The Practical Study of the Collaborative Teaching Mode of "AI-teacher" in the 5G Era

Yingquan Wang[1], Peng Han[1*], Lili Shi[1]

[1]Department of digital media art, Art College of Qingdao Huanghai University, West Coast New Area, Qingdao, Shandong, China
*Corresponding author. Email:544253480@qq.com

ABSTRACT

With the entering of 5g era, the practice form of "AI+ teacher" collaborative teaching formed by the co-existence of artificial intelligence and teachers will provide new opportunities for efficient teaching and personalized education. There are four forms of "AI agent+teacher", "AI assistant+teacher", "AI tutor+ teacher" and "AI partner+teacher". These four forms are not separated from each other, but cooperate with each other and serve teaching together. In the future, the practice form of "AI+teachers" collaborative teaching will make efforts to achieve educational transformation and break through technical barriers.

Keywords: Artificial intelligence, AI+teacher, Collaborative teaching, Practice form

1. INTRODUCTION

Intelligence according to intelligence. Based on this, embedding artificial intelligence technology into the different elements of teaching produces four creative and incremental intelligent forms: AI agent, AI assistant, AI tutor and AI partner. Among them, "AI agent and teacher" realized the division of teaching tasks, "AI Assistants and Teachers " realized the auxiliary synergy of teaching activities, "AI Tutors and Teachers" realized the appropriate synergy of teaching methods, and "AI Partners and Teachers" realized the interactive coordination of teaching subjects. In the four practical forms, AI and teachers should do their part, give full play to their respective advantages, assume corresponding job responsibilities, and work together to achieve efficient teaching and personalized teaching education.

2. "AI AGENT + TEACHER": DIVISION AND COORDINATION OF TEACHING TASKS

The teaching task includes not only the teaching of basic knowledge, but also the cultivation of basic ability.[1] Therefore, teachers are required not only to be competent for the mechanical repetitive teaching work represented by knowledge teaching, homework correction and score statistics, but also to undertake the creative teaching work represented by ability improvement, teaching design and emotional communication. With the human society entering the era of intelligence, it is expected to reconstruct the proportion of teaching task allocation through the embedding of AI agent, so as to make teaching more efficient and personalized. In the rapid development stage of knowledge and information, teachers inevitably expose disadvantages when undertaking teaching tasks: on the one hand, teachers' existing knowledge base can no longer meet the needs of teaching, and teachers need to constantly update and expand the original knowledge, which challenges the retrieval and memory of knowledge; on the other hand, due to the limitation of computing power and time and energy, teachers are dealing with problems Such as homework assignment and correction, student information collection and management of trivial work, often lead to low efficiency, high error rate of work results, so that the teaching work presents a certain degree of fuzziness and instability.[2]

AI agents use computational intelligence to "cognitive outsourcing" of teachers' computing information, which provides a way to make up for the above shortcomings. Specifically, AI agent relies on data-driven computing intelligence, which can collect and update the existing knowledge base in real time, so that teachers can access knowledge in time during teaching, and reduce the difficulty of teachers' retrieval and memory. In addition, AI agent processes data according to the designed and trained rules, and iteratively solves large-scale work to

help teachers deal with tedious low-level work.[3] At the same time, it can achieve high efficiency and low error rate, avoid the fluctuation of emotion, and finally complete the teaching task stably.

Similar AI agents include interactive books in the United States and "correcting network" in China. Specifically, interactive Books can help students practice oral English through simple word guidance, and automatically record the reading audio to students' pronunciation for evaluation and scoring, so as to help students read and understand English accurately and emotionally; and the "correction network" is to automatically correct students' simple errors in English or Chinese writing, and quickly correct the basis of composition through sentence by sentence comments And provide suggestions for modification. Both interactive books and "marking network" undertake the tedious grading and correcting work of teachers, while teachers mainly undertake the highly creative teaching work, such as completing the design of complex teaching activities and cultivating their complete personality by using the special emotional ties with students. In this way, according to the respective advantages of AI agents and teachers, different teaching tasks are assigned to carry out division of labor and cooperation, which can not only ensure the quality and efficiency of teaching, but also realize efficient teaching; high accuracy student information can be used as the source of data analysis to lay the foundation for personalized education.

