Research on the Role Predicament of Teachers in the Era of Artificial Intelligence*

HU Wei

Nanjing Normal University, Nanjing, China

Jiangsu Second Normal University, Jiangsu, China

SHI Ya-bing

Nanjing Normal University, Nanjing, China

Artificial intelligence has become a research hotspot in many fields. With the advent of the artificial intelligence era, many countries have formulated artificial intelligence policies with the aim of promoting the development and application of artificial intelligence. From the perspective of education, the arrival of this era poses some challenges to the existence and new role of teachers, mainly in two aspects of the teacher's knowledge authority role is not as before and the teacher's extensive education role is not enough. In order to solve the role predicament faced by teachers, they should identify new role orientations and become lifelong learners, creativity cultivators, and emotional communicators.

Keywords: the era of artificial intelligence, teacher's role predicament, teacher's role orientation

Introduction

As the main body of educational activities, teachers have a certain role in social expectations. The advent of the era of artificial intelligence has had a tremendous impact on all aspects of society. Artificial intelligence has played and will continue to play a powerful role in the diagnosis and treatment of diseases, food cultivation, industrial production, and in people's daily lives. Similarly, artificial intelligence has had a certain impact on the role of teachers. How to understand the teacher's role predicament in the era of artificial intelligence and how to confirm the teacher's role orientation in the era of artificial intelligence are the premise to explore and solve the current teachers development problems.

The Arrival of the Era of Artificial Intelligence

The era of artificial intelligence is not a distant imagination, but a reality that is coming. Since the 21st century, there has been a wave of new technologies represented by artificial intelligence and big data in the world. In 2016, it was called the "First Year of Artificial Intelligence". However, artificial intelligence is not a new concept that has emerged in recent years. As early as 1956, the definition of artificial intelligence

* **Acknowledgement:** This paper is a part of the results of the research program "Study on Teachers' Literacy Research in the Era of Artificial Intelligence" (D/2018/01/77) the author has taken charged of. And the paper is supported by Jiangsu "Qinglan Project" and "Jiangsu Higher Education Discipline Preponderant Discipline Construction Project".

HU Wei, post-doctor, School of Education Science, Nanjing Normal University; lecturer, Pre-School Education College, Jiangsu Second Normal University.

SHI Ya-bing, Ph.D. candidate, School of Education Science, Nanjing Normal University.

was proposed at the Dartmouth Conference, known as the starting point for global research on artificial intelligence.

Artificial intelligence can be divided into two types: weak artificial intelligence (Weak AI) and strong artificial intelligence (Strong AI). Weak artificial intelligence just looks like smart, but it does not really have intelligence, and it does not have autonomy. Strong artificial intelligence can think independently about problems and develop optimal solutions to problems. It is a smart machine with its own values and worldview system. In the next decade, artificial intelligence in the field of general intelligence may not be comparable to human intelligence, but the ability to solve problems in specific areas artificial intelligence may surpass humans.

From the policy perspective, the United States (US) Federal Government has issued three reports on artificial intelligence policy: Preparing for the Future of Artificial Intelligence (2016), The National Artificial Intelligence Research and Development Strategic Plan (2016), and Artificial Intelligence, Automation, and the Economy (2016). The State Council of China issued the “New Generation Artificial Intelligence Development Plan” (2017), which clarified “the guiding ideology of China’s new generation of artificial intelligence development (accelerating the deep integration of artificial intelligence and economy, society, etc.), strategic goals (to reach the world’s leading level by 2030) and important tasks”.

The era of artificial intelligence poses an unprecedented challenge to the existence of teachers. With the gradual advancement of artificial intelligence, teachers’ anxiety has turned into being replaced by robots. Will there be a picture of the cover of *The New Yorker* (October 23, 2017): The robot acts as the giver, while the humans sit on the ground? However, technological development is irreversible. “If we negate the technology, we will eventually deny ourselves” (Fjnn, 1996, pp. 47-55). *Reimagining the Role of Technology in Education: 2017 National Education Technology Plan Update* states, “Technology is a powerful tool to promote learning change, help improve the relationship between teachers and students, promote the change of learning mode, and alleviate the problem of unfair education”. The emergence of artificial intelligence has promoted technology not only as an extension of human limbs, but also as an extension of the human brain, and even as an extension of the whole person. From this perspective, artificial intelligence has optimized and strengthened human intelligence and promoted human development.

Teacher’s Role Predicament in the Era of Artificial Intelligence

The teacher’s role predicament in the era of artificial intelligence is mainly reflected in the challenge of teacher’s knowledge authority role, and the role of teacher’s extensive education is challenged by precision education.

The Role of Teacher’s Knowledge Authority is not as Before

Artificial intelligence can provide students with a huge amount of knowledge and challenge the teacher’s knowledge authority role. In the era of artificial intelligence, efficiency priority is the basic feature. Artificial intelligence has the functions of energy boosting, enabling, and empowering, which can improve work efficiency and effectiveness.

