Available Online: 25 June 2026 DOI: 10.54254/3049-7248/2026.34810

Practical logic and construction of the smart education paradigm in the age of artificial intelligence

Hui Sun

China University of Mining and Technology, Xuzhou, China

hellosunhui@126.com

Abstract. The development of new quality productive forces calls for high-caliber innovative talent, and the cultivation of interdisciplinary and innovative professionals depends on the optimization and upgrading of educational paradigms in terms of educational philosophy, cognition, and practice. A retrospective examination of the evolution of educational paradigms reveals a mutually reinforcing relationship between education and the development of productive forces. On the one hand, productive forces shape the disciplinary structure, organizational forms, and developmental objectives of education; on the other hand, educational paradigms promote the growth of new quality productive forces by providing intellectual support and cultivating talent reserves. After more than a century of transformation, the educational paradigm has reached a critical juncture marked by both unprecedented opportunities and significant challenges. How education can further consolidate its role as a source of innovation for social development has become an urgent issue. From the perspective of cultural reflection, it is particularly important to understand the underlying logic of constructing a smart education paradigm. This requires the development of a smart educational ecosystem characterized by a high degree of humanistic engagement in its resources, interactions, and evaluation mechanisms; the continuous pursuit of stronger integration between knowing and doing within a closed-loop teaching and learning process; and a closer alignment between knowledge management and the cultivation of comprehensive competencies. Employing the smart education paradigm as a compass to navigate the diverse possibilities of future educational life represents a key direction for educational exploration in the age of artificial intelligence.

Keywords: age of artificial intelligence, smart education, practical logic, paradigm construction

1. Introduction

Since the proposal to build China into a leading educational nation at the *19th National Congress of the Communist Party of China*, and the subsequent establishment of achieving this objective by 2035 as a key milestone at the *20th National Congress*, education—particularly higher education—has increasingly been recognized as a prerequisite for national modernization and the great rejuvenation of the Chinese nation. Against the backdrop of mounting external economic pressures and constraints on domestic circulation, economic development urgently requires the cultivation of new quality productive forces, while the advancement of these productive forces, in turn, depends on high-caliber innovative talent. The development

Copyright: © 2026 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

of interdisciplinary and innovative professionals cannot be separated from the optimization and upgrading of educational paradigms in terms of educational philosophy, cognition, and practice. As a fundamental subsystem of the broader social system, education, through continuous innovation, "can provide an uninterrupted supply of high-quality new labor endowed with rapidly updated knowledge and strong technological and professional competencies for the development of new quality productive forces" [1]. A retrospective examination of the evolution of educational paradigms reveals a mutually reinforcing relationship between education and productive forces. Productive forces shape the disciplinary structure, organizational forms, and developmental objectives of education, while educational paradigms foster the growth of new quality productive forces by supplying intellectual support and cultivating talent reserves. In doing so, education proactively meets the demand for scarce talent in emerging sectors and serves as a strategic driving force behind material production and social development.

Accompanied by the exponential evolution of information technology, the "Internet Plus" initiative has integrated with and fundamentally reshaped traditional industries at an unprecedented pace. In today's era of technological dominance, education, as a distinctive social sector, differs fundamentally from industries directly driven by production efficiency. Rather than operating as a standardized and linear process designed to achieve a predetermined outcome in a single effort, education constitutes a dynamic ecosystem that actively responds to transformations in social cognition, modes of knowledge production, and the evolving needs of human development. Consequently, the construction of a smart education paradigm in the age of artificial intelligence is, in essence, an inevitable stage in the technological mediation of educational theory and practice.

2. New quality productive forces call for a "new" type of worker

Advanced productive forces have long served as a fundamental engine of social progress, driving the transition from primitive existence to civilization. From hunting and gathering to agricultural cultivation, from apprenticeship-based handicraft production to mechanized mass manufacturing, and from the self-sufficient agrarian economy to the freely circulating market economy, the forms of productive forces have continuously evolved alongside historical development. The concept of new quality productive forces represents General Secretary Xi Jinping's strategic assessment of the future direction of the Party and the nation's development in response to profound global transformations unprecedented in a century. New quality productive forces encompass new forms of labor instruments, labor materials, and laborers, providing momentum for the development of emerging and future industries through the integration of scientific and technological innovation resources across industries, regions, and sectors to cultivate future pillar industries. In this sense, new quality productive forces constitute not only a theoretical and developmental proposition but also a practical and reform-oriented one. The central element underlying both practice and reform is undoubtedly people—the new type of worker—with innovation serving as the principal driving force. As one study argues, "The establishment of an innovative talent cultivation system forms the foundation for nurturing a reservoir of talent for new quality productive forces. It is not only crucial for the sustained enhancement of national scientific and technological capabilities but also directly influences the cultivation and rise of industries associated with new quality productive forces. First, China's higher education system should be continuously optimized and adjusted to cultivate highly qualified talent capable of serving emerging industries and future technological development. In scientific and technological innovation, a high-level talent pool should be established to meet the practical demands for sophisticated, cutting-edge, and scarce expertise, while the disciplinary and professional structure of higher education institutions should be flexibly adjusted to improve

the quality of talent cultivation in both foundational and emerging disciplines and ensure alignment with the developmental needs of new quality productive forces" [2]. It can therefore be argued that the cultivation of innovative talent is the educational response to the demand for a "new" type of worker in the era of new quality productive forces.

