From Tradition to Modernity: Redefining the Role of the Teacher in the 21st Century

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Abstract: The advent of artificial intelligence (AI) heralds a transformative era in education characterized by the integration of intelligent systems, including smart cities, schools, and classrooms. This paper explores the transition from traditional to modern educational paradigms, underscoring the need to redefine teachers' roles in the 21st century. In this context, educators are envisioned to leverage emerging information technologies, such as mobile internet, big data, and cloud computing, to construct a student-centric educational ecosystem that is accurate, personalized, flexible, and humane. This shift aims to facilitate the intelligent transformation of education, foster a symbiotic relationship between AI technology and educational practices, and optimally support students' developmental needs. Through this integrative approach, the paper illuminates the pathways for accelerating the progression towards an intelligent educational framework, thereby meeting the dynamic demands of contemporary learners.

1. Introduction

As we navigate through the epoch of smart education, teachers are thrust into a pivotal role, acting as the principal agents driving the infusion and application of artificial intelligence (AI) technology within the educational sector. They embody the intellectual backbone essential for steering education through an intelligent transformation, thus confronting them with an array of unprecedented challenges and elevated expectations regarding their professional roles[1-2].

2. Significance and Value of Teachers in the Intelligent Education Era

Technological inventions, inherently designed to cater to human survival and developmental necessities, should not supersede their creators but serve humanity and foster the advancement of civilization. AI technology epitomizes this principle. In the smart education framework, while technology-enabled educational approaches significantly alleviate the workload on educators, the ultimate objective is not to obviate the need for teachers. Instead, the goal is to instigate educational reform, stimulate educators to delve deeper into educational mechanisms, and enhance the quality of education provided[3].

Within the smart education matrix, the synergy between teachers and AI technology is indispensable from a pedagogical perspective. Teachers constitute a crucial element, facilitating the application of AI in education and ensuring it yields the desired outcomes. The relationship dynamics between human instructors and their virtual counterparts have been a subject of extensive debate, with various perspectives brought to the fore. This discourse aims to elucidate the importance and inherent value of teachers, fostering a shift from a competitive to a collaborative paradigm between human and machine, eventually culminating in a harmonious, symbiotic coexistence.

2.1. Rational Transformation of Educational Tools Promoted by Teachers

Max Weber, the esteemed German sociologist, distinguished between two forms of human rationality: instrumental rationality, which is efficacy-focused and technocentric, and value

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rationality, centered on the significance of human existence and consciousness of life. The surrogate nature of AI ensures the inevitability of technological permeation across diverse fields, significantly relieving human labor. Predictions of intelligent robots supplanting human employment in the future and the emergence of a "useless class" underscore the impending transformation in the rationality of educational tools during the intelligent education era[4].

Teachers are instrumental in catalyzing this rational transformation of educational tools, evident in the shift from knowledge transfer to wisdom development. In this era, the focus of education's instrumental rationality is on developing students' wisdom, cultivating higher-order thinking and complex problem-solving skills, which are imperative in a landscape dominated by increasingly intelligent robots. The fostering of these skills, distinctly human and irreplicable by robots, necessitates the support of teachers' intelligent teaching capabilities.

Furthermore, there is a transition from nurturing core literacy to constructing super core literacy, signifying the need to surpass traditional core literacy and formulate an AIQ (Artificial Intelligence Quotient) ability framework. This approach maximizes AI's surrogate function in an interconnected environment, where the relationship between humans and robots becomes a pivotal concern in smart education. Enhancing students' AIQ, with a focus on technical application skills, is crucial for steering humanity's future developmental trajectory[5].

Lastly, there is a transformation from focusing on external survival skills to nurturing inner personal growth. AI's facilitation of human resource liberation allows a greater focus on individual development. Education's instrumental rationality thus not only encapsulates the acquisition of knowledge and skills but also contributes to holistic human development. In the iterative process of teacher-student interaction, there is mutual enlightenment and learning, leading to continuous improvement for both parties. It is imperative for educators to navigate the potential pitfalls of technology-driven instrumental rationality, emphasizing humanistic care while adopting intelligent educational strategies. This approach is vital for preventing a slide into technocentrism and utilitarianism in education, acknowledging that despite its capabilities, AI cannot ultimately replace teachers due to its inherent limitations. Recognizing and delineating AI's "scope of activity" within education is essential for teachers to achieve self-transcendence in the intelligent education era. Beyond AI's operational boundaries, areas untouched by technology require the guidance of teachers, who must counteract the precision and utilitarian mindset of technology-led instrumental rationality, steering educational rationality towards serving and developing human value rationality[6].

2.2. Teachers Facilitating the Recrudescence of Educational Value Rationality in the Smart Education Era

Value rationality in education inherently refers to the essence of educational activity and the subject of education, emphasizing the quintessential methodology of imparting education. It postulates that education should invariably regard individuals not merely as objects of education or entities to be transformed but as both the subjects and ultimate aims of the educational process. In the context of this rationality, individuals are perceived not as mere outcomes but as the core essence of education[6].

