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THE REINVENTION OF TEACHERS' ROLES IN THE POST-AI ERA: THE TRANSFORMATION PATH FROM KNOWLEDGE IMPARTER TO METACOGNITIVE COACH

CUI YONGHONG[1] & CUI YIQIAN[2]

(Neijiang Normal University, Neijiang China 641100,)

（City University of Macau，Macau China 999078）

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ABSTRACT

In the post-AI era, the role of teachers is undergoing a transformation from knowledge imparters to metacognitive coaches. This transformation aims to adapt to changes in the educational environment, meet the diverse learning needs of students, and improve the quality of education. During the transformation process, teachers face challenges such as technology integration, changes in teaching methods, reshaping of role orientation, and lack of emotional care. To address these challenges, teachers need to enhance their technical training, innovate teaching methods, clarify their role orientation, and pay attention to students' emotional needs. Looking forward, with the continuous development of AI technology and the advancement of education internationalization, the roles of teachers will be further enriched and expanded, including utilizing AI technology to provide personalized learning resources and feedback, as well as possessing cross-cultural communication skills. Therefore, teachers need to continuously learn and adapt to the new technological environment, enhance their professional literacy and teaching abilities, in order to cultivate more talents with innovative thinking and autonomous learning abilities for the new era.

Keywords: post-AI era; reinvention of teachers' roles; knowledge imparters; metacognitive coaches; transformation path

1.0 INTRODUCTION

In recent years, with the emergence and development of emerging digital technologies such as natural language processing, machine learning, and ChatGPT, artificial intelligence (AI) has ushered in its third wave of development, triggering a new round of technological revolution and industrial structural transformation. AI has become a key factor and core driving force for promoting the intelligent transformation of various industries. [[i]] AI technology has permeated various fields of society and has gradually become an important force driving social progress. It also demonstrates broad application prospects in the field of education. [[ii]] In recent times, the application of AI technology in the field of education has become increasingly widespread, ranging from intelligent tutoring systems to personalized learning platforms, from automatic

[1] Author's biography: Cui Yonghong (1973-), female. Neijiang Normal University associate professor. Research direction: basic theories of education.

[2] Author's biography: CuiYiqian（1995-）， female. Faculty of Innovation and Design City University of Macau 2022 Art Doctoral Research Student.

assessment tools to virtual laboratory environments. AI is gradually changing traditional teaching methods and students' learning experiences. This trend has not only brought unprecedented convenience and efficiency to education but also posed new challenges and requirements for the role of teachers.

In the post-AI era, significant changes have taken place in the educational environment. Students can access knowledge and information anytime, anywhere through various smart devices and platforms, which has gradually diminished the exclusivity of the role of the knowledge imparter in the traditional sense. Meanwhile, AI technology can analyze students' learning behaviors and performances, providing teachers with precise teaching feedback and personalized teaching suggestions. These changes require teachers to adapt to the new educational environment and transform their role orientation, shifting from mere knowledge imparters to educators who can guide students to learn autonomously and cultivate their higher-order thinking and innovation abilities. The significance of studying the transformation of teachers' roles lies in several aspects. On the one hand, it helps teachers better understand and adapt to the educational changes in the AI era, enhancing their teaching abilities and professional qualities. On the other hand, through role transformation, teachers can better utilize AI technology to assist in teaching, improving teaching effectiveness and learning efficiency, thereby cultivating more talents with innovative spirits and practical abilities. In addition, studying the transformation of teachers' roles can also provide valuable references and insights for education policymakers and researchers, driving the reform and development of the entire education system.

In summary, exploring the issue of teachers' role transformation in the post-AI era not only holds significant theoretical value but also has far-reaching practical implications for educational practice. Through in-depth research, we can provide teachers with effective transformation pathways and strategic support, promoting continuous innovation and healthy development in the field of education.

