AI'S SECRET WEAPON IN EDUCATION. CHATGPT - THE FUTURE OF PERSONALIZED LEARNING

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Abstract: *This article delves into the fascinating intersection of AI and education, with a focus on ChatGPT, a conversational AI developed by OpenAI. Noted for its human-like responses, ChatGPT is positioned as a game-changer in personalized learning. The paper aims to highlight the untapped potential of ChatGPT in educational settings and advocate for its broader adoption by educators to enhance student learning outcomes. To achieve this objective, systematic research was conducted using a variety of data sources, literature sources, research studies, and online data focused on the efficacy of ChatGPT in academic environments.*

Key words: *ChatGPT, artificial intelligence, education, AIEd, AI*

1. Introduction

The relationship between "AI" and "education" has sparked intriguing debates and conversations. ChatGPT is a new conversational chatbot developed by OpenAI that could help educators incorporate AI into their teaching methods. ChatGPT generates responses similar to a human's by utilizing natural language processing. Its ability to produce coherent, systematic, and informative replies has gained global recognition.

The current state of AI technology is experiencing a significant boom and has the potential to revolutionize the world of personalized learning. With its capability to facilitate dynamic assessments and promote meaningful interactions within online, mobile, and blended learning environments, the possibilities for further advancements are endless. These developments have the potential to benefit individuals and institutions alike, ultimately leading to a more efficient and effective learning experience for all (Zhang and Aslan, 2021).

This article aims to assist the AIEd (Artificial Intelligence in Education) community, which includes educators, educational researchers, AI technology creators, and other stakeholders, in gaining a deeper understanding of AIEd. Therefore, the AIEd community—from educators and researchers to tech developers—needs to work collaboratively to explore this brave new world, aiming for an educational landscape that is both innovative and responsible.

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2. AI – Artificial Intelligence

Today's AI systems have unprecedented capabilities and performance, but their core algorithms are rooted in early 20th-century methods (Tuomi, 2018).

Artificial intelligence (AI), "in a practical sense, refers to computer systems that simulate or exhibit a specific aspect of human intelligence or intelligent behaviour, such as learning, reasoning, and problem-solving" (McCarthy, 1956). Artificial Intelligence (AI) encompasses a variety of intelligent processes and behaviors created through computational models and algorithms (Chen and Decary, 2020). AI refers to the study and development of intelligent agents (Cañedo and Skjellum, 2016). These agents are systems that perceive their environment and take actions to maximize their chances of success (Kuzlu et al., 2021).

AI is becoming increasingly common and transforming the way we collect information, analyse data, and make decisions based on the insights we gain. Its impact can be felt across all aspects of life, altering how we live, work, and interact with the world around us.

3. A brief history of OpenAI and ChatGPT

3.1. OpenAI

OpenAI is a leading AI research lab founded by prominent tech figures such as Elon Musk, Reid Hoffman (LinkedIn founder), Peter Thiel (PayPal co-founder), Greg Brockman (former Stripe-Chief Technology Officer), Sam Altman (Y Combinator founder) (Jürgen et al., 2023). Its primary goal was to create "friendly AI" that can enhance humanity's well-being by achieving Artificial General Intelligence (AGI) - machines that can perform any intellectual task like humans (OpenAI, 2015). Elon Musk expressed his worries about the potential risks of AI, but the primary focus is on augmenting human capabilities rather than replacing them. OpenAI initially committed to being a non-profit organization, sharing its work openly.

However, OpenAI's business model changed in 2019 when it became a for-profit entity. Microsoft invested $1 billion, which raised concerns about OpenAI's commitment to democratizing AI. Microsoft has invested an additional $2 billion and is negotiating to invest $10 billion more (Metz and Weise, 2023). Microsoft has exclusive licensing for GPT-3, one of OpenAI's significant breakthroughs. This shift sparked questions about the control of AI resources by wealthy firms.

OpenAI's remarkable achievement, GPT-3, was trained on vast datasets, including hundreds of billions of words from sources like Common Crawl, Reddit, online books, and Wikipedia (Brown et al., 2020). Heaven (2020) states that GPT-3 is the most formidable language model developed. This model can learn from any text and perform various tasks without extra training. Grossman (2020) notes that some tasks include generating narratives, producing computer code, completing images, translating between languages, and doing calculations. Recently, OpenAI has launched two new "large language models" (LLMs), ChatGPT (GPT-3.5) and GPT-4. These models show great potential in healthcare and laboratory applications (Lee et al., 2023).

