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# Research on the New Mission and Development of College Teachers in the Era of Artificial Intelligence

**Qiuzhong Ou[a,*], Wen Huang[b]**

*Wuhan Business University, Wuhan, Hubei, China*
*[a]476014380@qq.com, [b]1176184893@qq.com*
**Corresponding author*

***Abstract:*** *This paper discusses whether robots can become teachers and the role development of teachers in the era of artificial intelligence. The core issue focuses on the controversy over the teacher identity of robots: from the perspective of functionalism, technological progress may enable robots to realize the function of teachers, but at the pedagogical epistemological level, the answer is no: teachers and students are "concrete people", and their subjectivity and teaching uncertainty cannot be reduced to a collection of functions. This paper clarifies the evolution of the concept of "dual teachers", and points out that teacher robots, as artifacts that simulate teachers' functions, are fundamentally different from human teachers: human teachers are the main body of education, undertaking the mission of knowledge transmission, student socialization and cultivating "new people of the times", and teaching is the complex practice of "cultivating specific people with specific people". Robots are only functional substitutes, lacking real subjectivity and humanistic spirit, and their "pseudo-subjectivity" cannot replace the ethical interaction and meaning guidance of human teachers. In the era of artificial intelligence, teachers shoulder a new mission: as education leaders, they need to adhere to the essence of "weak education" to ensure the generative and communicative nature of teaching, guiding students (learning creators) to think independently and use AI tools rationally. At the level of professional development, AI can expand the boundaries of teachers' capabilities, but it faces ethical challenges such as emotional dissonance and algorithmic bias, and it is necessary to build an integrated system of "evaluation, training, service, teaching and research, and supervision" to promote "human-machine co-teaching" through virtual and real training. It is found that artificial intelligence promotes the innovation of "human-machine collaboration" teaching, but the dominant position of human teachers is irreplaceable, and it is necessary to adhere to the humanistic core of education in technology empowerment and explore new paths for teachers' professional development.*

***Keywords:*** *Dual Teacher, Artificial Intelligence, College Teachers, Mission and Development*

## 1. Introduction

The development of technical means has enriched the process of teaching understanding and brought new teaching problems. The process of modernization of teaching methods has developed to electronic computer-assisted teaching, and from the general provision of audio and video means, storing and presenting information, and realizing automatic control, to the point of real "teaching" and 'human-machine' dialogue, so it is inevitable to raise a question: what impact it will have on the teaching understanding process[1]. Neither "computer-aided teaching" nor "robot-assisted teaching" has changed the structure of the basic elements within the teaching activities, while the "human-machine collaborative teaching activities" in which artificial intelligence robots deeply participate are the structural innovation of the internal elements of the teaching activities by technology. Some scholars have proposed that teachers in the intelligent era are an era of "dual teachers" composed of "human teachers and pilots"[2]. This leads to the core question to be explored in this study—Can robots become teachers? From a functionalist point of view, the answer is yes. Because as long as technology is advanced enough, robots will eventually be able to fulfill the role functions of all teachers. However, from the perspective of pedagogical epistemology, the answer is no. Students are the main body of teaching understanding, teachers are the main body of educational activities, and students and teachers are not just abstract roles, which cannot be dismembered into a collection of functions. Misunderstanding teachers as "teacher roles" hides the neglect of "teacher subjectivity" and "teaching uncertainty".

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## 2. Human Teachers and Teacher Robots

### *2.1 The new concept of "dual teacher"*

The concept of "dual teacher" has multiple connotations and evolution in the context of Chinese education, which first appeared in the field of vocational education. Teachers who have both theoretical teaching ability and practical operation ability are called dual teachers. However, the "dual teacher" in the "dual-teacher teaching" and "dual-teacher classroom", which belong to the field of electrification research, have large semantic differences, and it is easy to confuse their connotations and bring logical confusion. The origin of "dual-teacher teaching" is still in the field of vocational education, referring to the education and teaching activities of two teachers in one subject at the same time, which was more used in vocational education at first, and most of the courses were taught by "dual teachers" composed of school tutors and enterprise tutors, and then expanded to higher education and other practical subject teaching. "Dual-teacher teaching" has become a teaching mode that integrates and redistributes high-quality educational resources through Internet technology. At this time, "dual teacher" not only refers to "online teachers and offline teachers", but may also refer to "online teacher team and offline teacher team". But in any case, the teachers at this time are still the default "human teachers", and the "robot teachers" have not yet appeared.

