

The Impact of ChatGPT on the Transformation of Traditional Education from the Perspective of Constructivism

Yumo Han*

School of Biological Engineering, Tianjin University of Science and Technology, Tianjin, China

*Corresponding author: hym22206117@mail.tust.edu.cn

Abstract. Technological products with artificial intelligence, such as ChatGPT, have revolutionized today's education and spurred many debates on how to modify traditional teaching methods to a more modern approach. Since technology-facilitated learning has gained popularity recently, it is worthwhile to investigate the effects of AI products – particularly ChatGPT – on educators and learners as well as a number of instructional issues. This paper, which adopts a constructivist viewpoint, begins by elaborating on the instructional activities that involve both teachers and students. It then addresses the effects on each group of educators from two angles: the ways in which ChatGPT is influencing traditional education and the ways in which it is accelerating its reform. This study concludes that ChatGPT can help students learn and compensate for the shortcomings in educators' instruction. However, there are also problems with ChatGPT's instructional activities, such as a loss in students' initiative in learning and a danger to teachers' authority. This study offers a reference for future research on the use of constructivism and the transition from dualism to trialism in education and teaching.

Keywords: ChatGPT; constructivism; technology-facilitated learning; AI+ Education.

1. Introduction

In recent times, China has been accelerating the modernization and reform of education. It has also been promoting the integration of big data, artificial intelligence, the Internet, and the real economy, as well as the digitalization and intelligence of industry [1]. Big data, artificial intelligence, and other technologies are gradually permeating many industries as a result of the advancement of Internet technology, changing human productivity and way of life [1]. According to the Ministry of Education's "Education Informatization 2.0 Action Plan", creative research smart education demonstration should be carried out on the basis of emerging technologies like artificial intelligence, big data, and the Internet of Things, supported by various intelligent devices and the Internet. This will help to support the reconstruction of teaching methods supported by new technologies [1]. Use ChatGPT as an example, ChatGPT was created by OpenAI using natural language processing technology. With the help of this chatbot, users can converse with it more organically and intelligently [2]. ChatGPT's main purpose is to create chatbot responses using pre-trained language models [2]. These models are able to provide increasingly accurate and human-like responses by learning from vast amounts of textual data [2]. Due to its potential to revolutionize instruction and education, ChatGPT has experienced rapid growth and has garnered significant attention from academics and researchers in the field of education [3].

However, ChatGPT's quick development has two sides. On the one hand, ChatGPT can enable students and increase their effectiveness in the classroom. However, because it is so widely used, learners' subjective initiative will be diminished, causing them to rely more and more on its "convenience" over time. However, by utilizing ChatGPT's increased knowledge capacity, more varied ways of expressing knowledge, more focused transmission of knowledge, etc., it can also assist educators in fostering innovative teaching practices. On the other hand, heavy reliance on ChatGPT could undermine educators' authority [4]. Accordingly, this paper makes an effort to examine ChatGPT's impact on the reform of conventional teaching and education from a constructivist standpoint [3].

2. Literature Review

The constructivist theory of learning was expanded upon in light of psychologist Jean Piaget's observations regarding children's cognitive development. Constructivism is a novel theory of learning that gives learning new meaning. According to the constructivist theory, teachers are the primary educators, and students are the subjects of their education. Constructivism emphasizes student construction of knowledge within a specific environment, assisted by peers or teachers, and via the use of interactive learning tools. The father of constructivism, Jean Piaget, proposed the terms accommodation and assimilation to characterize this process of reciprocal creation. Assimilation refers to the process of incorporating information from external inputs into an individual's initial cognitive structure. When the original cognitive structure is unable to digest the information supplied by the new environment, hue refers to the recombination and alteration of individual cognitive structures [4]. Constructivism serves as the theoretical foundation for education and learning, which is why it is frequently applied in the context of teaching and educational reform. An interactive strategy model for online design education was developed by Enguo Cao and his colleagues [4]. It was founded on the idea of constructivist learning in four dimensions: context, cooperation, dialogue, and meaning. In contrast to conventional teaching theories, constructivism offers an alternative explanation for why student learning—rather than teacher instruction—is the primary element influencing how students construct their knowledge systems during the learning process. Constructivism has led to new educational enlightenment and has its own distinct interpretation of information, teaching, students, teachers, and other aspects of understanding [5].

As a new technology, ChatGPT assists students outside of the classroom in addition to instructors and other peers. It will support students' knowledge growth just like constructivists demonstrated. For example, ChatGPT can offer immediate feedback when learning a language. In order to help students comprehend and master material in other areas, ChatGPT can offer solutions to situational queries. This allows students to learn even when their teacher is not present. Studies have indicated that ChatGPT increases students' enthusiasm for learning. Many studies have currently examined ChatGPT's potential in AI+ education; however, few have examined ChatGPT's function in the learning process from a constructivist standpoint. For this reason, this study will carry out additional analysis and research from this angle.