In general, artificial intelligence includes three stages of development: computational intelligence, perceptual intelligence, and cognitive intelligence. In the first stage, artificial intelligence has the ability of fast calculation and memory storage. The second stage of artificial intelligence has visual, auditory, and tactile

abilities. The third stage of artificial intelligence has the ability to understand and think. The computational intelligence of artificial intelligence makes knowledge memory no longer difficult, and the status of teacher, as knowledge authority will be not as before.

According to previous surveys, the most vulnerable industry in the era of artificial intelligence is the repetitive labor industry. Artificial intelligence will compress the role of teachers and make education more standardized. At present, the work of teachers is mainly based on knowledge transfer, which is to some extent a kind of repetitive work. If the role of the teacher is only to allow students to cope with exams by rote, reading, and on-the-spot wit, then efficient, low-cost artificial intelligence robots can replace the repetitive, low-creative work of teachers.

The Role of Teacher's Extensive Education is not Enough

Artificial intelligence can provide students with a more precise education and challenge the teacher's extensive educational role. Since the industrial revolution, in order to cultivate a large amount of labor, class teaching has been made into the main form of teaching organization. This form has its superiority, which can expand the scale of education, improve teaching efficiency, give full play to the leading role of teachers, and make the learning activity system controllable.

At the same time, this form has its limitations, and students' initiative is limited, ignoring the individual differences of students. This is an extensive education and a form that is common in most schools today. The perceptual intelligence and cognitive intelligence of artificial intelligence provide technical guarantee for personalized education and the realization of personalized learning, replacing the extensive education methods in the past and providing customized education services for students.

Specifically, it can provide accurate learning services, according to student characteristics (learning style, cognitive level, learning objectives, etc.), feedback students' learning situation in real time through data analysis or intelligent algorithms, correct insufficient service, and improving personalized service levels according to learner's digital portraits, transform the identity of students' knowledge consumers, and thus, become knowledge creators.

Peter Diamandis, founder of Singularity University, argued that "artificial intelligence can provide the best education of the future, because it can provide targeted and personalized education based on the different interests and characteristics of students" (Diamandis, 2016). Artificial intelligence can make a more targeted evaluation of students based on big data, which is difficult for teachers to achieve. Furthermore, artificial intelligence helps to promote the formation of a learning society and contributes to the construction of a learner-centered learning environment.

Teacher's Role Orientation in the Era of Artificial Intelligence

In the era of artificial intelligence, in order to solve the role predicament faced by teachers, it is necessary to clarify the new role orientation.

Lifelong Learners

The role of teachers in the era of artificial intelligence should be lifelong learners. Education is to establish a balanced relationship between the individual and the external environment. However, the development of modern society is accelerating; people's concepts and understanding cannot keep up with the development of the times. Traditional education presents a kind of powerless attitude. Therefore, it is necessary to innovate

educational concepts and establish new education models. Through lifelong learning to promote people's comprehensive and free development, advocate individual independence and introspection, thus caring for the quality of human life.

Paul Lengrand (1975) put forward the concept of "lifelong education" and systematically elaborated on this concept in his book *An Introduction to Lifelong Education*. He believed that "Lifelong education, including all aspects of education, includes not only the process from the beginning to the end of life, but also the links between the various stages of the educational development process" (p. 16).

As technology changes faster and faster, humans need to actively meet the challenge. Learn more skills to adapt to change. As the level of education continues to increase, students gain deeper knowledge in more specialized fields and their professionalism has been strengthened. However, due to the speed of knowledge renewal, lifelong learning has become more and more important, and people need the ability to "re-learn" or "continue to learn".

The current education is more like making pottery. The clay is shaped into a shape, then fired, and finally shaped into pottery. This kind of education has been unable to adapt to the changing world. In the face of an increasingly automated society, the demands on human skills are constantly changing.

On October 18, 2017, AlphaGo Zero boarded *Nature*. The biggest difference between AlphaGo Zero and the previous version is that it has a strong self-learning ability, and no longer needs to learn based on human chess games. In a certain sense, the main goal of education is to enable people to learn. But the current problem is that artificial intelligence brings uncertainty in the future. What kind of knowledge or skills must be needed by society after 10 years is unknown. Therefore, teachers should become lifelong learners, practice lifelong learning concepts, help students establish lifelong learning concepts, develop from time to time, and actively face the unpredictable future.

Creativity Trainers

The role of teachers in the era of artificial intelligence should be the creativity cultivator. In the foreseeable future, machines will replace humans in standardized and repetitive work, and many jobs and even industries will disappear.

Professor Xiang Xian-ming of Nanjing Normal University expressed certain concerns about artificial intelligence. He believed that:

Human beings rely on intelligence to become the master of this planet. Human beings have strong learning ability, but in the era of artificial intelligence, humans can put memories, calculations, and even parts. Wisdom work is given to machines. Artificial intelligence is different from human intelligence and is superior to human beings in many aspects. Therefore, education should play the role of human beings. The future education may be a kind of education with "humanity as the king". The task is to cultivate people's morality and creativity.

Artificial intelligence is an automated system of perception, learning, and thinking. Its strength lies in the storage, dissemination, execution, and retrieval of knowledge. The advantage of teachers is to cultivate students understanding, creativity, and imagination. The important significance of artificial intelligence in educational practice is to replace the low-value repetitive labor of teachers, so teachers have the energy to innovate teaching mode and pay attention to the cultivation of students' innovative ability.