2.0 EDUCATIONAL ENVIRONMENT IN THE POST-AI ERA

In the post-AI era, the educational environment is undergoing unprecedented changes. With the continuous maturation and widespread application of AI technology, information technology with AI at its core is not only addressing the practical contradictions in education but also bringing about profound transformations in the educational environment, educational content, educational activities, and the role of teachers. [iii] The field of education is gradually stepping into a new stage of intelligence, personalization, and efficiency. Firstly, intelligence has become a new feature of the educational environment. Intelligent teaching systems, intelligent assessment tools, intelligent learning platforms, and other emerging tools provide teachers and students with richer, more diverse, and convenient teaching resources and learning pathways. These intelligent systems can conduct real-time analysis based on students' learning behaviors and performance, providing teachers with precise teaching feedback and personalized teaching suggestions, thereby effectively enhancing teaching effectiveness and learning efficiency. Secondly, personalized education has become possible. AI technology can tailor personalized learning plans and teaching resources for students according to their learning needs, interests, and ability levels. This personalized educational model can stimulate students' interest and enthusiasm in learning and promote their comprehensive development.

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In addition, a highly efficient educational environment is also an important characteristic of the post-AI era. AI technology can automatically process a large amount of teaching data and learning information, providing teachers with more comprehensive, accurate, and timely teaching support. At the same time, intelligent learning platforms can provide students with more flexible and convenient learning methods, enabling them to learn anytime, anywhere, thereby greatly improving learning efficiency and effectiveness. However, the educational environment in the post-AI era also faces some challenges. For example, issues such as how to ensure the safety and reliability of intelligent systems, how to protect students' privacy and data security, and how to balance the relationship between AI technology and traditional teaching methods all require in-depth consideration and solutions. It is evident that the educational environment in the post-AI era is exhibiting new characteristics of intelligence, personalization, and efficiency, providing strong support for continuous innovation and healthy development in the field of education. However, we should also soberly recognize the challenges and issues that exist and actively seek solutions to promote continuous progress in education.

3.0 NECESSITY OF TEACHERS' ROLE TRANSFORMATION

In the post-AI era, significant changes have taken place in the educational environment and technology, posing new requirements and challenges to teachers' roles. This necessitates a transformation in teachers' roles, shifting from being mere transmitters of knowledge to designers and facilitators of students' learning activities, thereby fostering a new type of learning partnership between teachers and students.[iv]Therefore, the transformation of teachers' roles appears particularly necessary. Firstly, technology integration has become the new normal in education. The application of technologies such as intelligent teaching systems and online learning platforms enables students to access knowledge and information anytime, anywhere. This change requires teachers to shift from being transmitters of knowledge to guides and facilitators of learning, helping students filter, integrate, and apply information while cultivating their autonomous learning and critical thinking skills. Secondly, there is a growing demand for personalized education. Each student has a unique learning style, interest, and level of ability. Through role transformation, teachers can better understand and pay attention to individual differences among students, apply personalized teaching strategies to meet the learning needs of every student, and promote their comprehensive development. Furthermore, changes in the education evaluation system necessitate the transformation of teachers' roles. The traditional evaluation method focused mainly on exam scores is gradually shifting towards diversification. and process-oriented evaluation. Teachers need to become observers and evaluators of students' learning processes, providing continuous observation and feedback to help students clarify their learning directions and adjust their learning strategies. Lastly, the transformation of teachers' roles is also an inevitable requirement for adapting to social development. With the rapid development of society and the constant updating of knowledge, teachers need to continuously learn and enhance their professional competence, becoming lifelong learners to better guide students in adapting to changes and challenges in the future society. The transformation of teachers' roles is a necessary measure to address changes in the educational environment in the post-AI era. Through role transformation, teachers can better adapt to technology integration, meet the demand for personalized education, cope with changes in the education evaluation system, and adapt to social development, thereby providing students with more high-quality, efficient, and personalized educational services. The transformation of teachers' roles is not a diminution of their

professional value but rather a higher level of specialization. By leveraging human-machine collaboration to unleash educational potential and resisting technological alienation through humanistic care, teachers can ultimately become "education leaders in the AI era." In the new classroom ecology consisting of "teachers-students-machines," teachers should re-examine their roles and positioning, fully leveraging the advantages of "machine teachers" while exerting the unique advantages of human teachers in cultivating higher-order thinking skills and enhancing interpersonal communication and collaboration abilities.[v]This transformation will determine whether future education can adhere to its original intention of cultivating people in the midst of technological advancements, nurturing a new generation that possesses both digital competence and humanistic spirit.

