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Exploring the Cognitive Dynamics of Artificial Intelligence in the Post-COVID-19 and Learning 3.0 Era: A Case Study of ChatGPT

Lingfei Luan, Xi Lin, Yan Dai, Shu Hu, Qianlu Sun

Abstract: The emergence of ChatGPT, an AI system designed for conversation by OpenAI, has prompted conversations about its transformative possibilities in multiple fields, primarily in education. This study conducts an in-depth investigation into the emotional and cognitive factors contributing to the popularity of ChatGPT and its influence on the shift towards a technology-driven, student-centered educational paradigm known as Learning 3.0. This study examines how ChatGPT accomplishes functional needs through human-AI interaction, such as effective task performance and social and emotional demands. This is achieved by integrating theories like the Computers Are Social Actors (CASA) paradigm, Relationships Motivation Theory, and Technology Acceptance Model (TAM). The study claims that personal AI trainers like ChatGPT could reinforce self-regulated learning strategies, responding to an increasing need for remote education due to the COVID-19 pandemic. This paper establishes ChatGPT as a personification of the concepts of 3.0 learning, which center on advancing abilities, customization, and customization using technological advancement to create study experiences suited to the student's needs. While acknowledging limitations in the concept and the need to produce statistical facts through research, the researchers underline its potential for transforming education systems and enhancing human understanding. In addition, this paper brings up important ethical issues that must be considered for generative AI technologies to be widely used in education and academia. Educators must choose how to achieve an appropriate balance: leveraging technology to enhance learning while safeguarding the students they teach from potential risks.

Keywords: Artificial Intelligence (AI), ChatGPT, Learning 3.0, Online Education, COVID-19, Self-Regulated Learning, Human-Computer Interaction, Technology Acceptance, Educational Technology, Generative AI

Highlights

What is already known about this topic:

- Conversational AI systems like chatbots are increasingly used in education, but their implications are not fully understood.
- Self-regulated online learning became increasingly important during the COVID-19 pandemic.
- Concepts like Learning 3.0 describe a shift towards skills-based, personalized education enabled by technology.

What this paper contributes:

- Analysis of ChatGPT's psychological appeal in terms of emotional needs and technology acceptance model.
- Discussion of ChatGPT's potential to transform online education towards the Learning 3.0 paradigm.
- Perspective on AI advances enabling co-evolution between human capabilities and education systems.

Implications for theory, practice and/or policy:

- Advances understanding of human-AI interaction and effects on learning.
- Informs educators on effectively leveraging AI for customized student support.
- Suggests proactively designing education policy and systems around emerging technologies like ChatGPT.
- Raises need to study the impacts of AI on human cognition and the labor market.

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Introduction

The rise of AI systems such as ChatGPT has prompted extensive discussions and debates worldwide in many areas, particularly in education. ChatGPT, an AI developed by OpenAI, is a conversational AI based on the GPT-3 language model with a massive 175 billion parameters to process (Brown et al., 2020; Floridi & Chiriatti, 2020). The utilization of a word-driven dialogue system offers assistance in cross-domain problem resolution and the generation of content to answer users' inquiries. Within one week of its introduction to the public, one million consumers had signed up for the platform (Haque et al., 2022). This has spurred a discussion over the implications of ChatGPT in various fields, including education. Some educators claim that the emergence of such technology renders conventional online exams outmoded and raises worries over the eventual automation of the teaching profession (Cotton, 2023; King & ChatGPT, 2023; Kung et al., 2022; Pavlik, 2023). In contrast, some argue that ChatGPT has the potential to improve students' adaptability to changing educational needs and develop independent learning practices, which also assist instructors in providing customized training plans (FIRAT, 2022; Qadir, 2022; Zhai, 2022). The considerable interest received by this chatbot necessitates more research into the psychological underpinning of its use and its possible influence on the evolution of educational paradigms. The discourse around AI's incorporation into the education sector and its role in molding the education of future generations includes not just talks of technology developments but also considerations of the human experience and the behavioral consequences of technological change.

Literature

The rapid advancements in artificial intelligence (AI) have ushered in a new era of technological innovation, significantly impacting social interactions, education, and the workforce (Akbulut et al., 2023; Lin, 2023; Luan et al., 2023). At the forefront of this transformation is ChatGPT, a groundbreaking development in natural language processing that promises to redefine human preferences in social needs (Bozkurt, 2023a). Simultaneously, the COVID-19 pandemic has catalyzed an unparalleled transition toward online education, bringing both difficulties and possibilities for learners and instructors (Luan et al., 2024). This transition coincides with the emergence of the Learning 3.0 era, where AI tools like ChatGPT are increasingly integrated into educational settings, sparking a debate on the balance between technological advancements and human evolution in learning. This literature review aims to explore these interconnected themes, delving into the transformative potential of ChatGPT, the impact of the pandemic on online education, and the broader implications for society and the future of learning.