With intelligent robots effectively substituting for humans in various functions, individuals are liberated from basic survival and occupational challenges. This newfound freedom allows individuals to focus more introspectively, making "the individual" the fundamental premise and cornerstone of all activities. The value rationality in education underscores that "humans are ends in themselves, not merely means to an end". There is an urgent imperative in the era of intelligent education for a resurgence of value rationality that is unequivocally centered on the human subject.

As extensions and enhancers of human capabilities, artificial intelligence (AI) translates knowledge, behaviors, teaching, and management into binary codes of '0' and '1'. However, these AI-driven processes are devoid of moral considerations, emotional intelligence, philosophical and aesthetic appreciation, critical and innovative thinking, and humanistic care. The axiom "One can only educate by being educated" epitomizes the irreplaceable role teachers play in prioritizing

individuals, fostering students' personal growth, and facilitating their comprehensive physical and mental development, ultimately "restoring students to their original state as natural persons".

In the intelligent education epoch, teachers, with a student-centric approach, provide personalized guidance to foster holistic student development, thereby facilitating the reclamation of educational value rationality. Firstly, this resurgence necessitates a student-oriented approach where students are recognized and treated as "humans", serving as the focal point of all educational activities. In this era, AI, through data algorithms, emulates teachers' tasks, executing simple and mechanical functions like intelligent grading, pronunciation and composition correction. This automation liberates teachers from mundane and repetitive tasks, allowing them to invest more time and energy into understanding and addressing students' emotional and developmental needs.

Secondly, AI technology in the smart education era amasses student data to construct digital profiles. Teachers can leverage this data to offer tailored guidance, addressing the diverse developmental needs of each student and promoting their growth. This personalized approach not only supports the students' academic development but also caters to their emotional and psychological needs, fostering a more holistic development.

Thirdly, the realization of educational value rationality is predicated on the comprehensive development of students, encompassing not only their knowledge and skills but also their physical and psychological well-being. The extensive application of big data, Internet of Things (IoT) technology, and AI in education equips teachers with tools to understand and support students' comprehensive development from various angles. This multifaceted understanding enables educators to attend to students' cognitive, psychological, and social development, ensuring each student benefits from adaptive learning environments that leverage their unique strengths, ultimately nurturing innovative and intelligent talents aligned with societal demands[7].

3. Transformation of Teachers' Roles in the Smart Education Era

3.1. Transition from Knowledge Delivery to Guidance

Smart education necessitates a paradigm shift where students increasingly assume autonomous learning roles, engaging in independent learning and self-construction. This change compels teachers to transcend their conventional roles as information transmitters, instead embodying guides and facilitators. Such a transformation is imperative to accommodate students' diversified and personalized learning needs and enhance the flexibility of the teaching process. Teachers in the smart education era should abandon a "one-size-fits-all" approach, adopting more targeted, flexible, and personalized strategies imbued with educational wisdom— a core tenet of smart education[7].

3.2. From Teacher-Centric "Teaching" to Student-Centric "Learning"

Traditionally, teachers predominantly controlled educational activities, dictating the teaching process and consequently determining students' learning. This teacher-centric model often neglects student variability, leading to a disconnect between teaching and learning. The introduction of AI in education heralds a shift in the dynamic of teaching activities, enhancing student engagement in the learning process and redefining the teacher's role from "teaching" to facilitating "learning".

Firstly, teachers evolve from being sole knowledge providers to managers of learning resources. The advent of smart education disrupts the teachers' monopoly on knowledge as AI technologies facilitate access to information. With the rapid expansion and updating of knowledge, coupled with its complexity and variability, students are now active participants in the learning process. The increasing demand for personalized learning further diminishes teachers' control over knowledge dissemination, necessitating a shift in focus from "teaching" to facilitating "learning". Teachers must therefore relinquish some control, transitioning from knowledge gatekeepers to learning resource managers, providing resources based on students' needs and selecting fundamental, cutting-edge, and valuable knowledge to foster students' intellectual development[8].

Secondly, teachers transition from mere data collectors to personalized education facilitators. Traditional teaching relied on direct teacher-student interaction for student data collection, which

often lacked reliability, validity, and comprehensiveness[9]. Smart education utilizes technologies like big data, blockchain, and AI to enable precise data collection throughout the education process. This approach provides a comprehensive student profile, facilitating personalized teaching strategies based on detailed student understanding, thus meeting their developmental needs more effectively.