The proposer of the "robot teacher" is Hiroshi Kobayashi, a professor at Tokyo University of Science in Japan, who designed a robot teacher called "Saya", which was included in Baidu Encyclopedia in July 2024. Teacher Robot (TR) can be both a physical robot or a virtual character in cyberspace, and is a generalized robot that can perform the functional duties of teachers in various application scenarios. Theoretically, a teacher robot is an artifact that simulates the intelligent behavior of teachers in real life to achieve their teaching function. In applications, teacher robots can directly participate in teaching practice or indirectly promote the teaching process, thereby improving educational performance[3]. There is a mixture of concepts in existing studies, which is closely related to the influence of the functionalist theory of teacher role.

### *2.2 The differences between human teachers and teacher robots*

"Teacher" is not the same as the functional concept of "teacher role", but a philosophical "human agent". The essence of teachers is the subject, while the essence of teacher robots is an artifact. Teacher robots are "substitutes" rather than "replacements" of human teachers, and teacher robots are robots, not teachers with independent subject status.

The irreplaceability of teachers as the subject of education is rooted in the essence of their social and historical practice as "concrete people", while teacher robots can only exist as functional substitutes. Educator Gu Mingyuan once proposed: "The greatness of Marx lies in the fact that he did not abstractly discuss the all-round development of man, but for the first time linked human development with the development of society and social production, and foresaw the inevitability of future development." Scholars call this anthropological position that discusses people not abstractly but concretely as the one of "concrete people". Different from the modern Western "abstract man", the "concrete man" takes Marx's historical dialectical materialism as the guiding ideology, which is a comprehensive and profound understanding of the nature of human reality. "Concrete people" are social people, historical people, cultural people, and practitioners[4]. Talents with such characteristics can become the main body of education and realize the true value of teaching activities.

Teaching activities need to be cultivated by "concrete people". If the contour clues of human cognition are compared to human bones, then these bones communicate with each other and rely on neurotransmitters, joint fascia-teaching. Although teaching does not discover and create new knowledge, it is an indispensable intermediary link in the process of human development and a stepping stone on the ladder of human development. Its function and value are twofold: to preserve and transmit existing knowledge, and to cultivate people who can inherit the past, discover and create new knowledge[5]. AS The Teacher Law of the People's Republic of China points out, teachers are professionals who assume the responsibility of teachers, with the purpose of cultivating better talents for the society, and they are also the carriers of the inheritance of national spirit and quality. Teachers not only convey the scientific and cultural knowledge accumulated by human beings to students, but also socialize students in the teaching process, so that they can become the main body of social and historical practice and the main body of education to inherit, discover and create new knowledge.

The culture contained in the teaching content is a spiritual treasure trove condensed and generated by

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the past human history, reflecting the free will and essential power of human beings. In the process of teaching, teachers need to pass on the existing human spiritual culture to students, and they also need to cultivate students into cultural newcomers who update the treasure house of human spirit. When students enter teaching activities, they are a "unfinished existence" in the cultural sense, and there is no predetermined "what a person is", nor is there a force outside of people to decide, which can only be confirmed through students' free and conscious subjective activities. Human development is always in change, and it is also a process of growth and learning; The biggest difference between man and living things is that man has obvious incompleteness[6]. The process of teaching "adults" is, in the ultimate sense, the clarification of the meaning of one's own life by the teaching subject. It not only pays attention to how much knowledge students can gain through teaching, but also pays attention to the extent to which students' subjectivity can be demonstrated and expanded, and shapes students into "new people of the times" in social and historical practice.

Teacher robots do not have the social, historical, cultural and practical nature of human subjects. Because the data resources are certain and have obvious engineering, the AI-driven model is relatively lacking in humanistic and spiritual resources, and the advanced nature of human beings cannot be replaced[7]. In the process of human-computer interaction, robot teachers can show a certain "subjectivity" by identifying moral standards, making behavioral decisions, and performing tasks, and become an entity between human subjects and ordinary things. However, this "subjectivity" is a functional imitation rather than a manifestation of conscious agency, self-consciousness and free will, and is a "pseudo-subjectivity" rather than a real subjectivity. Artificial intelligence is moral only from a computational point of view, and when ethics is reduced to a set of guidelines, teaching becomes rigid and rigid. The interaction between teacher robots and students is only in a functional sense, while the interaction between human teachers and students can be in an ethical sense.

## 3. The Mission and Development of Teachers in the New Era of Artificial Intelligence

### *3.1 The new mission of teachers in multi-dimensional education*

Teachers in the era of artificial intelligence should take on the new mission of being an educational leader and anchor the essence of education in the torrent of technology. Biesta once referred to weak education, that is, education should not be a perfectly running machine to match inputs and outputs, but should be a beautiful journey full of risks when people meet. The advantage of generative artificial intelligence is that it allows students to understand the world through abstract language and obtain "correct answers" through a high degree of abstraction of the real world, and big data models can make students' learning predictable and plannable, in other words, the work of teachers under the framework of strong education can be replaced by artificial intelligence. Accordingly, we need to return to the complex and unpredictable true nature of education as a communication and interaction, teachers should lead students to observe and explore various unknowns and challenges in the real world, so that communicativeness and generativity in education become the main line.

