



A Paradigm Shift in the field of Education with chatGPT: A review

Anterpreet Kaur Bedi^{1*}, Gagandeep Kaur¹, Ruchika Lamba¹ and Manpreet Singh²

¹Department of Electrical and Instrumentation Engineering
Thapar Institute of Engineering and Technology, Patiala, India

²Department of Civil Engineering
Thapar Institute of Engineering and Technology, Patiala, India

Email: anterpreet.bedi@thapar.edu

doi: 10.48047/ecb/2023.12.si4.1178

Abstract: A new writing tool, ChatGPT, introduced in November 2022, has recently gained enormous attention. ChatGPT is a strong AI text generator tool utilized in the development of conversation AI applications, such as chatbots, where it can generate responses similar to the ones coming from an actual human. Earlier, Google search engine was supporting the research and knowledge enhancement by providing various resources to the learner. Human cognition was important while extracting the fruitful information from these resources. A paradigm shift in the year of 2022 is witnessed due to ChatGPT applications, utilization and resource sharing in every field of human life, i.e., not only education industry, but also from day to day life to various food, travel, tour, medical industries, etc. In due course of time, a tremendous change in human perception will be witnessed. Presently, within 5 months of ChatGPT, three important factors have come up: convenience, time saving and ChatGPT's expertise in every field, which has proved chatbot to be the next most demanding robot. This paper aims to review this powerful language generation model in the current education scenario. It aims to discuss how AI model has affected the human thought process and reduced the human efforts.

Keywords: chatGPT, Generative Pre-Training Transformer, Artificial Intelligence, cognitive intelligence, education

1. Introduction

Artificial Intelligence (AI) is a powerful fast growing tool that focuses on creating smart and intelligent machines that can act and think like humans. AI systems are capable of learning from their surrounding environments so as to make decisions based on the data they receive. With the advancements in AI technology, it is now being used in different fields of applications, such as medical treatments, automation industries, education sector,

* Corresponding author. We acknowledge the support and suggestions from

etc. A new large-scale language tool developed by open AI is ChatGPT, introduced on November 30, 2022, so as to simulate human-like conversations. ChatGPT is the latest and the most impressive freely available, artificially intelligent chatbot yet. It is a Natural Language Processing (NLP) tool, modelled on a Generative Pre-trained Transformer (GPT), that was trained using the vast amount of textual data available on the internet (Deng and Lin 2022). It works by generating responses in a chatbot by mimicking natural human language by understanding the context of a conversation.

In a period of less than one year, ChatGPT has already transformed the way humans interact with technology. It has successfully shown its potential in revolutionizing every field of human life, including education system. Compared to the traditional search engines, such as Google or Yahoo, where results can be overwhelming, ChatGPT attempts to give a unique user experience with the help of its conversational interface. For the students to survive in the current jobs market, both locally and globally, it has now become inevitable for them to gain skills to exploit the AI technology perfectly (Ng, et al. 2022). Where earlier students used Google search engine for a given task, a paradigm shift to ChatGPT is now being observed. Where Google offers multiple options to choose from for the search results, along with the complete source of information, ChatGPT provides a summarized answer with no further exploration choice to the user. Moreover, it is limited to information up to the year 2021, thus limiting its accuracy. This might result in an incomplete research in future, which is usually not recommended not only in the education sector, but in every field of human life. Seen from different perspectives, ChatGPT can be both a boon or a bane, depending on its usage intensity by students, as well as teachers in running the current education scenario.

The remaining sections of the paper are organised as follows: Section 2 shows how ChatGPT has been a gift to the education sector. Section 3 describes how the same technology has also affected the education society in a negative manner. The review of how ChatGPT has led to a rapid shift in the field of education is concluded in Section 4.

2. ChatGPT: A boon to the education system

Although there have been a number of different AI systems and chatbots throughout the years, such as Bard by Google, none of them has been as powerful tool as ChatGPT, owing to its user-friendly interface (Anders 2023), (Adamopoulou and Moussiades 2020). Its effectiveness and flexibility has lent itself to various applications in the field of education. ChatGPT is more than a search engine. It is able to combine numerous sources of information using its NLP model, so as to understand teacher/ student queries and result in executable actions that are reformed into an answer suitable for teachers/ students. In a period of less than a year, it has become a study partner for the students. Especially for an introvert student, who finds it difficult to ask questions to his/ her teacher, ChatGPT has become a solution. In fact, education is progressing with rapid advancements in technology, and AI such as ChatGPT can play several helpful roles.