3. ChatGPT in Reforming Traditional Education

3.1. Impact on Teachers

The benefits of ChatGPT in general education put teachers' authority in the classroom in jeopardy [6]. Teachers tend to have more knowledge about the subjects they teach, so their answers to surgical questions in the teaching field may not be as comprehensive as those provided by ChatGPT, which uses a 100 billion regional network, a 100 billion large model, and a database function in knowledge production [6]. ChatGPT can provide comprehensive answers to questions raised by students.

When ChatGPT is used excessively, it might undermine the function that teachers play in the classroom by causing students to become sidetracked and think that ChatGPT will handle their after-school assignments [3]. When it comes to information instruction, ChatGPT's knowledge is more fluid and open-ended than teachers' fixed time- and space-based methods of imparting knowledge [5]. Students might no longer be able to rely solely on the teacher's incessant classroom instruction while they study and explore knowledge [6]. With ChatGPT, learning and knowledge production will be transformed, empowering students to believe that technology can be their companion rather than their teachers [6].

Constructivism, on the other hand, maintains that pupils accept and create new knowledge based on firsthand experience through their own understanding rather than accepting new information straight from teachers. Thus, it is important to incorporate students' prior knowledge and experiences into instruction. Before instructing, teachers must comprehend and fully grasp the prior knowledge and

experiences of their students. They must also do an excellent job of analyzing the learning environment and creating lesson plans that not only prepare students but also the textbooks and lesson standards. This perspective aligns well with the teachings of Confucius, who taught students according to aptitude, and Socrates' midwifery. Different students can receive different responses. In reality, the goal of the information acquisition process is to assist pupils in continuously growing and creating on the foundation of their current cognitive abilities [5]. Because ChatGPT is heavily reliant on text, it can assist teachers in general, but teachers also need to be aware of individual distinctions, something that ChatGPT is unable to achieve at this time.

Constructivism prioritizes student-centered learning yet gives teachers' roles more weight. In conventional education, a teacher's job is no longer to indoctrinate pupils or impart knowledge; instead, they should act as mentors and facilitators who help them build a support system and engage in self-construction. Teachers now work with students as partners in discussions, learning, and creation rather than as intellectual authorities. For numerous educators, this is an issue, and despite having more significant duties, it is challenging to work. The emphasis of teachers' work is now on a specific and unique person, how to guide diverse pupils, and how to accurately grasp the current knowledge system of students, rather than just books and teaching aids. Teachers can use ChatGPT to aid students in creating good scaffolding based on the present system's development [5].

3.2. Impact on Students

ChatGPT has had the most impact on students' learning in terms of education, and this has generated a lot of interest and spirited debate among people from all walks of life [7]. Early in January 2023, New York City became the first city to outlaw ChatGPT in the New York Public School System. There is a growing concern that ChatGPT can negatively affect kids. [7] Students who utilize ChatGPT frequently run the risk of developing a dependency of sorts. Students are prone to becoming infatuated with its role, especially if they use it frequently to help them finish study assignments and get better scores [3]. There is precedent for the development of indolent behavior and the reliance on intelligent instruments [3]. For instance, there have been prior reports of students using assignment search engines to the detriment of their academic achievement. Students' subjective initiative and inventiveness will be diminished if they rely too heavily on Internet resources [3]. This contradicts the constructivism philosophy. Constructivism places a strong emphasis on students taking the initiative to learn on their own, independent of teachers' guidance or even the use of clever tools. For instance, every question the teacher poses in class has a proper response, and the teacher is aware of it. As a result, pupils' ingenuity is restricted to replicating existing solutions. Even more so are ChatGPT and other artificial intelligence tools and software; they take pictures to look up questions and then automatically copy the answers into their own learning assignments without any thought.

However, there are certain benefits to ChatGPT-facilitated learning as well. The help provided by ChatGPT may pique the interest of certain students in particular content. According to the constructivist perspective on education, children acquire information by more than just passively listening to their teachers. In order to actively construct themselves, students are instead expected to learn on the preexisting knowledge framework. Through ongoing inquiry and comprehension of persons, they have encountered the alternating process of balance, imbalance, balance, and imbalance. From this angle, students can be somewhat motivated and given the opportunity to achieve the creation of self-knowledge by using ChatGPT as a learning aid.