As Rogers (2002) said, "Teachers can no longer stick to the teaching models that existed in the past, the technical age requires them to face the future and create new teaching models" (p. 71). In the National Forum

on Artificial Intelligence and Future Education 2017, American artificial intelligence and education expert, Mitch Rosenberg believed that “teachers’ tasks should develop students’ ability to master control techniques, rather than the ability to be controlled by technology in turn, teachers will not be replaced by artificial intelligence, and only traditional education methods will be replaced”.

In terms of destroying knowledge and creating knowledge, artificial intelligence is still impossible to replace human beings. Therefore, the future should focus on research-based talent development, which requires cultivating students’ innovative thinking, just as science, technology, engineering, art and mathematics (STEAM) education adopts interdisciplinary education model, breaks the boundaries between different disciplines and attaches importance to cultivating students’ creativity in practice.

Emotional Communicators

The role of teachers in the era of artificial intelligence should be emotional communicators. The essence of education is not only to acquire knowledge and skills, but also more importantly, to cultivate students’ world outlook, values, and outlook on life, which are inseparable from the careful cultivation of teachers. Future work needs to establish emotional connections with others, show empathy, and require unique human skills to participate.

Although with the accelerated development of modern technology, computer and other technical means have replaced some of the teachers’ work. However, the nature of school education has not changed. Education is a human-oriented activity. Teacher-student relationship is the interaction among people. This is something that the machine cannot replace. The development of modern technology should strengthen the role of teachers, especially as a means and tool for spiritual communication and emotional communication between teachers and students.

The relationship between teachers and students should be a relationship between “me and you”, focusing on dialogue and communication. This relationship is based on the premise of emotional communication. Intelligentization will be the core of the new industrial revolution. The construction of a smarter planet is inseparable from wisdom education. Wisdom education is inseparable from the construction of a smart campus, the creation of a smart learning platform, and the development of intelligent robots. These are the general trends, but the machine cannot replace people’s mental emotion. So, the teachers need to pay attention to the emotional education of the students.

In addition, artificial intelligence as a science and technology with great potential will change the way people learn in the future. With the advent of the era of artificial intelligence, the widespread application of artificial intelligence requires that education should strengthen the attention to the overall development of people, pay attention to the art education of students, and focus on the use of experience and interactive learning.

If the teacher only imparts knowledge and the teaching process is cold, then no matter how hard the teacher can improve the teaching efficiency, it cannot compete with the powerful computing power of artificial intelligence. If the teacher’s teaching process is concerned about the children’s life growth, touch the depth of the children’s mind, enriching the emotional world of children, this is a kind of education with temperature. Artificial intelligence is not a substitute for such a teacher.

Further, future education should be a kind of education of “human-machine symbiosis”. Artificial intelligence and teachers should be a complementary relationship. Teachers can exert their human emotional

advantages, and machines can exert their computing power, they can work together to complete the cultivation of students and realize the abundance of individual life of students.

Conclusion

In summary, what we need to continue to think about is: Will artificial intelligence become “people”, instead of “people” or even beyond “people”? Can humans and artificial intelligence collaborate, dance, and coexist? In what form will this coexist? Where will teachers in the era of artificial intelligence go? The key to the problem lies in the value orientation of human beings.

As Murray Shanahan (2015) put it in his book *The Technological Singularity*, “we must seriously think about what values to enter for smart machines” (p. 165). Similarly, Oxford University, Professor Luciano Floridi (2014) pointed out that “the deep philosophical problems brought about by technology are not related to what they can do to humans, but how they lead humans to re-understand self-definition and how we should be intelligent. Machine interaction is related” (p. 285).

In short, education needs to adhere to the human position. Teachers need to stick to the position of inspiring students. Education reform needs the support of society. In the era of artificial intelligence, the role predicament faced by teachers needs social support to solve and realize. Teachers should reflect on the relationship between technology and people and clarify the value of self-existence.

Artificial intelligence does not replace teachers, but such teachers should be high-quality teachers to promote human development. For teachers who only rely on knowledge transfer but have no teacher morality, artificial intelligence may be able to eliminate them. This problem is beyond the scope of this article discussion.

Facing the uncertainty of the future, we should move from an “anthropocentrism” thinking mode to a “whole cosmopolitanism” way of thinking, so as to achieve human-machine coexistence.

References

- Fjnn, J. D. (1996). Awalk on the altered side. In D. P. Ely and T. Plomp (Eds.), *Classic writings on instructional technology*. Englewood, CO: Libraries Unlimited, Inc.
- Floridi, L. (2014). *The fourth revolution: How the infosphere is reshaping human reality*. Oxford: Oxford University Press.
- Lengrand, P. (1975). *An introduction to lifelong education*. London, UK: Croom Helm Ltd.
- Rogers, P. L. (2002). *Designing instruction for technology-enhanced learning*. Hershey: Idea Group Publishing.
- Shanahan, M. (2015). *The technological singularity*. Cambridge: MIT Press.