ChatGPT as the New Force to Reshape Humans' Preferences in Social Needs

The Computers Are Social Actors (CASA) paradigm claims that the relationship between people and computers is one of social interaction rather than tool use. This concept suggests that computers, similar to human social actors, possess the power to influence and modify human behavior and social interactions (Reeves & Nass, 1996). Contrary to the conventional view of computers as passive tools, this approach views computers as active participants in human relationships. Lee et al. (2006) indicate that people subconsciously adopt the behavioral standards governing human relationships in their interactions with machines. Their argument implies that people consider computers to be social actors and respond to them similarly to how they would behave to other human actors. Forsyth (2010) extends this perspective by pointing out that interpersonal interaction can serve as either task- or social-oriented communication goals. The social-oriented goal focuses on sustaining social connections and interactions, whereas task-oriented behavior focuses on accomplishing a specific task with an optimized approach.

Interpersonal interaction may approach human-machine interaction differently depending on the communication objectivity and orientation; for example, some may emphasize connection orientation and focus on human self-esteem and well-being, while others may favor functional orientation and

optimize the action plan to complete a specific task. In effect, Forsyth's (2010) argument implies that interpersonal exchange contains a distinguishing two systems, including fundamental goals, relationship cohesion, efficacy, relationship satisfaction, and even other implements such as patient care provided in healthcare settings (Myers et al., 1999). The argument shows that the method by which humans interact with computers may vary depending on context or relationship type. It is essential to investigate human-computer interactions by examining multiple systems. With the introduction of ChatGPT, this differentiation between the two independent systems has been totally eliminated. ChatGPT is a generative AI solution with both functional and social features, satisfying the demands of individuals who wish to get answers fast and functioning as an optimal assistant to provide personalized and interactive support.

First, ChatGPT preserves the AI-powered chatbot design's functionality but creates appropriate answer patterns depending on user input, making online text communication more natural and intuitive (OpenAI, 2023). While the controversy persists over whether utilizing ChatGPT to write an essay or assignment accounts for plagiarism, it cannot be denied that ChatGPT uses the strength of the natural language training model to satisfy the demands of most domains. Students may use ChatGPT for multiple purposes, such as requesting information on certain topics, summarizing articles, providing writing revisions, establishing a logical core connection, or outlining a paper via multiple questions. This model represents the epitome of generative AI by delivering individualized and interactive assistance to meet each user's requirements and preferences. Real-time feedback and personalized assistance can empower users to make more rapid and effective adjustments, facilitating job completion and performance. Second, the integration characteristics of ChatGPT offer users a more flexible and straightforward search channel than traditional searching. Users do not need to search several large databases or platforms to locate relevant information. Instead, they simply provide ChatGPT with precise directions during conversations, such as looking for measurements of protein molecules in academic databases and listing the relevant articles. This strategy enhances the utilization of open educational resources (FIRAT, 2022). According to the learning materials and resources to give individualized guidance, ChatGPT can comprehensively satisfy the demands of users and users to seek the answer to deliver the optimal solution. Based on customized guidance supplied by learning materials and resources, ChatGPT cannot only fulfill the demands of users in all aspects but also provide solutions for users seeking answers. As a result, ChatGPT has advanced functional characteristics in human-computer interaction.

Second, ChatGPT redefines the role and function of social robots in human-social interaction, addressing people's emotional requirements to develop a feeling of autonomy and anti-anxiety in the post-COVID-19 period. Following Forsyth's concept of distinct human-machine systems, artificial intelligence has historically developed two distinct products: functional AI, which aims to enhance efficiency in task performance, such as domestic chores (Reiser et al., 2013), and companion robots, which fulfill emotional needs for companionship, such as Nanny robots. Social robots, on the other hand, are designed to promote humans' well-being and provide companionship (Kanamori et al., 2002). Individuals have a more positive attitude toward functional robots built for home duties since they can boost workers' productivity, as evidenced by empirical study (Dautenhahn, 2005; Kim et al., 2021). Kim and colleagues (2021) conducted a study to explore humans' attitudes toward two types of AI (Functional and Social). Participants were given two three-minute video clips, one labeled "functional" and the other "social," introducing an AI character, Samantha. The purpose of the study was to assess the views of participants about AI, with a focus on the differences between those who viewed the "functional" video and those who viewed the "social" film. Compared to the "social" group, participants in the "functional" group had a more positive attitude toward AI, as demonstrated by the study's findings. It is important to note, however, that the study did not seek to determine whether the participants had experienced or interacted with different types of AI in the past; consequently, the results can only be interpreted as a preference for the content of the two AI videos, rather than an experience with AI. In addition, the study's

analysis of the experiment is confined to the preference of the two groups of subjects for the content of the two AI movies. It cannot provide insight into the participants' experience with AI.