4.0 PATHS FOR THE TRANSFORMATION OF TEACHERS' ROLES

“The China Education Modernization 2035” proposes to promote the informatization and intelligentization of education and improve teachers' information literacy. This indicates that the application of artificial intelligence technology poses new challenges to teachers' teaching models.[vi] The "chalk + blackboard" teaching model has been unable to meet students' personalized learning needs, and the traditional role and functions of teachers are gradually weakening.[vii] The role of teachers is undergoing a profound transformation. This transformation is not only a requirement of the times, but also an inevitable trend in the development of education itself.

4.1 From Knowledge Imparter to Learning Guide

In traditional teaching, teachers often played the role of knowledge imparters, instilling book knowledge into students. However, in the information age, the ways of acquiring knowledge have become diversified, and students can learn autonomously through various channels such as the internet and libraries. Therefore, teachers need to transform from knowledge imparters to learning guides, helping students screen information, build knowledge systems, and cultivate their autonomous learning abilities and critical thinking. The essence of the digital transformation of education is the shift from a traditional teaching model centered on teachers and focused on knowledge transmission to a new educational model centered on students and placing greater emphasis on knowledge generation, dissemination, and innovation.[viii]

4.2 From Classroom Manager to Learning Scenario Creator

In traditional classroom teaching, teachers are primarily responsible for maintaining classroom order and managing student behavior. However, in new teaching models, teachers need to focus more on creating learning scenarios. By designing inspiring and interesting teaching scenarios, teachers can stimulate students' interest in learning and their desire to explore. For example, teachers can utilize virtual reality technology to create virtual laboratories where students can conduct experiments in simulated environments, thereby deepening their understanding and application of knowledge.

4.3 From Single-Discipline Educator to Interdisciplinary Instructor

As the trend of interdisciplinary integration becomes increasingly apparent, teachers need to possess interdisciplinary knowledge backgrounds and teaching capabilities. This requires

teachers to not only be proficient in their own subject area but also to understand the basic knowledge and research methods of other disciplines. By integrating knowledge and methods from different disciplines into teaching, teachers can cultivate students' comprehensive literacy and innovative abilities.

4.4 From Teaching Executor to Curriculum Developer

In traditional teaching, teachers mainly execute established teaching plans and curriculum schemes. However, against the backdrop of curriculum reform and innovation, teachers need to be more involved in curriculum development. Based on their own teaching practice and student needs, teachers should design practical and distinctive courses. This requires teachers to possess theoretical literacy and practical abilities in curriculum design, enabling them to flexibly utilize various teaching resources and methods to create courses that not only align with educational goals but also closely meet students' actual needs.

4.5 From Technology User to Technology Integration Innovator

With the continuous development of educational technology, teachers need to transform from mere technology users into technology integration innovators. The deep integration of artificial intelligence with education and teaching has promoted the innovation and transformation of educational forms.[ix]This requires teachers to not only be proficient in various educational technology tools but also be able to combine these tools with teaching practice to create new teaching methods and models. For example, teachers can utilize big data to analyze students' learning behaviors and outcomes, providing personalized learning support and feedback to students. They can also leverage artificial intelligence technology to assist in instructional design, improving teaching efficiency and quality.

4.6 From Closed Teaching to Open Teaching

In traditional teaching, teachers' instruction is often confined to the classroom and within the school. However, in the context of open education, teachers need to break this closed nature and extend teaching beyond the classroom, integrating it with the external environment such as society and families. This requires teachers to possess an open teaching philosophy and methodology, capable of utilizing social resources to conduct practical teaching activities, broadening students' horizons and experiences.

In summary, the paths for teachers' role transformation are diversified, involving transitioning from knowledge transmitters to learning guides, from classroom managers to learning situation creators, from single-subject educators to interdisciplinary teachers, from teaching executors to curriculum developers, from technology users to technology integration innovators, and from closed teaching to open teaching. The implementation of these transformation paths will help enhance teachers' professional literacy and teaching abilities, providing better support and guarantee for students' comprehensive development.

5.0 CASE STUDY: SUCCESSFUL ROLE TRANSFORMATION

A Case of Teacher Zhang, an Elementary School Chinese Language Teacher

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5.1 Before and After the Transformation

Before Transformation: Teacher Zhang was a traditional elementary school Chinese language teacher primarily responsible for teaching the content of Chinese textbooks. The classroom was dominated by the lecture method, with students passively receiving knowledge. Although Teacher Zhang taught diligently and conscientiously, students' enthusiasm and interest in learning were not high, and the classroom atmosphere was relatively dull.

