Chapter 1

A State-of-the-Art Review on the Implications of ChatGPT in Educational Practices and Research

Sonal Linda

Department of Computer Science, Aryabhatta College, University of Delhi, India

ABSTRACT

Chat generative pre-trained transformer (ChatGPT) has brought a great revolution in the education system. The evolution of ChatGPT is from an artificial intelligence (AI) chatbot based on natural language processing (NLP) model, reinforcement learning, and deep learning algorithms that are responsible for enhancing its capabilities of learning educational goals to help learners and educators. The incorporation of ChatGPT in education may involve some limitations, challenges, opportunities, and threats. In this chapter, the authors analyze the potential capabilities of ChatGPT in education associated with some risks. Further, they discuss opportunities and threats raised due to integration of ChatGPT in the education system. The goal of this study is to provide valuable recommendations in educational practices and reforms for policy making while ensuring ethical use of ChatGPT.

1. INTRODUCTION

In modern society, education plays a vital role in nurturing individuals who possess the skills to adapt to future advancements, shaping their lives, careers, thoughts, and emotions. The establishment of educational objectives is grounded in societal

requirements, necessitating anticipation and preparation for the needs of future citizens (Zhai, 2023). Recently, ChatGPT launched by OpenAI has become viral in social media platform (Do, 2020) because of its conversational way to interact with people. ChatGPT is an AI chatbot that can answer questions, follow-up previous chats, admit its mistakes, accept the challenges in odd premises, and handle inappropriate requests intelligently (Fergus et al., 2023; Zhang, Zhang, Li, Qiao, Zheng, Dam, & Hong, 2023). It has potential to impact our various aspects of life including healthcare, transportation, and education (Hosseini et al., 2023; Shahriar & Hayawi, 2023; Singh & Singh, 2023). Particularly in education, it may empower students as well as teachers to foster their AI literacy by answering students' query, providing virtual tutors, and capturing personalized learning experiences (Su & Yang, 2023; Zhai, 2023). There is variety of interesting usage of ChatGPT in education, such as, writing essays and short stories, debugging, and generating computer programming codes, summarizing an article, drafting comparative analysis, creating assignments and quizzes, designing charts and graphs, etc. (Baidoo-Anu & Owusu Ansah, 2023; Shoufan, 2023). However, Educators realized that students in schools can use it to cheat whereas professors observed that academicians can improve their programming and writing skills in research (Hosseini et al., 2023). Therefore, it depends on the students either he/she choose to cheat or get motivated to learn. Teachers can also use it as a learning tool to boost his/her confidence in classroom by organizing healthy discussion on complex problems generated by ChatGPT. Moreover, teacher can compare student's writing with ChatGPT writing in terms of grammar, vocabulary, and sentence structure. Students can also submit his/her writeup to ChatGPT and ask for feedback and innovative ideas. Thus, it may help to enhance the teaching learning process in an interactive way by collecting personalized feedback from the students and maintain previous conversations.

Over a few months, millions of people are using ChatGPT without knowing how does it work. In fact, the idea and technology behind ChatGPT is not new. ChatGPT is the latest version of GPT-3.5 and fine-tuned of the similar language model InstructGPT (Rahman & Watanobe, 2023). GPT-3.5 is the updated version of GPT-3 which is called a family of large language models (Aydın & Karaarslan, 2023; Fezari & Ali-Al-Dahoud, n.d.; Leike, 2023). ChatGPT utilizes both supervised and unsupervised machine learning algorithms. It collects images, text, voice recordings, computer code, structured and unstructured data from the users' chat, comments, emails, and abundance of social media information flooded over the web. It uses deep learning methods to recognize voice and images by analyzing and producing text. Further, it uses AI based natural language processing model for sentiment analysis by translating and summarizing text (Haleem et al., 2022).

The performance of ChatGPT varied across subject domains. For example, it may excellent for economics, satisfactory for computer science and unsatisfactory

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