Students have started using ChatGPT for learning a new subject or while studying for an exam. ChatGPT can provide them with study materials, quizzes, practice questions etc. so as to understand complex ideas. It can help by creating scenarios that can be used in the

classroom to help practice and assess. Its ability to generate translations, explanation and summaries are being used by the students to make complex learning easier (Catherine, et al. 2022). Further, it is capable of writing original works of facts or fiction. Students are exploiting its potential to write out complete essays, where it can even include reference sections, if needed. Not only essays, it can be used to compose writings in any format, such as syllabi, poems, song lyrics, movie scripts and much more (Transformer, Thunström and Steingrímsson 2022). ChatGPT can further help students by giving feedback on the text that they have written. This feedback has the ability to surpass that offered by Grammarly, thus serving as a teaching assistant that can either be used directly by the students before their submissions, or even by teachers while evaluating them. Such innovations have led to a sharp shift in the way students are gaining knowledge in the current scenario. ChatGPT is not only being used by school students for their assignments and homeworks, rather it is being used by students in every fields of education. Medical students have started using the ChatGPT's ability of effective language translation to help communicate with the patients belonging to different linguistic backgrounds (Khan, et al. 2023). Engineering students are using this AI technology for its guidance while building practical technical assignments as well. The ability of ChatGPT to be able to create and debug computer codes in multiple languages, such as C++, HTML, Java and many more is being exploited by the students to improve the efficiency of their work.

Not only at the school or graduation level, this new technology has also led to a paradigm shift in the way research is carried on. It can help the scholars in conducting a relevant scientific literature related to their research question or hypothesis by providing a summary of the existing research. Research scholars are making use of ChatGPT to help them in writing research articles, in addition to their own expertise and knowledge. Further, it can edit as well as proofread the paper for grammar and other errors. It can also support dissemination of new research ideas by creating advanced and better metadata, indexing and summaries of research findings (Lund and Wang 2023). ChatGPT, if used responsibly, can also help authors in various ways. By composing the descriptions of findings and structuring a paper based on the formatting styles of relevant journals, it can help in saving time and expenses. In a similar manner, ChatGPT can also be used in revising imperfect English in manuscripts so as to achieve publications in high quality journals (Jiao, et al. 2023).

ChatGPT is not only being used by students, but it is also being included in classrooms by educators as well. Instructors have started using this technology in content creation, such as designing multiple versions of tests, creating student learning assignments, syllabi, rubrics and more. In addition, it can also assist as an assignment checker. This promptness while evaluating the assignments can help the instructors in guiding the students to use their skills more in the preliminary stage so as to complete it perfectly, with complete understanding (Anders 2023). ChatGPT can be leveraged for creating new teaching approaches, and help them in promoting experiential learning (Mhlanga 2023).

3. ChatGPT: A bane to the education system

Owing to its ease of use, capability to virtually answer any type of question asked, as well as its capability of content creation, ChatGPT has become a major new disruptive

technology, and is being considered as the next Google or a revolution for the Internet (Haque, et al. 2022). Even though ChatGPT is being considered as a powerful tool in the field of education, however, it comes with a lot of limitations. Since the technology is created using the text knowledge available on the Internet, as of December 2022, the model is limited to the information up to 2021, thus making it a language limited model (Anders 2023). This questions the accuracy and unbiasedness of the technology. Since the model is designed based on the human-generated data, there are high chances that it may learn biases existing in the data, resulting in biased and inaccurate solutions. Thus, like any other statistical model, ChatGPT can create works with errors, and hence should be used as an assisting tool rather than a final answer.

While ChatGPT provides information to students by carrying out conversations, however, it has profoundly impacted them in different ways. Owing to its limited knowledge, ChatGPT can only know what it has been taught. As a result, it might be unable to deliver a thorough understanding of a subject, which can otherwise be provided by educators with their traditional and vast experiences. In fact, with the advent of this technology available to students at their fingertips, the room for their creativity has been adversely affected. The technology has led the students to stop thinking and creating something of their own. The new trend of typing the query, and copy-pasting the solution to complete a given task has resulting in students losing interests in learning independently, thus leading to a sharp decline in human intelligence.