Based on the Relationships Motivation Theory, autonomy and motivation are essential aspects of human development and advancement (Deci et al., 2014). Specifically, Individuals seek autonomy to satisfy their physiological, security, emotional, dignity, and self-actualization needs (Maslow, 1943). ChatGPT, being an AI system, has the capability to fulfill emotional, dignity, and self-actualization needs. This is accomplished partly through ChatGPT's round-the-clock and immediate service, allowing for personalized user engagements. Answering users' inquiries individually can promote a feeling of social camaraderie and care. In addition, the content of these interactions remains private, allowing users to feel appreciated and valued without fear of the conversation being criticized or exposed. In addition, the customized content of ChatGPT can assist users in swiftly locating answers to problems, enhancing their productivity and performance and contributing to a greater sense of dignity. Self-actualization is the highest degree of human need. ChatGPT can give a vast array of intelligent assistance to make individuals feel more productive and purposeful in their jobs, fostering feelings of self-worth. For example, students may receive good grades for writing papers, brainstorming, and being guided by ChatGPT, and programmers could receive rewards for optimizing code using ChatGPT.

The Influence of COVID-19 on Online Education

The shift towards remote instruction in higher education institutions, as a result of the COVID-19 pandemic, has led to a significant increase in the use of online learning and the number of students enrolled in online courses (Azorín, 2020; Luan et al., 2023; Luan et al., 2024; Reshi, 2023). Allen and Seaman (2010, 2013) reported a consecutive seven-year growth in student online enrollment, with a 21% growth rate and a 32% participation rate of college students in at least one online course. Despite the potential benefits of online learning, such as increased autonomy and flexibility, students often face various challenges, particularly regarding self-regulation and independence when studying online (Cho et al., 2010). Self-regulated learning is a concept that refers to the self-directed processes and self-perceptions that enable learners to utilize their cognitive abilities and achieve academic success effectively (Zimmerman, 2008). The theory of self-regulated learning, developed by Albert Bandura in his social-cognitive learning theory, posits that human functioning is a dynamic interaction between personal, behavioral, and environmental factors, referred to as triadic reciprocity (Bandura, 1986). Specifically, personal factors include individual self-efficacy, goal orientation, and metacognition; environmental factors include instruction, peer learning, and help-seeking in an online learning context; and behavioral factors focus on learning performance (Schraw et al., 2006). Researchers have emphasized that self-regulated learning, as an active and constructive process, involves goal orientation, self-efficacy, self-control, motivation, cognitive strategies, and metacognitive self-regulation (Pintrich & Zusho, 2002). As a result, self-regulated learners tend to be self-motivated, use metacognitive learning strategies frequently, and exhibit high academic performance (Zimmerman & Martinez-Pons, 1986).

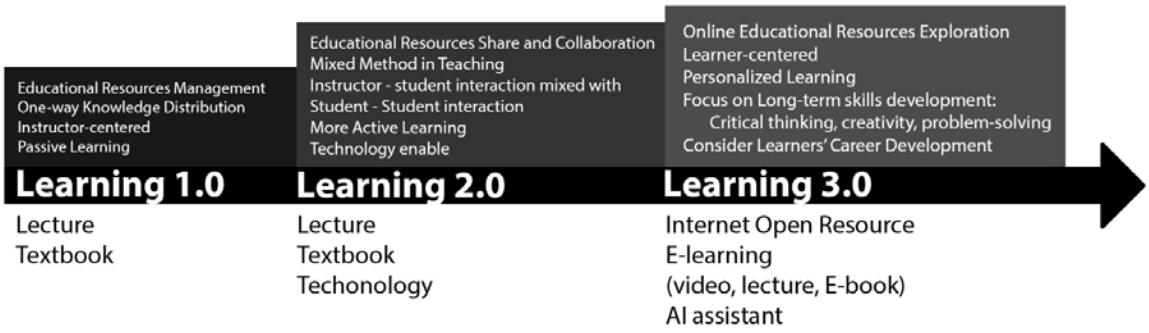
Additionally, self-regulated learning involves the ongoing adjustment of cognitive processes and activities to align with the specific learning context (García & Pintrich, 1991). Zimmerman and Schunk (2001) further noted that self-regulation depends on the context of learning. In the case of online learning, the lack of real-time interaction with instructors and physical distance from school resources can create academic and emotional challenges for students (Bowers & Kumar, 2015). However, online learning environments offer students greater autonomy, and they are expected to be independent and self-regulated to maintain cognitive engagement and motivation (McMahon & Oliver, 2001). Virtual AI mentoring has been suggested to address these challenges to support student learning (Carter et al., 2020). A study by Siemens (2013) found that AI coaching tools have the potential to help learners effectively use self-regulated learning strategies and detect when they need assistance. Additionally, AI tutoring systems have been used since 1997 and have played a crucial role in online learning. Hwang