3.2. ChatGPT

With the rapid advancement of technology and the world's increasing interconnectedness, artificial intelligence (AI) has made significant strides in various fields, including education. The use of AI in educational settings has the potential to drive progress and inspire innovation, as stated by Zhai (2022). One of the growing AI tools used for educational purposes is ChatGPT.

"GPT" is an acronym for "Generative Pre-trained Transformer." This term describes a model type that can generate text based on a given prompt or seed text. GPT models can generate coherent and contextually appropriate text continuations, even if not explicitly present in their training data. Before being fine-tuned for specific tasks, GPT models undergo a pre-training phase that involves learning from vast amounts of text data. During this phase, the model predicts the next word in a sentence, which helps it develop a general understanding of language, context, facts about the world, reasoning abilities, and more.

The GPT is powered by a neural network architecture known as "Transformer", which was initially introduced by Vaswani et al. in their 2017 paper titled "Attention is All You Need". This architecture employs self-attention mechanisms to evaluate the significance of different words in a text concerning a given word. This ability enables it to handle long-range dependencies in language effectively. The transformer architecture has become the cornerstone of many state-of-the-art models in Natural Language Processing (NLP) and even in other domains.

4. Methodology

This research emphasizes ChatGPT's benefits to educational institutions, especially those facing limited resources and time constraints. The data used to conduct the research came from various sources. For the data sourced from educational institutions, a specific focus was placed on how educators currently implement technology in their classrooms, their level of satisfaction with these tools, and how ChatGPT fits into this landscape. Meanwhile, data from online educational tech companies provided insights into the trends and demands of educators in tech integration, with a specific lens on chatbot technologies like ChatGPT.

To further validate and contextualize the findings, the scholarly articles served a dual purpose: to offer a theoretical framework for understanding the practical applications and implications of ChatGPT and to compare real-world usage of ChatGPT with ideal or best-case scenarios posited by academia.

The research highlighted the gaps between potential and actual usage by weaving together these diverse data sources. It pinpointed the exact areas of opportunity and challenge for ChatGPT's wider adoption in educational settings.

5. Chat GPT and education

5.1. Artificial Intelligence in education (AIEd)

AI tech has advanced significantly over the past decade, leading to the emergence of ChatGPT. AIEd presents a unique opportunity to revolutionize the way we teach and learn. The advancements in AI-powered education has the potential to transform the educational experience, engaging students in new and innovative ways (Jürgen et al., 2023).

The community focused on Artificial Intelligence in Education (AIEd) is increasingly delving into the effects of AI platforms on virtual learning. Roll and Wylie's (2016) study advocates for greater AI integration in interactions between educators and students and educational activities beyond the classroom. Popenici and Kerr (2017) also investigated the impact of AI systems on learning and teaching. They found potential conflicts between students and instructors, such as privacy concerns, changes in power structures, and excessive control. Manyika et al. (2017) emphasize that teachers who focus on improving students' affective intelligence, creativity, and communication skills will remain valuable in the future. Artificial intelligence can enhance education at all levels by providing personalization despite the belief that quality education requires active human participation (Grosz and Stone, 2018).

All these studies collectively underscore the urgent need for further research to identify and address the challenges and limitations that could inhibit AI systems from reaching their full educational potential.

5.2. The use of ChatGPT in education

The use of ChatGPT in education has brought about new challenges and risks despite its widespread use. One primary concern is the potential for AI-powered cheating, as it enables students to submit written assignments and exams that are not their work and can even provide tailored responses to specific questions (Lo, 2023).

As an AI-powered assistant, ChatGPT excels at catering to various academic requirements. It can proficiently provide exam-style answers, assist in homework tasks, create scholarly essays, and even autonomously craft complex contracts. However, the tasks it performs go beyond mere information processing. They require a highly sought-after skill known as "creative intelligence". ChatGPT is not just a tool for automating tasks but a pioneering system that blends automation with creative thinking to deliver exceptional results. Since its launch on November 30, 2022, ChatGPT users have increased by over a million in just one week (Mollman, 2022). According to Deng and Lin (2022), ChatGPT is a significant language model (LLM) that can generate responses that fit the context and carry on a conversation that sounds natural.