3. "AI ASSISTANT + TEACHER": ASSISTANT COOPERATION OF TEACHING ACTIVITIES

There is a "subject object subject" communication process in teaching activities, that is, teachers need to use language, text, equipment and other object media to promote students' physical and mental development. Under the wave of education globalization, the traditional media in the past have exposed some limitations. They can no longer meet the students' thirst for multicultural knowledge. The lag and singleness of traditional media greatly limit the space of knowledge change. In addition, as the main body of teachers also exposed some defects. [4]It is difficult to recognize complex and changeable information. The development of the Internet provides a channel of information exchange and dissemination for the globalization of education, breaks the information barrier between countries and regions, and greatly expands the learning space of teachers and students, but also inevitably brings challenges to teachers' speech transcription and text recognition.

In this regard, AI assistant can use cognitive intelligence to "cognitive outsourcing" teachers' perceptual information to provide and identify cutting-edge educational information, and act as a multi-functional instrument to assist teachers to complete

teaching activities. Specifically, AI assistant can sensitively perceive and recognize the language of different countries and regions, and transcribe the latest education information into digital text that can be recognized by teachers and students. This not only injects fresh blood into the traditional paper media, makes it have a certain foresight, but also helps teachers break through the obstacles of information recognition. On the basis of AI, the students can recognize their emotional changes clearly, and report their emotional changes on the basis of speech and emotion control.

4. "AI TUTOR + TEACHER": APPROPRIATE COORDINATION OF TEACHING METHODS

The essence of teaching method mainly depends on two aspects: Students' learning cognitive activities and teachers' logical procedure and psychology of teaching. It is determined by both learning method and teaching method. In the process of teaching, how teachers should teach depends on how students learn.[5] Therefore, students' learning style plays a leading role. To a certain extent, it determines teachers' teaching methods, and then determines the selection of teaching methods.

First of all, it is necessary to clarify the students' learning style. In the past, it mainly relied on Teachers' individual experience and subjective perception to analyze students' cognitive and behavioral patterns, and then to judge students' learning styles. The accuracy of the results is low and unstable. Secondly, teachers' teaching methods should be determined. Teachers need to make correct choices according to different teaching situations, different times, local conditions, learning science and the law of teaching development, which undoubtedly challenges teachers' ability to control complex situations. In order to solve these problems, AI tutors should be used to outsource teachers' cognitive information. Because AI tutor is an intelligent form produced by AI agent and AI assistant at a certain stage of development, it not only has low-level computational intelligence and perceptual intelligence, but also has high-level cognitive intelligence.[6] In the face of more creative challenges, it can compete with human super teachers to carry out teaching work independently.

Secondly, because AI tutor has computational intelligence and perceptual intelligence, it can accurately and stably perceive and calculate the various needs of students in any situation on the basis of large-scale collection, mining, calculation and reasoning of students' individual cognitive and behavioral data, and analyze students' cognitive and behavioral patterns with the help of a huge knowledge base, so as to clarify students' learning style; on the other hand, the AI tutor can make use of the huge knowledge base to analyze students' cognitive and behavioral patterns Yu Ai tutor has cognitive intelligence. It can learn the teacher's mode of

dealing with problems in complex teaching situations by setting good rules and massive data, and obtain the subjective cognitive ability and creativity comparable to that of super grade teachers. Then it can determine the teaching methods, and select appropriate teaching methods combined with students' learning methods, so as to achieve the goal of guiding students' personalized learning.

Finally, under the collaborative teaching mode of "Ai tutor + teacher", the complete teaching process is no longer the "one-man play" of teachers, but the "double play" of AI tutors and teachers. As the chief director and commander in chief, teachers are responsible for completing highly creative teaching design and guidance, while AI tutors are the main implementers of teaching activities, which solves the problems of insufficient number of teachers and uneven professional level among regions to a certain extent.

5. "AI PARTNER + TEACHER": INTERACTION AND COOPERATION OF TEACHING SUBJECTS

The traditional teaching subject mainly refers to teachers and students, and their social interaction is the focus of teaching activities. The interaction between teachers and students is not only conducive to the deep exchange, accumulation and sublimation of knowledge, but also conducive to promoting their own development. When human society has entered the era of strong artificial intelligence or super artificial intelligence, some intelligent machines or devices will also have subjectivity and become independent individuals with independent consciousness. [7]They can participate in the social interaction between teachers and students, and form a multiple interaction structure of "learning community" with teachers and students to promote each other's development.