and colleagues' review of AI-supported online learning stated that the combination of intelligent tutoring systems and distance learning began in 1997. With the advancement of AI algorithms, AI tutoring systems have improved learner-system interactions to promote personalized, adaptive, and collaborative learning (Hwang et al., 2022).

ChatGPT in Learning 3.0 Era: Definition, Implications, and the Debate on Technological vs Human Evolution

The term "Learning 3.0" was introduced by Maria Langworthy (Langworthy & Hirsch-Allen, 2022). It describes a new trend in learning and education, which encompasses transitioning from traditional teacher-centered learning to more student-centered with the assistance of technology. Learning 3.0 emphasizes critical thinking, creativity, and problem-solving while Learning 1.0 emphasizes memorization and the acquisition of facts and information. Learning 2.0 is transitioning to a technology-enabled and student-centered approach focusing on knowledge application and skills like collaboration, communication, and problem-solving. The comparison of the three learning eras is shown in Figure 1. The core elements of Learning 3.0 include skills-based education and verification for career mobility, data-driven personalized education for career development, decentralized education with micro-learning and quality assessment, and revenue from the skills-focused education model (Langworthy & Hirsch-Allen, 2022). From the core elements of Learning 3.0, it is clear that the education system is adapting to social development needs, as the emphasis has shifted from obtaining degrees to building human and technological systems and catering to the requirements of a rapidly evolving work and life. Creativity, communication, adaptability, self-awareness, autonomy, critical thinking, and teamwork are at the heart of Learning 3.0's emphasis on long-lasting abilities for the next generation. Namely, the objective of Learning 3.0 is to create a customized and flexible learning and working system, which may be everlasting (Roslansky, 2021). Javaid and colleagues (2023) highlighted the potential of large language models like ChatGPT in facilitating personalized and adaptive learning experiences known as Learning 3.0. Although technological capabilities and shifts in social demands have influenced the educational sphere, the establishment of AI and large language models exemplified by ChatGPT symbolize a significant move towards Learning 3.0. (Luan et al. 2023). However, the active involvement of educators, policymakers, and stakeholders will be crucial for shaping and actualizing this shift (Bozkurt, 2023a; Lin & Schmidt, 2023).

Figure 1. The Development of Learning and Their Core Components



With the expansion of Internet technology, particularly after COVID-19, online education has flourished, and Internet technology has grown inseparable from learners. Both students and instructors are faced with a daunting task: interacting with the Internet's massive volume of information and selecting the finest information (Dai et al., 2023). These obstacles impact not just teaching methods but also learning methods and the effectiveness of learning. When students can discover answers to simple queries in a few seconds through ChatGPT, the conventional one-way approach for disseminating educational information is outdated (Luan et al., 2023). The Learning 3.0 abilities of adaptability, autonomy, collaboration, and communication are expressed in the Q&A between users and ChatGPT. Similarly,

the core concept of Learning 3.0 is to be student-centered and to deliver individualized educational objectives. When users interact with ChatGPT, they are the subjects of the interaction for learning, information acquisition, and problem-solving. The solution-driven interaction promotes the users' learning autonomy and enhances their adaptability to collaborative learning. It also encourages students to seek the best answers to their questions and delve deeply into their knowledge. AI now embodies the dual attributes of friend and helper; it demonstrates its capability as a natural language-based information exchange, generating service for users, and as a 24-hour partner willing to answer any queries at any time. This may be the primary reason why ChatGPT obtained a considerable number of users quickly, breaching the constraints of traditional AI design and presenting itself to the market as a convergent product.

