

Teachers' Role Transformation and Professional Development in the Context of Artificial Intelligence

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Abstract: The rapid development of Artificial Intelligence (AI) technology has facilitated the deep integration of technology and education. With AI-assisted teaching, teachers are freed from tedious and repetitive tasks, providing the conditions for creative teaching and learning. But the age of technology has also brought new demands and challenges for teachers. This paper outlines the new demands placed on teachers, discusses the changing role of teachers and finally explores the professional development of teachers in the era of technology.

Keywords: Artificial intelligence; Teacher role; Professional development

1. Introduction

In the context of the rapid development of artificial intelligence technology, the explosive growth of the total amount of knowledge and the extremely fast speed of knowledge dissemination has profoundly changed all areas of society; one of the most influential areas is the field of education. Artificial intelligence + education reflects the deep integration of artificial intelligence and education, providing conditions for teachers to carry out differentiated teaching and organize personalized learning. The new educational concepts and the continuous innovation of teaching methods accompanying the emerging technologies also put forward new requirements for teachers' abilities. In addition, in the new era of smart technological updates, the dual pressure of social change and educational change on the role of the teacher has also made the role conflict of the teacher seem more and more intense. Therefore, it is urgent for the teacher community to realize the conflict between old and new roles, the pressure of survival and the pressure of profession that they are going to face in the age of information technology. Starting from the new requirements for teachers in the era of AI education, they should re-conceptualize their roles while exploring new paths for teachers' professional development.

2. New Requirements on Teachers in the Age of AI

In the age of AI, the way knowledge exists; teaching scenarios and teaching methods are changing. The subjective role of the teacher with knowledge authority will be dissolved, and the teaching cognitive ability, teaching design ability, teaching monitoring ability, and mastery of subject matter knowledge required by traditional teaching will be given new connotations or higher requirements. As human beings, if we don't improve and change ourselves quickly, we are likely to be forced to change by the outside world and it is the teaching profession that is bearing the brunt of this today.

2.1 New Requirements on How Teachers Integrate Learning Content

The rapidity and ease of access to information in the age of artificial intelligence has changed the paradigm of teachers teaching knowledge and students learning knowledge. Moreover, the development of mobile learning nowadays also provides physical and social environments for students' personalized learning, creating great convenience for learning. These changes signal that the teacher is no longer just a knowledge transmitter but has become a learning facilitator. This requires teachers to change the traditional concept of knowledge transfer and try to integrate the knowledge of the subject areas they teach in a "problematic" way, introducing topics in a problematic manner to guide students' thinking and promote their learning. At the same time, in the process of problem integration, teachers should also anticipate what types of mistakes students will make, so that timely correction can be done in teaching.

2.2 New Requirements on Teachers' Information Literacy

The rapid development of information technology and its continuous integration with the curriculum have brought about changes in teaching methods, teaching modes, and teaching evaluation that have impacted traditional teaching. Teachers who do not update their educational concepts in time to adapt to the information technology environment will be detached from the wave of modernization. This requires teachers to have a strong sense of information and to be able to perceive and capture information sensitively. Teachers should consciously select and integrate appropriate information according to the various aspects of teaching and learning, and at the same time give good feedback to enhance their sense of teaching efficacy.

2.3 New Requirements on Teachers' Monitoring Ability

Teaching monitoring ability refers to the teacher's ability to plan, check, evaluate feedback and regulate the teaching activity itself as an object of consciousness throughout the whole process of teaching in order to ensure that the teaching achieves the desired goals^[1]. In the age of Artificial Intelligence, teacher monitoring of the classroom does not only exist in the traditional classroom, but has changed from collective monitoring of learning to monitoring of individualized learning as well as from classroom monitoring to situational monitoring and so on. This requires teachers to learn and master the appropriate media technologies, monitoring tools and methods of monitoring and apply them actively in their teaching.

2.4 New Requirements on Teachers' Ability of Human-computer Collaboration

With the development of technology and the abundance of information resources, learners can get a continuous learning experience at any time and any place. At the same time, artificial intelligence technology can also analyze the data of learners' learning habits and learning situation, and can provide teaching content and teaching progress that matches the learners. This greatly compensates for the inability of teachers to differentiate instruction when faced with groups of students. In the future, human-computer collaborative teaching will become an important feature of teachers' work. In the process of this transformation, how teachers can reposition their roles and how to better do human-computer collaborative teaching will become a new issue for teachers in the technological era.

3. Transformation of Teachers' Roles in the Age of AI

The relationship between AI and teachers is mutually shaping and evolving, with technology replacing the increasingly tedious and repetitive tasks of teachers, and teachers augmenting the educational intelligence of AI. In this mutually augmenting developmental evolution, the role of the teacher is transformed as follows.