4. ChatGPT in Reforming Traditional Education

4.1. Positive Influence on Teachers' Teaching

Teachers face a challenge in using technological tools in the increasingly popular artificial intelligence of today, with ChatGPT serving as a prime example of a large language model. However, by fully utilizing ChatGPT's artificial intelligence technology, teachers can greatly increase the efficiency of their instruction. Studies already conducted have demonstrated that ChatGPT can

generate original teaching materials based on educators' learning objectives to support them in creating unique and engaging lessons. It can also generate a variety of suitable teaching designs to give educators inspiration and options for lesson planning [8]. Teachers can therefore more nimbly modify their teaching strategies to give students individualized education and pay closer attention to how their students are learning.

Constructivists think it is unproductive to just teach kids without taking into account what they already know. In a constructivist classroom, the emphasis switches from the teacher to the students, claim Brooks and Brooks [9]. They emphasize that the outdated notion of the teacher as the "expert" imparting knowledge to obedient students is no longer appropriate. Rather, students are encouraged to actively participate in the learning process in a constructivist classroom [9]. With ChatGPT, educators can use artificial intelligence to act as a mediator and offer assistance and direction.

4.2. Positive Impact on Students' Learning

For students, learning is a vital and significant activity, and ChatGPT, an intelligent learning companion, offers them specialized help and direction for learning [10]. It can instantly respond to any question posed by students based on the issues that are present in the classroom and offer advice and recommendations for their development. Students can clear up uncertainty, get the knowledge and information they need, and accelerate their learning through conversation and communication with ChatGPT [10]. tailored learning path: Students can select a more suitable learning path based on criteria like interest and capacity for tailored development, thanks to ChatGPT's personalized recommendation and learning analysis [11]. This strategy aligns with the idea advanced by constructivism. Students are encouraged to contribute their own viewpoints to the learning process by constructivism. Student-centered activities serve to affirm and reinforce these ideas. Students are able to create their own knowledge of subjects and have autonomy over their learning in this way [9].

5. Conclusion

With the help of ChatGPT technology, education is going through a significant and all-encompassing transformation. The use of new educational models and technology offers teachers fresh ideas for designing a classroom environment while also giving students access to more flexible, customized, and diverse learning experiences. It should be highlighted, nevertheless, that while ChatGPT technology performs admirably when handling huge data and automation, it is still constrained in its ability to foster original thought. As a result, educators should focus on helping students develop their capacity for creative thought, encourage them to overcome the constraints of technology and foster their innovative skills. Along with using ChatGPT as an after-school study tool, students should concentrate on their in-class learning. The dualism-to-trialism schooling paradigm has gained more and more traction. The term "trialism" refers to the addition of artificial intelligence, such as ChatGPT, on the basis of teachers and students in order to support teachers in teaching and aid in students' learning. Future research could focus on the use of constructivism and the education and teaching style of the dualism-to-trialism shift.

References

- [1] Xi L. Research on Open Education Teaching Reform driven by big data and artificial intelligence technology. *Journal of Guangxi Radio and Television University*, 2022, 33(06): 33-35.
- [2] Yu H., Zhang W. Thinking about the reform of education and teaching based on ChatGPT technology. *Continuing Education Research*, 2023, 5: 33-39
- [3] Wang Y., Wang D., Liang W., Liu C. "Aladdin Magic Lamp" or "Pandora's Box": The potential and risk of ChatGPT education application. *Modern Distance Education Research*, 2023, 35(02): 48-56.
- [4] Zheng J., Liu S., Feng D., Cao L. Application of open online courses in blended teaching mode from the perspective of constructivism. *Theoretical Research and Practice of Innovation and Entrepreneurship*, 2023, 6(23): 139-142.
- [5] Li N. Research on the Flipped Classroom Teaching Model of "pedagogy" from the perspective of Constructivism theory. *Science Advisory (Education Research)*, 2023, 11: 117-119.

- [6] Ding Y., Lyu H. When teachers meet ChatGPT: challenges and responses. *Contemporary Education Forum*, 2024, 1-9.
- [7] Jiang L. AI-driven Education reform: The impact and prospect of ChatGPT/GPT. *Journal of East China Normal University (Educational Science Edition)*, 2023, 41(07): 143-150.
- [8] Lu Y., Yu J., Chen P., Li M. Applications and prospects of Generative Artificial Intelligence in education: A case study of ChatGPT system. *Distance Education in China*, 2023, 43(04): 24-31+51.
- [9] Atteh E. Exploring the effect of constructivist learning approach on pre-service teachers problem-solving skills in mathematics at Wiawso College of Education. *Asian Research Journal of Arts & Social Sciences*, 2022, 18(4): 174-185.
- [10] Tao Y., Zhou Y. ChatGPT's Discussion on the reform in the field of Education. *Journal of Shazhou Polytechnic College*, 2023, 4: 32-35.
- [11] Shen S. The Impact and development of generative artificial intelligence on education. *Chinese Character Culture*. 2023, 22: 175-177.