However, even though it is being widely accepted by the students, ChatGPT, being an AI model, does not exhibit emotional intelligence, empathy, or interpersonal skills like teachers do. Rather, it is just a tool that is incapable of developing teacher-student relationship, which is of prime importance for providing good education (Alam 2022). As a result, the ultimate goal of cultivating interpersonal ties and relationships which can only be established by teachers has started seeing a setback. As a result, the influence of ChatGPT on the future of education has become a huge concern, with thinking skills being the prime victim.

4. Conclusions

In essence, it can be said that ChatGPT has both positive as well as negative impact on the education system. Where on one side, it can help students, as well as educationist in creating personalized learning content, automate repetitive tasks, and also provide on-demand access to educational resources, on the other hand, it has greatly reduced critical thinking capability of the humans. Another major impact has been witnessed with the advent of this technology: lack of human interaction, especially in students. A decline in social skills, especially of the students in the current generation, is clearly visible which can further hamper their overall personality. There has been a sharp dip in the teacher student relationship building as well.

The field of education is always shifting and rapidly developing. As such, the ever-evolving demands of the students can only be accommodated by human educators, who can contribute new concepts and strategies into their teaching techniques by adjusting their approaches to serve the demands of the students. Just like any other new technology, it is

essential for the students as well as teachers to exploit ChatGPT in a manner that can maximize its benefit, while minimizing its drawbacks. An effective and judicial use of the technology is a must. One must remember that the ultimate goal has to be enhancement in the educational experience for students, without replacing the inevitable role of human interaction and critical thinking in the learning process.

References

- Adamopoulou, Eleni, and Lefteris Moussiades. 2020. "An overview of chatbot technology." *Artificial Intelligence Applications and Innovations: 16th IFIP WG 12.5 International Conference, AIAI 2020, Neos Marmaras, Greece, June 5–7*. Springer International Publishing, 373-383.
- Alam, Ashraf. 2022. "Cloud-Based E-learning: Scaffolding the Environment for Adaptive E-learning Ecosystem Based on Cloud Computing Infrastructure." *In Computer Communication, Networking and IoT: Proceedings of 5th ICICC 2021*. Singapore: Springer Nature Singapore. 1-9.
- Anders, Brent A. 2023. "Why ChatGPT is such a big deal for education." *C2C Digital Magazine* 1 (18): 4.
- Catherine, Gao CA, Frederick M. Howard, Nikolay S. Markov, Emma C. Dyer, Siddhi Ramesh, Yuan Luo, and Alexander T. Pearson. 2022. "Comparing scientific abstracts generated by ChatGPT to original abstracts using an artificial intelligence output detector, plagiarism detector, and blinded human reviewers." *bioRxiv*.
- Deng, Jianyang, and Yijia Lin. 2022. "The Benefits and Challenges of ChatGPT: An Overview." *Frontiers in Computing and Intelligent Systems* 2 (2): 81-83.
- Haque, Mubin UI, Isuru Dharmadasa, Zarrin Tasnim Sworna, Roshan Namal Rajapakse, and Hussain Ahmad. 2022. "I think this is the most disruptive technology": Exploring Sentiments of ChatGPT Early Adopters using Twitter Data." *arXiv preprint arXiv:2212.05856*.
- Jiao, Wenxiang, Wenxuan Wang, Jen-tse Huang, Xing Wang, and Zhaopeng Tu. 2023. "Is ChatGPT a good translator? A preliminary study." *arXiv preprint arXiv:2301.08745*.
- Khan, Rehan Ahmed, Masood Jawaid, Aymen Rehan Khan, and Madiha Sajjad. 2023. "ChatGPT-Reshaping medical education and clinical management." *Pakistan Journal of Medical Sciences* 39 (2): 605-607.
- Lund, Brady D., and Ting Wang. 2023. "Chatting about ChatGPT: how may AI and GPT impact academia and libraries?" *Library Hi Tech News*.
- Mhlanga, David. 2023. "Open AI in education, the responsible and ethical use of ChatGPT towards lifelong learning." *Education, the Responsible and Ethical Use of ChatGPT Towards Lifelong Learning*.
- Ng, Davy Tsz Kit, Jac KL Leung, Maggie Jiahong Su, Iris Heug Yu Yim, Maggie Shen Qiao, and Samuel Kai Wah Chu. 2022. "AI Literacy for All." *AI Literacy in K-16 Classrooms*. Springer International Publishing, 21-29.

Transformer, GGP, Almira Osmanovic Thunström, and Steinn Steingrimsson. 2022. "Can GPT-3 write an academic paper on itself, with minimal human input?" *HAL Open Science*.