a research tool to assist teachers in locating trustworthy and legitimate sources of data for their courses. Aithal and Aithal (2023) contended that ChatGPT, with its extensive information database, can offer educators specialized articles, research papers, or webpages that are particularly relevant to the subject matter they are instructing. By doing this, educators can avoid wasting time and effort searching the internet for pertinent materials.

Helping teachers develop ideas for tasks or activities that fit their instructional objectives is another way ChatGPT can support lesson planning (Božić & Poola, 2023; Qadir, 2023). With a small quantity of input regarding the topic, grade level, and learning goals, ChatGPT can make exciting and imaginative suggestions for how students might engage with the content. It could include suggestions for writing exercises, collaborative projects, or virtual field trips, for example, that will meaningfully enhance the course.

Teachers can get assistance from ChatGPT in creating evaluations or assessments for their classes. Knowing the goals and learning outcomes can help determine the best exams or quizzes to gauge students' progress (Lee, 2023). For example, it can suggest particular questions or offer a series of ready-made tests that fit the instructor's goals. This can help educators save time and work when developing evaluations from the ground up.

ChatGPT can help teachers personalize their courses and aid with planning and assessment (Qadir, 2023). Through the entry of information on their classroom demographics, interest levels, and ability gaps, it is found that ChatGPT can provide various tactics for interacting with students at various proficiency levels (Cotton et al., 2024). This can help educators differentiate their education and foster a learning environment for all pupils.

#### ***4.4. Accuracy of information in ChatGPT***

The data that ChatGPT was trained on determines its accuracy as an AI assistant (Patel & Lam, 2023). If the system was trained on trustworthy and complete data, then ChatGPT's information should also be accurate. However, the information could only be accurate if the training data is balanced and complete.

Furthermore, ChatGPT analyses and interprets data efficiently using cutting-edge algorithms and natural language processing methods. These methods aid ChatGPT in comprehending users' complicated queries and providing pertinent and accurate answers. Additionally, the system can swiftly and efficiently retrieve information, responding accurately and relevantly to various inquiries.

To guarantee that ChatGPT delivers precise information, the system's creators have extensively collected training data from multiple reliable sources. This data comes from general knowledge databases, news stories, policy documents, and scientific studies. The developers also routinely update the training data to give ChatGPT access to the most recent data.

According to academic physician specialists, the study by Johnson et al. (2023) has found that the data supplied by ChatGPT to various medical queries is generally reliable. Nevertheless, some restrictions must be taken into account. Temsah et al. (2023) support this theory, stating that studies show ChatGPT can provide reliable data comparable to medical students in specific medical specializations, such as parasitology. Similarly, ChatGPT offered accurate historical data about chatbots (Shahriar & Hayawi, 2023). In their first study trial, Wagner and Ertl-Wagner (2023) found that ChatGPT-3 could correctly respond to clinical questions from radiologists only around 66% of the time, with a third of the answers having errors. They also stated that just a tiny percentage of the references provided contained the necessary data to address the question, and the remainder of the citations were not found. However, De Angelis et al. (2023) contended in a synthesis piece that several case studies objected to using ChatGPT. They drew attention to its lack of scientific accuracy, lack of current data, and inability to offer a critical examination of the results.

Ultimately, it is imperative to acknowledge that ChatGPT's information accuracy has limitations. Although ChatGPT can comprehend the situation and provide relevant answers, it might not be as adept at deciphering human emotions as people are. ChatGPT is trained based on accessible data and might not be fully informed in all areas, as Baidoo-Anu and Owusu Ansah (2023) stated. As a result, it occasionally might offer unreliable or lacking answers. ChatGPT cannot learn from experience the way people do; therefore, its responses do not improve with time. In addition, given the divergent viewpoints found in the literature, users must double-check the data supplied by ChatGPT. Since ChatGPT is still in its infancy as an artificial intelligence

system, there is much space for development to reduce the uncertainty gap entirely. Users need to be sufficiently knowledgeable about science to verify the accuracy of information until the issue is resolved.

With the continued development and enhancement of its natural language processing capabilities, knowledge base expansion, and teacher-friendly interface, ChatGPT has a bright future. With these improvements, ChatGPT may become a valuable resource for educators in preparing and delivering lessons. They can utilize it to develop ideas, organize classes, adjust to the needs of different learners, and provide helpful resources. Teachers may improve their creativity, efficiency, and effectiveness in the classroom by utilizing ChatGPT's features, ultimately improving student outcomes.

#### ***4.5. Regulations of ChatGPT and other AI tools around the globe***

Right now, very few countries have regulations and laws on the use and production of ChatGPT and other AI products. It is important to note that regulating AI and similar technologies is still evolving, and different countries may take different approaches to regulation.