If we consider the transmission and exchange of educational resources as the construction and operation of an information system, then Learning 3.0's innovation is to switch the traditional one-way information dissemination (teachers-centered) to comprehensive knowledge discovery and interaction (student-centered). The induction of ChatGPT provides the approaches and ability for users to navigate through the transition. According to Davis' technology acceptance model (TAM), another reason for ChatGPT's quick adoption is that it offers two criteria for tool awareness: perceived usefulness (PU) and perceived ease of use (PEU) (Davis, 1985). There is no doubt that ChatGPT users will increase their job and study efficiency, save their time, and improve their performance and quality, all of which are emphasized by TAM as advantageous. With ChatGPT's straightforward question-and-answer structure, users do not need to acquire particular skills to obtain the necessary information. This energy-saving consumption strategy reflects TAM's user-friendliness. Yang and Yoo (2004) found that cognitive attitudes alter the influence of PU and PEU on information system usage. In this case, the attitudes of users and educators toward new technologies and innovations will significantly impact the promotion of Learning 3.0 and the role of ChatGPT inside the educational system. In conclusion, it is not so much that the educational system changes with the times as new technology and the enhancement of people's cognitive awareness produce new instruments that encourage the evolution of the educational system.

Conclusion

The outbreak of COVID-19 has had a significant influence on human development, particularly education. In the post-pademic age, instructors and students face uncertainties in the teaching and learning process and employment pressure. Under the combined constraints of education and employment, educators and students must reevaluate current educational approaches and outcomes, as well as students' future career development. As a companion and task-accomplishing AI, ChatGPT opens up a new world of learning for users by providing them with rapid, efficient, and individualized assistance and support. From Q&A with ChatGPT, one can quickly obtain an appropriate solution or crucial information and thereby gain the motivation to eliminate anxiety caused by uncertainty in learning while enhancing interest and self-exploration to achieve psychological satisfaction and peace. Furthermore, this customized exploration enables students who are self-directed and focused on their future development to gain access to more helpful learning resources. In addition to its versatility in aiding students with various tasks, generative AI, including ChatGPT, has significantly impacted education (Bozkurt, 2023b). It offers advantages such as research assistance, automated grading, improved human-computer interaction, simplified enrollment, enhanced student services, improved teaching, research support, and increased student retention. However, it also raises concerns about cheating, misinformation, bias, abuse, privacy breaches, job displacement, digital literacy gap, AI-induced anxiety, plagiarism (Akinlar et al., 2023), reduced human interaction, and accessibility issues (Bozkurt, 2023a). These dualities underscore the need to carefully consider the ethical and practical implications of integrating generative AI into educational settings.

Various research papers emphasize that generative AI has the potential to transform education, as seen through the main ideas, arguments, and conclusions of those papers (Bozkurt, 2023a; Luan et al., 2024).

They emphasize the general transformative capacity of generative AI in education, including enhancing social and cognitive learning processes, expanding academic capabilities, and augmenting educational experiences through human-AI interaction and AI-supportive systems (Bao & Li, 2023; Guo & Wang, 2024; Li et al., 2023). However, scholars also note the ethical implications and concerns, some of which include AI literacy and emotional intelligence, as well as concerns about the impact of generative AI on teaching, learning, and human-AI interaction (Bozkurt, 2023b).

This paper has a broad aim: to clarify and underpin the developmental process and the psychology of ChatGPT while considering AI and ChatGPT from the perspective of education and offering all education leaders a clear understanding of the importance of taking the whole generative AI technology into education, including, not only the actual application of the technology itself but also the negative and positive aspects of the implementation, discussing how to take in this technology from a broader view, offering the educational landscape at present and sometime soon enough its different tendency and significant change. The educators' responses to the evolving landscape of generative AI in education must be balanced because the tools of this sort of technology are imminent. The potential it offers to the students and learners is immense, but the use of it is delicate.

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About the Author(s)

- Lingfei Luan (Corresponding author); lluan@bgsu.edu; Belmont University, USA, https://orcid.org/0000-0002-8574-6578
- Xi Lin; linxi18@ecu.edu; East Carolina University, USA, https://orcid.org/0000-0003-2387-4117
- Yan Dai; yzd0038@auburn.edu; Auburn University, USA, https://orcid.org/0000-0003-1170-7776
- Shu Hu; shu13@gsu.edu; Georgia State University, USA, https://orcid.org/0000-0001-7268-901X
- Qianlu Sun; qianlu.sun@slu.edu; Saint Louis University, USA, https://orcid.org/0009-0002-9906-8162

'Author's Contributions (CRediT)

Lingfei Luan: Conceptualization, Writing – original draft, Writing – review & editing; Xi Lin: Writing – review & editing; Yan Dai: Writing –review & editing Writing; Shu Hu: Writing –review & editing. Qianlu Sun: Writing - review & editing.

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