The use of AI in education has vast potential. It can provide personalized learning experiences and adaptive teaching methods. As society increasingly digitizes, AI's importance grows. It automates tasks, analyses vast amounts of data, and offers insights applicable across many fields.

5.3. Benefits of using ChatGPT in education

Now that ChatGPT's place within the AI education framework is established, its potential impact on teaching and learning in the future should be considered. It is essential to examine the potential benefits and challenges that ChatGPT may bring for educators, decision-makers, and academic researchers.

- **Accessibility**

Chat GPT offers 24/7 accessibility. Students and teachers can delve into educational content at any time of the day or night, from any location, promoting independent study and review beyond the classroom.

- **Versatility**

One of the standout features of ChatGPT is its versatility, making it applicable in various academic settings, from elementary classrooms to higher education. It can be used for different types of academic work, such as quizzes, essays, and complex research papers. ChatGPT is a multi-faceted educational tool that can meet various teaching and learning needs.

- **Instant feedback**

Students and teachers can receive immediate responses and guidance, which can be invaluable for learning and improvement.

- **Enhancing pedagogical practice**

Atlas (2023) notes that ChatGPT is capable of more than just assisting teachers with quizzes, exams, and course outlines - it also enables them to create lesson plans, presentations, and assess student assignments.

- **Learning assessment**

Kasneci et al. (2023) highlight that the tool can also evaluate various types of written assignments, such as research papers or essays, and provide critical insights into students' strengths and weaknesses. In short, ChatGPT presents an efficient and innovative approach to educational evaluation. By utilizing its capabilities, teachers can focus on more impactful activities like lesson planning, professional development, and individual student mentoring, which are essential for improving student learning outcomes (Sok and Heng, 2023).

- **Enhanced personalization**

Unlike traditional educational resources that offer a standard approach, ChatGPT can customize learning experiences to align with each student's unique needs. Algorithms assess a student's performance, strengths, and weaknesses, enabling the tool to provide targeted exercises to improve specific skills. Additionally, real-time feedback guides students through their learning journey.

Although the benefits mentioned are impressive, they only scratch the surface of the many advantages ChatGPT can bring to the world of education. These advantages are highly recommended in academic settings because they offer many benefits that positively impact teachers and learners. ChatGPT can help simplify administrative tasks while enhancing the learning experience, making it a powerful tool that can transform modern education.

In a pilot study, Zhai (2022) tasked ChatGPT with drafting an academic paper and found the resulting document coherent, partially accurate, informative, and systematically organized. Zhai suggests that educators should pivot their focus towards enhancing students' creative and analytical abilities by incorporating AI-powered tasks that engage learners in addressing real-world challenges.

In short, incorporating ChatGPT into educational environments provides numerous benefits that significantly improve the teaching and learning experience. With its capability to provide customized and individualized learning and its efficiency in automating repetitive tasks, ChatGPT is an invaluable resource for contemporary education. Its interactive features and accessibility round the clock help increase student involvement, while its data-driven insights allow informed curriculum planning. Its versatility ensures its applicability across various educational needs and challenges. As a result, ChatGPT offers an empowering, inclusive, and cost-effective approach to education that promises better results for teachers and students.

6. Conclusions

Artificial Intelligence (AI) has become an active force for change in education. It encourages educators and learners to reconsider traditional methods of gaining knowledge. By utilizing intelligent algorithms and data analysis, educational institutions can better customize educational material, offering students a more personalized learning experience.

AI-powered tools can assist teachers in identifying gaps in their teaching methods or individual student performance, making it easier to address specific needs and elevate the overall learning experience. Educational platforms using AI can even adjust in real-time to student responses, offering additional exercises or adjusting difficulty levels as needed.

Moreover, administrative tasks that typically take up educators' time can be automated, allowing teachers to spend more time with their students. Attendance, grading, and even initial rounds of essay assessments can be done through AI, making processes more efficient and accurate.

AI's influence extends beyond the classroom door, reshaping educational research, academic planning, and even school management. From automating library services to predictive analytics for student success rates, AI is providing new insights and efficiencies.

Education is experiencing the profound effects of AI, which will lead to more personalized, efficient, and expansive learning opportunities.

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