Generally speaking, regulatory bodies worldwide might be interested in regulating AI assistants like ChatGPT for several reasons, such as ensuring consumer safety, protecting privacy rights, preventing discrimination, and promoting fairness and transparency. ChatGPT experienced a significant personal data breach for the first time in March. Act Now Training (2023) reported that OpenAI recently published a blog post stating that the breach exposed payment-related and personal details of 1.2% of the ChatGPT Plus subscribers. However, further concerns regarding AI and ChatGPT go beyond privacy regulations.

Data privacy legislation is one way that ChatGPT might be regulated. According to Hacker et al. (2023), these regulations might impose limitations on the gathering, storing, and using data produced by ChatGPT interactions. Consumer protection laws may also be relevant in regulating ChatGPT, primarily if utilized in commercial contexts, in addition to data privacy regulations. The transparency of algorithms is another regulatory area. This speaks to the notion that businesses creating AI systems ought to be open and honest about the processes their algorithms use to arrive at judgments. This strategy can lessen bias and injustice while fostering responsibility (Rivas & Zhao, 2023).

In China, AI and data privacy are governed by various laws and regulations such as Cybersecurity, National Intelligence, and Personal Information Protection Law. These laws require companies to obtain user consent for data collection and processing and to implement measures to protect user data (Lubowitz, 2023). In April 2023, China released guidelines and rules on generative transformer tools such as ChatGPT. Kharpal (2023) of CNBC reported that the Cyberspace Administration of China's preliminary regulations define the guidelines that generative AI services must adhere to, such as the nature of the material that these products can create. The content must align with the fundamental principles of socialism and should not undermine the state's authority per the draft regulations.

The proposed regulation by the European Union, known as the Artificial Intelligence (AI) Act, centers on improving data quality, transparency, human oversight, and accountability guidelines. Additionally, it seeks to tackle ethical concerns and issues related to implementing AI in multiple industries, including healthcare, education, finance, and energy Act Now Training (2023). Cain (2023) reported that general-purpose AI systems are risky and should not be exempted, which was echoed by a group of worldwide AI specialists' advocates. The proposed

regulations only enforce specific accountability requirements on high-risk systems. These specialists propose that software, such as ChatGPT, must be evaluated to determine any potential harm it may cause and implement appropriate safety measures. The rules must consider the entire lifespan of the product.

As of this writing, the United States is on the course of regulating ChatGPT and possibly other generative AI tools. Shepardson and Bartz (2023) reported that The National Telecommunications and Information Administration, a department within Commerce that guides the White House on telecommunications and information policy matters, is seeking feedback because of regulatory attention on an “accountability mechanism” for AI. The agency would like to determine if there are ways to establish confidence in AI systems’ legality, efficacy, morality, safety, and other dependability factors.

The quest to regulate generative transformer tools such as ChatGPT is underway. However, governments worldwide must hurry as the proliferation of the systems and programs related to AI is not pausing any time soon. De Angelis et al. (2023) stated that it is vital to regulate generative transformer tools such as ChatGPT because they have the potential to be misused in different ways, such as generating fake news, disinformation, hate speech, and even deepfakes. George and George (2023) argued that without appropriate regulation, these tools can cause harm to individuals and society as a whole. Ensuring they are used ethically and responsibly to realize their benefits without compromising social and ethical values is crucial.

## **5. Conclusions & recommendations**

ChatGPT is a handy tool for teaching since it gives students a way to get help immediately and receive feedback quickly. Its value is found in its capacity to provide tailored content that addresses every student’s individual learning needs and its adaptability to offer support anytime and anywhere. Teachers can design lessons, assist the class, and create assessments using ChatGPT. With this technology, educators and learners alike can become more familiar with intricate ideas that they might not have been able to grasp independently.

Furthermore, the data that ChatGPT was trained on determines its accuracy. Data from various literature revealed that because artificial intelligence relies on machine learning algorithms and an extensive database of data to produce accurate findings, its accuracy is on par with artificial intelligence. However, literature also questioned ChatGPT due to phony citations, poor scientific accuracy, outdated data shortages, and an inability to evaluate the results critically. As more information and data are incorporated into the system, it will continue to advance and strengthen its levels of accuracy.

Finally, rules must be established to guarantee that ChatGPT is adequately run and aligned with the curriculum. Evaluating the AI conversation’s suitability for student consumption regarding ethics and morality must be part of these restrictions. Additionally, it is essential to ensure that students learn the crucial problem-solving abilities they will need for their future employment and stay independent of ChatGPT. The regulation imposed on ChatGPT should strike a balance between the use of technology and dependence on previously acquired academic skills to guarantee that technologically assisted education enhances rather than replaces traditional methods of instruction.

## **ACKNOWLEDGEMENTS**

Thanks to the New Uzbekistan University for hearing this paper. There is no conflict of interest in any manner in this paper.

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