Teachers in the era of artificial intelligence should take on the new role of learning creators. In the 2023 UNESCO published "Guidelines for the Application of Generative Artificial Intelligence in Education and Research", mentioning that the key danger of artificial intelligence is that it "may weaken human agency", and when artificial intelligence can give "correct" answers to almost all questions instantaneously, students' active observation and subjective thinking about the world will also collapse, directly skipping the meaningful scenery along the learning process itself. And the beauty of learning that is always long overdue may be difficult for students to perceive. Accordingly, teachers should restore the contemplative nature of learning, create a rich and connected learning environment that includes mixed reality, natural participation and social interaction, guide students to see the world with a focused, persistent and calm gaze, maintain patience, respect and judgment in the dialogue of "human-AI-world-human", and have the courage to pursue multiple answers and independent thinking, so as to use artificial intelligence to support their own learning in a reasonable and restrained manner.

Therefore, we need to rethink the educational process and consider how AI can be used to improve education. For example, by asking students to review AI-generated text and consider whether the facts are correct and whether the arguments make sense, it can help improve students' critical thinking skills. Additionally, generative AI can be used to help students brainstorm ideas before they start writing. Teachers can ask generative AI questions such as "Are there any other perspectives on this topic?" or "What do you think differently about my suggestion?" These questions can be used to comment on an article and point out ways to improve. Teachers' fears and concerns about students cheating using these

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tools can be alleviated through a process-based approach to student assessment.

### *3.2 Professional development of teachers based on artificial intelligence*

#### *3.2.1 Expanding the boundaries of teachers' professional capabilities*

The practice of using artificial intelligence technology to promote teachers' professional development in our country has formed a systematic promotion path. In 2019, China launched the "Smart Education Demonstration Zone" project to apply information technology innovation to solve the pain points and difficulties of teaching and improve teachers' information teaching ability. Guangzhou has become the first batch of "National Smart Education Demonstration Zones", building a smart teacher training system of "online learning space and offline practice classroom" to support teachers to obtain targeted training on demand. The central Guizhou region uses the intelligent teaching and research platform to set up an inter-school lesson preparation group, and significantly improves the excellent rate of rural teachers' teaching design through intelligent optimization of lesson plans. In 2020, China began to use artificial intelligence technology to accurately provide teachers with teaching and research reports on teaching behavior and teaching quality, so as to achieve precise teaching reflection, precise teaching assistance, accurate teaching guidance, and accurate teacher portraits[8]. The role of teachers has been transformed into "lamplighters in the students' spiritual world" and "ferries in the knowledge world", guiding independent inquiry-based learning with AI assistance. Tsinghua University has developed a vertical model of disciplines and an AI teaching assistant system to realize intelligent Q&A and learning feedback, and promote the change of teaching paradigm. Although the promotion and application of artificial intelligence technology is still mainly piloted, it has shown a value proposition that is conducive to the professional development of teachers in terms of technical foundation, scenario application and personalized needs. Its internal logic is that on the basis of technology, artificial intelligence should provide teachers with massive data and reduce their workload, so that teachers can teach more scientifically. In terms of scenario application, artificial intelligence should ensure the process monitoring of teachers' professional development and expand the field of teachers' professional training, so as to achieve benign interaction between individuals and the environment. Combining the dual advantages of technical foundation and scenario application, teachers should rely on artificial intelligence to obtain personalized services that meet their own needs, showing the advantages of professional development based on artificial intelligence technology.