3.3. From Solo Practitioners to Collaborative Teams

Traditional teaching often occurred in isolation due to time and space constraints, with limited collaboration among educators. Smart education, facilitated by advanced communication technologies, allows for more seamless collaboration among teachers, transcending temporal and spatial barriers. With human-AI collaboration becoming commonplace, it is imperative to delineate the roles between human teachers and AI, ensuring each can maximize their strengths through cooperative efforts. This evolving landscape necessitates a transition in teachers' roles from working independently to engaging in collaborative, team-based approaches, enhancing the efficiency and effectiveness of the educational process[9].

4. Adherence to Teacher Roles in the Smart Education Era

With the dawn of the intelligent education era, robots exhibit increasing levels of intelligence . The expanding application of artificial intelligence (AI) across various domains, coupled with the irreversible integration of AI technology and education, is evident. While AI possesses undeniable advantages in the educational process compared to humans, it is pivotal to acknowledge its limitations in the educational field. Thus, teachers must fortify their role awareness and maintain their unique identity amidst the onslaught of the intelligent education era[8-9].

4.1. Upholding the Role of Nurturing Students' Social and Individual Attributes

Education transcends the mere transmission of pre-existing knowledge; it is also a process nurturing human class attributes. These attributes encapsulate characteristics of humans as social beings, encompassing external social traits (such as social and negotiation skills) and internal individual attributes (like understanding and compassion). Teachers, acting as social individuals, embody roles determined by both their external and internal attributes. Since neither teachers nor students exist in isolation, their roles as members of social groups are integral. Engaging with various group members necessitates social attributes, while each individual, teacher or student, possesses unique value and meaning. The realization of these unique values and meanings unfolds through practical rational actions, embodying the generation, internalization, and practice of moral wisdom[10-11].

Firstly, teachers must steadfastly nurture students' social attributes, as sociality is a distinctive human trait. Enhancing social skills requires not only acquiring declarative knowledge but also developing procedural knowledge through varied social interactions. Teachers, as pivotal social figures for students, contribute to accumulating students' procedural knowledge. Through continuous interaction, students refine their social experiences, preparing them for future societal integration. Teachers' conduct and instructional styles subtly influence students' future interpersonal approaches, underscoring the importance of teachers as role models and guides.

4.2. Commitment to Fostering Students' Higher-Order Thinking Skills

Cultivating higher-order thinking skills is a foundational objective of smart education. Achieving this goal in the smart education era entails fostering intellectually agile individuals. The stimulation of higher-order thinking skills, encompassing creativity, imagination, and critical thinking, is crucial. Teachers must guide students through exploration, imagination, action, and reflection based on higher-order thinking frameworks, thereby offering precise smart education to facilitate intellectual development[10].

4.3. Adherence to the Role of Educational Researcher

Teachers inherently are researchers, with research being their fundamental responsibility and mission. In the smart education era, AI teachers increasingly participate in education, handling complex and tedious tasks, alleviating teachers' workload, and affording them more time for educational research. However, AI cannot wholly substitute human teachers as education is inherently a creative endeavor, with the human brain irreplaceable. Education is a collaborative process between teachers and students, characterized by mutual stimulation and consensus-building. New insights and ideas often emerge from teachers' deep exploration and active interaction with students, a feat unattainable for computers. In the intelligent education era, the teacher's role as a researcher is paramount, reflected in various aspects of the educational process[11-12].

5. Conclusion

In transitioning from traditional to contemporary educational paradigms, it is imperative to redefine the role of teachers in the 21st century[12], elucidating their significance and value in the era of intelligent education. Understanding the nuanced transformations and steadfast aspects of the teacher's role is crucial for delving deeper into the study of educational practices in this technologically advanced era. Teachers operating within the framework of smart education possess distinct advantages compared to their counterparts in traditional, more isolated educational settings. These advantages include access to extensive databases, the ability to collaborate effectively with intelligent systems, and the utilization of deep learning technologies, among others.

As noted by the American progressive educator John Dewey[13], education is a dynamic field subject to continuous change. Educating contemporary students using yesterday's methodologies effectively deprives them of the opportunities and knowledge necessary for tomorrow[14]. With education poised to evolve in tandem with technological advancements, teachers must proactively navigate the challenges and innovations presented by smart education.

In the context of the rapidly advancing smart education era, teachers act as pivotal intermediaries facilitating the integration of artificial intelligence into education. Their level of information literacy significantly influences, and perhaps even determines, the efficacy of incorporating AI technologies into the educational process. Consequently, there is a pressing need for teachers to fortify their roles as researchers and innovators. They must explore ways to supplant mechanical and repetitive tasks with intelligent labor[15], effectively executing the fundamental educational mission of fostering well-rounded individuals through innovative technological means, including the Internet of Things and artificial intelligence.

As we venture deeper into the era of smart education, achieving precise alignment and integration between AI technologies and educational practices becomes paramount. Addressing emerging educational challenges and resolving latent contradictions in the educational landscape, engendered by the relentless march of time and technological progress, necessitate the sustained and committed efforts of educators worldwide.

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