After Transformation: Through participating in educational training and self-study, Teacher Zhang gradually recognized the limitations of traditional teaching modes and began attempting to transform her role from a knowledge transmitter to a facilitator and promoter of students' learning activities. After the transformation, Teacher Zhang placed greater emphasis on stimulating students' interest and initiative in learning, adopting diversified teaching methods such as group discussions and project-based learning to encourage students to explore and cooperate autonomously. At the same time, Teacher Zhang utilized online platforms and digital resources to provide students with richer learning materials and interaction opportunities.

5.2 Challenges and Coping Strategies During the Transformation Process

Challenges: Change in Teaching Philosophy: Abandoning traditional teaching concepts and internalizing new ones required a lengthy process for Teacher Zhang.

Innovation in Teaching Methods: The transformation necessitated exploring new teaching methods and means, placing higher demands on Teacher Zhang's instructional design and organizational capabilities.

Proficiency in Technology Application: Teaching using online platforms and digital resources required a certain level of information technology application ability, which was relatively weak for Teacher Zhang.

Coping Strategies: Participation in Educational Training: Teacher Zhang actively participated in various educational training activities to learn new teaching philosophies and methods.

Peer Exchange and Cooperation: She exchanged and cooperated with other teachers, sharing teaching experiences and methods, and jointly exploring the path of transformation.

Self-Study and Improvement: Teacher Zhang utilized her spare time to self-study information technology-related knowledge to improve her technological application abilities.

5.3 Effects After the Transformation

After the transformation, the classroom atmosphere became more lively, students' interest and enthusiasm in learning significantly increased, and learning outcomes improved markedly. Additionally, through the transformation practice, Teacher Zhang's teaching philosophy, teaching methods, and information technology application abilities were all significantly enhanced, comprehensively improving her professional literacy. Furthermore, post-transformation, Teacher Zhang placed greater emphasis on interaction and communication with

students, fostering a more harmonious and rapport-filled teacher-student relationship, and making the learning experience more enjoyable and positive for students.

In this case, Teacher Zhang successfully achieved the transformation of her teacher role through active transformation practices, not only improving students' learning outcomes and her professional literacy but also promoting the harmonious development of teacher-student relationships. This transformation practice provides useful references and insights for other teachers.

6.0 CHALLENGES AND COUNTERMEASURES

In the post-AI era, the role of teachers is transforming from knowledge transmitters to metacognitive coaches. This process presents numerous challenges but also brings about many countermeasures and opportunities.

6.1 Challenges

A: Challenge of Technology Integration

In the era of AI, teachers need to master and proficiently use various intelligent educational tools, such as intelligent teaching systems and online learning platforms. However, for many teachers, these new technologies may constitute an insurmountable gap. They may lack the necessary technological literacy to effectively integrate AI technology with teaching practice.

B: Transformation of Teaching Methods

Traditional teaching methods often focus on the transmission of knowledge. However, in the era of AI, teaching methods need to emphasize more on students' autonomous learning, cooperative learning, and inquiry-based learning. This transformation requires teachers to possess higher instructional design capabilities to devise teaching activities that both align with students' cognitive characteristics and stimulate their interests.

C: Reshaping of Role Orientation

The transition from knowledge transmitters to metacognitive coaches signifies that teachers need to shift their focus from students' knowledge acquisition to their thinking abilities, learning methods, and emotional attitudes. This reshaping of role orientation requires teachers to possess stronger self-reflection abilities and professional development awareness, enabling them to continuously adjust their teaching methods and strategies to meet students' needs.

D: Lack of Emotional Care

In the context of AI-assisted teaching, direct communication between teachers and students may decrease, potentially leading to a lack of emotional care for students. Teachers need to pay attention to students' emotional needs and provide necessary psychological support and humanistic care while leveraging AI technology to improve teaching efficiency.

6.2 Countermeasures

A: Strengthen Technical Training and Support

In response to the challenges of technology integration, schools and educational institutions should enhance technical training for teachers and provide necessary technical support and resources. By organizing regular technical training, seminars, workshops, and other activities, they can help teachers grasp the basic principles and application methods of AI technology, thereby improving their technical literacy and application abilities.