#### *3.2.2 Helping teachers' professional development face multiple practical constraints*

The ethical and security issues of artificial intelligence are becoming increasingly prominent, and the guarantee and supervision mechanism has just begun. At present, the protection and supervision mechanism for artificial intelligence in the field of education is not perfect, coupled with the bias of users' understanding and application of this technology, many ethical and security issues have been exposed. First, the problem of emotional dissonance. "Virtual teachers" based on artificial intelligence technology can answer students' academic problems and give students learning autonomy, but at the same time, it will cause students to form technology dependence or physical and mental addiction, which will weaken the emotional communication between teachers and students in the real world, aggravate the emotional shielding of teachers and students, and lead to the dissonance of the teacher-student relationship. The second is the problem of cognitive bias. Artificial intelligence tools still lack the autonomous awareness and ability to identify the authenticity of information, and their problems such as "algorithm bias" and "information cocoon" will lead to bias or discrimination in the knowledge they provide, resulting in biases in users' cognitive acquisition or strategy selection. The third is the issue of privacy leakage. Artificial intelligence technology can comprehensively and quickly store teachers' personal information, physical and mental state, growth process and evaluation files, and once the data system fails or is hacked, a large amount of user information will be leaked or even used for illegal activities. In July 2023, the Interim Measures for the Management of Generative Artificial Intelligence Services promulgated by the Cyberspace Administration of China and seven other departments require classified and hierarchical supervision of artificial intelligence services, which will provide guarantees for solving ethical and security issues caused by artificial intelligence applications by solving technical loopholes, improving service transparency, and maintaining personal privacy in the future.

#### *3.2.3 Empowering teachers' professional development through institutional innovation*

Artificial intelligence has brought new possibilities for teachers' professional development, and also put forward new requirements for teachers to deeply understand, participate in, and promote "human-machine co-teaching". In the future, teachers should not only take the initiative to solve their own

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problems in the level of intelligent application and professional development role positioning, but also participate in the construction of the school education system in the intelligent era, and actively respond to the overall concept and policy requirements of the country in artificial intelligence education. In order to effectively promote the professional development of teachers in the era of artificial intelligence, a teacher professional development system integrating "evaluation, training, service, teaching and research, and supervision" should be established under the support of artificial intelligence technology, covering the professional evaluation system, comprehensive training system, growth service system, intelligent teaching and research system, and education supervision system involved in teacher development, so as to systematically improve the actual effect of artificial intelligence in helping teachers' professional development.

It is necessary to build a comprehensive training system for teachers and enrich their growth support by combining virtual and real worlds. In order to solve the problem of regional imbalance in the teaching team, the top priority is to use artificial intelligence technology to break through the time and space limitations, establish a comprehensive training system for teachers with a larger number of participants and a wider coverage area, and create a teacher community grid in which different subjects cooperate and rely on each other in a combination of virtual and real worlds, and strive to enrich the professional growth support of teachers. Specifically, work can be carried out from the following three aspects: First, the existing teacher training system needs to be integrated. Educational departments concerned establish a trinity teacher training mechanism with overall government planning, university system design, and specific implementation of primary and secondary schools, rely on artificial intelligence technology to integrate the professional development data of teachers at all levels in different regions, and provide high-quality curriculum projects that meet the actual needs of teachers. Second, an integrated teacher community grid needs to be built. Based on artificial intelligence technology, educational departments concerned promote activities such as simulation teaching, online training, teacher-student mutual evaluation, and decision-making simulation, and enhance the connection between teachers and team cohesion by combining cloud communication and grassroots practice, forming a growth atmosphere of mutual help and common progress. Third, cross-domain teacher exchanges needs to be carried out. Educational departments concerned promote virtual training tools such as GPTeach into campuses, allowing teachers from different countries, schools, and organizations to learn, communicate and receive training together in the virtual world, and simulate differentiated teaching environments through artificial intelligence technology, helping teachers immerse themselves in the school environment of different cultural backgrounds and different economic levels, and allowing teachers to carry out simulated teaching practice in the face of different student groups simulated by intelligent systems. In the real world, teachers should be facilitated to interact offline. For example, mentor-apprentice pairing is carried out, and senior teachers provide teaching experience and theoretical guidance to novice teachers, so that novice teachers can help senior teachers master new technologies, forming complementary advantages between new and old teachers. By building a comprehensive teacher training system that combines virtual and real, artificial intelligence technology will be more widely accepted among teachers.

## 4. Conclusions

With the deep penetration of artificial intelligence technology in the field of education, the "human-machine collaboration" teaching mode does provide new ideas for educational reform, and the teaching assisted by intelligent machines is also known as the "dual-teacher classroom". However, whether robots can truly replace the role of teachers requires dialectical thinking from multiple dimensions. Throughout the application of science and technology in the field of education, artificial intelligence technology inherits the advantages of electronic technology and information technology to provide teachers with tools and methods, and on this basis, it has more profoundly shaken the professional role of teachers. In teaching epistemology, students are the main body of teaching cognition, teachers are the main body of educational activities, and students and teachers are not only abstract roles, but also "concrete people". Teaching activities cannot be reduced to simple causal reactions under the structural functionalist paradigm, but should be complex and diverse practical activities. Therefore, with the support of artificial intelligence technology, we should innovate a systematic teacher professional development system of "evaluation, training, service, teaching and research, and supervision", and continuously explore effective paths for artificial intelligence to help teachers' professional development.

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