3.1 Designer of Personalized Student Learning

In the age of technology, purely intellectual teaching will be mostly undertaken by AI, which also replaces tedious tasks with low intellectual inputs such as homework correction, feedback, paper organization and grade statistics. Prof. Ye Lan said: "Teachers are not only transferring knowledge, but also engaging in unique creative work"^[2]. Smart technology provides more creative space for teachers to design personalized instruction for students. In the future, with technical support, the technical means provided by artificial intelligence for teaching can assist teachers in realizing personalized teaching that differs from person to person, and provide students with rich, diverse and appropriate learning resources and activities. Thus, the role of the teacher as a knowledge transmitter becomes the designer of students' personalized learning.

3.2 Emotional Supporters of Personalized Student Learning

The integration of AI technology with the curriculum is a major trend, but its capabilities for personalized learning are not yet fully mature. For example, while AI can currently tailor the content and pace of learning for learners through technical analysis, its performance in personalized monitoring and feedback is highly controversial. If the AI system keeps saying that the student is doing it wrong in the monitoring and feedback of learning, the student's motivation will be reduced. Teachers should become emotional supporters of students' personalized learning by giving timely tips, advice, and support during this process.

3.3 Supervisor of Students' Personalized Learning

Despite the increasing access to information, fragmented and superficial chunks of knowledge and convenient learning channels do not guarantee students' learning outcomes. After teachers have sifted through the vast amount of information and organized it according to students' learning characteristics to design learning content that meets students' learning and development, the weight of teachers in students' learning will give way to students' independent and personalized learning. At this point, the teacher will become the supervisor of students' individualized learning, as most students' initiative and self-motivation must be motivated and supervised by the teacher.

3.4 Explorers of Human-computer Co-teaching

Human teachers will not be replaced, but will work together with AI teachers to undertake teaching tasks and highlight their

unique strengths in the process of human-computer collaboration^[3]. In the future, human-machine coexistence will become the new ecology of society. In the new era, teachers should be clear about the transformation of their roles, actively embrace intelligent technology and actively explore how human-computer co-teaching. At the same time, when introducing various types of technology into the classroom, teachers should also carefully screen and avoid the risks they bring, so as not to over-exclude or over-rely on them, and strive to improve their information literacy and ability to apply educational technology.

4. Professional Development of Teachers in the age of AI

While it is unlikely that technology will ever completely replace the role of the teacher, there will be significant changes in the function and weight of teacher and AI involvement in the classroom of the future, as well as significant challenges^[4]. At this new point of educational change, the direction of teacher professional development becomes clear.

4.1 Focus on the Development of Information Literacy among Pre-service Teachers

Students pursuing teacher training programs constitute the main pool of teachers and are the largest group of pre-service teachers. Therefore, teacher education in colleges and universities should take the initiative to connect with the future, and make the improvement of information technology literacy and the ability to apply information technology as an important task in training teacher trainees. During the training process, teachers should guide teacher trainees to learn and understand the language expression and use skills of AI to improve their thinking, judgment and application abilities, with a view to enabling them to better manage AI without being manipulated when they move to teaching positions in the future.

4.2 Renewal of Mentalities and Institutional System

The study points out that teacher's technology perceptions and teaching practices have a positive impact on AI teaching. Teachers cannot just treat AI as a machine that replaces them in completing repetitive tasks. For schools, technology has long since permeated talent training standards, curricula, textbook development and even management styles. Therefore, school administrators should continuously improve teachers' understanding of the impact of AI technology on education and grasp the direction and substance of combining education and technology in teaching. At the same time, it is more important for educational administrations to strengthen institutional top-level design and actively promote the deep integration of education and artificial intelligence. For example, the education sector can actively conduct school pilots to try to synergize collaboration with schools and enterprises, so that teachers are moderately involved in the development and implementation of AI-assisted teaching.

4.3 Explore new Methods of Teaching and Learning with Human-computer Collaboration.

Mike. Prof. Sharples points out that the greatest advances in education are not in technology but in new pedagogies such as collaborative learning, feedback and inquiry-based learning^[5]. Teachers should actively explore and practice new teaching methods in the future based on practical examples of successful AI learning. On the one hand, a bottom-up approach can be adopted by collecting examples of successful practices independently and then exchanging and sharing them through a shared network of teachers. On the other hand, a top-down strategy can be used to provide teachers with certain training first, such as observing high-quality typical classrooms, so that they can create new teaching methods based on AI and explore the possibilities of teaching new methods in conjunction with technology.

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