B: Innovate Teaching Methods and Strategies

To address the transformation of teaching methods, teachers need to continuously innovate their teaching methods and strategies to meet students' needs. For instance, they can adopt new teaching models such as project-based learning and flipped classrooms to stimulate students' interest and initiative in learning. At the same time, teachers can utilize AI technology to conduct in-depth analysis of students' learning data, providing personalized learning resources and feedback to students.

C: Clarify Role Orientation and Development

Direction Regarding the reshaping of role orientation, teachers need to clarify their role orientation and development direction. As metacognitive coaches, teachers should focus on students' thinking abilities, learning methods, and emotional attitudes, helping them establish correct learning concepts and methods. Additionally, teachers must possess self-reflection and professional development awareness, constantly adjusting their teaching methods and strategies to adapt to changes in the educational environment.

D: Strengthen Emotional Care and Humanistic Concern

In response to the lack of emotional care, teachers need to pay attention to students' emotional needs while using AI technology to improve teaching efficiency. For example, they can increase opportunities for teacher-student interaction through online interactions and group discussions, understand students' psychological states and learning difficulties, and provide necessary psychological support and humanistic concern. Furthermore, teachers can utilize AI technology to analyze students' emotional data, promptly identifying and addressing students' emotional issues.

The reshaping of teachers' roles in the post-AI era is a complex and long-term process. Never has an era placed such high expectations and demands on teachers' learning abilities as the AI era.[x]。 In the face of challenges, teachers need to continuously strengthen their technological literacy, innovate teaching methods and strategies, clarify their role orientation and development direction, and pay attention to the emotional needs of students. Meanwhile, schools and educational institutions should also provide necessary support and resources to jointly promote changes and development in the field of education.

7.0 CONCLUSION AND PROSPECTS

In the post-AI era, the reshaping of teachers' roles is not only an inevitable trend in educational development but also a crucial measure to address technological challenges and enhance

educational quality. By transitioning from knowledge transmitters to metacognitive coaches, teachers can better adapt to changes in the educational environment, meet students' diverse learning needs, and cultivate talents with innovative thinking and self-directed learning abilities for the new era.

7.1 Conclusion

During the transformation process, we deeply recognize that the integration and innovation of technology do not happen overnight but require teachers to continuously explore and learn through practice. With strengthened technical training and support, teachers can gradually master the basic principles and application methods of AI technology, integrating it into teaching practice to improve teaching efficiency and quality. Meanwhile, the transformation of teaching methods is also a vital aspect of this process. Teachers need to shift from traditional knowledge impartation to focusing on students' autonomous, cooperative, and inquiry-based learning. By innovating teaching methods and strategies, teachers can stimulate students' interest and initiative in learning. In addition, the reshaping of role orientation is equally crucial for teachers. As metacognitive coaches, teachers need to focus on students' thinking abilities, learning methods, and emotional attitudes, helping them establish correct learning concepts and methods. This shift in role orientation requires teachers to possess stronger self-reflection abilities and professional development awareness, enabling them to continually adjust their teaching methods and strategies to meet students' needs and the changing educational environment. During the transformation process, we have also identified challenges, such as the lack of emotional care. This reminds us that while leveraging AI technology to improve teaching efficiency, we must also attend to students' emotional needs, providing necessary psychological support and humanistic care.

7.2 Prospects

Looking ahead, with the continuous development and application of AI technology, teachers' roles will further enrich and expand. For example, teachers can utilize AI technology to deeply mine and analyze students' learning data, providing them with more personalized learning resources and feedback. Simultaneously, teachers can employ virtual reality, augmented reality, and other technological means to create more realistic and vivid teaching scenarios, enhancing students' interest and participation in learning. Furthermore, with the continuous advancement of education internationalization, teachers' roles will become more diversified. Teachers need to possess cross-cultural communication skills, understand the learning characteristics and needs of students from different cultural backgrounds, and provide them with more inclusive and diverse educational services.

In summary, the reshaping of teachers' roles in the post-AI era is an ongoing process. Teachers need to continuously learn and adapt to the new technological environment, enhancing their professional literacy and teaching abilities. Meanwhile, schools and society should also provide necessary support and resources, jointly driving changes and development in the field of education. Only in this way can we cultivate more talents with innovative thinking and self-directed learning abilities for the new era, contributing to social progress and development.

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