With the continuous progress of society and the continuous generation of knowledge and information, the education goal puts more emphasis on the personalized development of students, which exposes some disadvantages in the past social interaction between teachers and students. [8]On the one hand, the individual limitations of teachers are difficult to meet the personalized needs of a large number of students, and it is difficult to provide adaptive learning support for them; on the other hand, due to their own knowledge and emotional disadvantages, teachers are difficult to achieve mutual promotion and co evolution with students. Therefore, using AI partners to "cognitive outsourcing" teachers' social information, so that AI partners and teachers and students form a "learning community" structure, to narrow the gap between educational goals and educational reality, has a certain reality and inevitability.

In the multiple interaction structure of "learning community", AI partners and teachers are real promoters, and they are also individuals with equal thinking, emotion and ability. AI partners have the same intelligence and creativity as teachers, and their working forms include collaborative lesson preparation teachers, listening and evaluating teachers, educational experiment subjects and so on.For example, auto tutor, project debugger robot and Rubi children's social robot are all budding AI partners.

For example, Auto Tutor is an intelligent learning guidance system based on natural language. It can use natural language to talk with students on the basis of simulating teacher's teaching, give timely feedback to students' answers, and timely adjust the dialogue content according to students' understanding of problems, which is conducive to students' analysis and understanding of knowledge. The customized dialogue between auto tutor and students based on natural language undoubtedly lays the foundation for efficient teaching. Because of the ability of data-driven long writing and speech, long paragraph listening and understanding, and modeling ability of simulating human dilemma, the robot can interact with students in debate, create attractive and unbiased views, and then help teachers make correct decisions.

In a word, the multiple interaction structure of "learning community" formed by teachers and students is the collaborative teaching form of "Ai partner + teacher", which increases the interaction objects of teaching subjects, makes the teaching transition from interpersonal cooperation to human-computer cooperation in the true sense, and realizes the co evolution of multi-agent.

6. CONCLUSION

With the entering of 5g era, the practice form of "AI+teacher" collaborative teaching formed by the co-existence of artificial intelligence and teachers will provide new opportunities for efficient teaching and personalized education. Because the "defects" of teachers themselves cannot meet the needs of the times, a new teaching form of "human technology" is formed. The practice forms of "AI+teacher" collaborative teaching can be divided into "AI agent+teacher", "AI assistant+teacher", "AI tutor+teacher" and "AI partner +teacher" according to the level of synergy. These four forms are not separated from each other, but cooperate with each other and serve the teaching together. In order to bridge the gap between the theory and practice of teaching, we should try our best to make a breakthrough.

ACKNOWLEDGMENTS

rch on collaborative Teaching Mode of "AI+ Teacher" in 5G Era (hhxyjg2028).

REFERENCES

[1] Carl Benedikt Frey a, Michael A. Osborne b The Future of Employment:How Susceptible are Jobs to Computerisation?[J].Technological Forecasting and Social Change,2017,114:254-280. DOI：10.1016/j.techfore.2016.08.019

[2] R Clifford. The Status of Computer-Assisted Language Instruction[J]. Calico Journal,1987,4(4):9-16. DOI：10.1016/j.techfore.2016.08.019

[3] Yan Zhiming, Fu jialiu, Zhu Youliang, Duan Yuanmei. Ai-tpack: connotation, teaching practice and future issues [J]. Journal of distance education, 2020,38 (05): 23-34. DOI：10.15881/j.cnki.cn33-1304/g4.2020.05.003

[4] Q Wang,G Ding,S Yu . Crowdsourcing Mode-based Learning Activity Flow Approach to Promote Subject Ontology Generation and Evolution in Learning[J]. Interactive Learning Environments,2018(8):1-19. DOI：10.1080/10494820.2018.1509875

[5] Vodanovich S,Sundaram D,Myers M.Research Commentarydigital Natives and Ubiquitous Information Systems[J].Information Systems Research,2010,21(4):711-723.DOI：10.1287/isre.1100.0324

[6] Singh Singh P. Key Concepts and Network Architecture for 5G Mobile Technology[J]. International Journal of Scientific Research Engineering & Technology，2012,1(5): 165-170. DOI：10.1234/ijsret.org/pdf/sapana_singh

[7] Zhou Qin, Wen Xinyue. Practice form of "Ai + teacher" collaborative teaching in intelligent era [J]. Journal of distance education, 2020,38 (02): 37-45. DOI：10.15881/j.cnki.cn33-1304/g4.2020.02.004

[8] Feng Rui, sun Jiajing, sun Faqin. Ethical risks and rational choices in the application of artificial intelligence in Education [J]. Journal of distance education, 2020,38 (03): 47-54. DOI：10.15881/j.cnki.cn33-1304/g4.2020.03.005