The upgrading of traditional industries such as coal and petroleum, as well as breakthroughs in emerging fields including quantum technology, biotechnology, intelligent technology, and green technology, all require new types of workers capable of providing intellectual support. The traditional Comenian classroom, organized around a teacher-centered educational paradigm, primarily cultivates talent oriented toward the imitation of established experience. By contrast, the rapidly evolving digital society demands interdisciplinary innovators equipped with boundary-crossing modes of thinking. Such individuals are able to make effective use of artificial intelligence, big data, and other technological platforms; to achieve the efficient integration of creative ideas and practical wisdom through close interactions among humans, between humans and machines, and among machines themselves; and to translate these capabilities rapidly into practical production systems. They are "innovation-oriented individuals who combine a growth mindset and a strong disposition for learning with human-machine symbiotic thinking, AI literacy, entrepreneurial spirit, and the capacity to transcend conventional boundaries" [3]. As has been observed, "they constitute the primary element of the new quality productive force system—the 'new quality labor force'" [4].

Accordingly, the educational paradigm of the future cannot remain one of experiential replication; it must become a paradigm that promotes knowledge creation and human flourishing. Likewise, future talent development should not be confined to the traditional master-apprentice model in which students merely follow teachers step by step. Instead, learners should confront emerging challenges with a lifelong commitment to inquiry, combining the intellectual disposition to learn with the practical competence to act. China's post-2000 generation, as digital natives, possesses an innate affinity for digital technologies. They are enthusiastic yet rebellious, characterized by a strong desire for knowledge while simultaneously relying on fragmented forms of information acquisition. Educational paradigms must therefore be innovated to accommodate the developmental characteristics of this new generation. By mitigating the adverse effects of data fetishism and algorithmic worship, education can cultivate a "new" type of worker endowed with innovative thinking and capable of leading future social development.

3. Intelligent media technologies empower systemic educational reform

The *19th National Congress of the Communist Party of China* identified educational informatization as a major pathway toward building a leading educational nation. Through the sustained efforts of several generations of educators, the process of educational modernization has progressed from *Education Informatization 1.0* to *Education Informatization 2.0*. This transition has not only opened a promising avenue for the transformation toward a smart education paradigm but has also laid a solid foundation for achieving the goal of becoming a leading educational nation. In *Education Informatization 2.0: Exploring Pathways for Smart Teaching Reform in Local Universities*, Mo Li argues that the development of educational information technology has undergone four stages: initiation, application, integration, and development [5]. Following the completion of the foundational stages of establishing information technology infrastructure, expanding campus broadband networks, and building public educational resource service platforms, intelligent media technologies, together with the Internet of Things (IoT), real-time data processing, artificial intelligence, and other cloud-based intelligent technologies, have advanced educational informatization into an integrated stage of development.

Driven by significant breakthroughs in underlying technologies and the exponential evolution of "Internet Plus" technologies, systemic reforms in education are quietly reshaping educational forms, reconstructing teaching models, and reorganizing educational systems. Teaching and learning spaces have transcended the fixed constraints of physical classrooms, evolving toward more abstract and integrated environments. Shared educational resources can now be tailored to individual learning needs, enabling learners to construct and co-create dynamic, high-quality content from multiple perspectives. The widespread adoption of digital educational platforms facilitates real-time interaction between teachers and students, creating immersive and diversified learning environments in which teachers assume the role of constant companions across temporal and spatial boundaries. Consequently, the empowering effect of information technology on educational reform "extends to virtually every aspect of teaching and learning. Its influence is intricate and far-reaching. Today, information technology, once an exogenous variable to education, has become embedded within the educational system through the integration of 'Internet Plus Education'" [5].

Historically, every major transformation of educational paradigms has been enabled by advances in information technology. Educational development has evolved from an experience-oriented paradigm supported by slide projectors, overhead projection systems, and broadcasting technologies, to a computer-assisted paradigm based on multimedia and network technologies, and subsequently to a data-driven paradigm characterized by Massive Open Online Courses (MOOCs) and micro-courses. In today's age of intelligent media, information technology permeates education with unprecedented intensity, influencing not only educational resources and instructional methods but also teaching processes and pedagogical approaches. Educational forms have begun to exhibit quasi-human characteristics, with intelligent technologies capable of undertaking mechanical, procedural, and even generative cognitive tasks on behalf of learners. As one study observes, "On the 'Internet Plus Education' track, information technology constitutes an effective pathway—and arguably the only pathway—toward the era of Education Informatization 2.0. ... As a principal actor in the educational system, higher education institutions bear the undeniable responsibility of integrating information technology under the guidance of educational objectives while simultaneously promoting educational development through technological innovation" [5]. It is precisely because of the integration and empowerment of information technology, particularly contemporary intelligent media technologies, that the transition from a computer-assisted educational paradigm to a smart education paradigm has become possible. Correspondingly, educational paradigms must assume new historical responsibilities and meet increasingly demanding standards of development.

"The age of artificial intelligence represents a critical turning point in the development and transformation of teaching and learning. Technology empowers instruction and promotes personalized education" [6]. By constructing multidimensional educational resources, immersive learning environments, and human-centered educational ecosystems, education can respond effectively to the demands of the AI era and adapt to the changing realities of contemporary society. Intelligent media technologies therefore transcend the traditional boundaries separating online and offline learning, teachers and students, and humans and machines. Through the systematic construction and integration of educational resources and learning environments, they foster a sustainable and resilient educational ecosystem capable of supporting the long-term development of smart education.

4. The deep integration of smart education with contemporary educational contexts

The intrinsic driving force behind the emergence of the smart education paradigm lies in the development of new quality productive forces. Beyond the digitalization of the means of production and the virtualization of the objects of labor, this transformation calls for a new type of worker characterized by interdisciplinary competence and innovative capacity. The smart education paradigm did not emerge spontaneously; rather, it is the product of the historical evolution of multiple educational paradigms. It reflects both the internal dynamics of educational transformation and a profound integration with the realities of the contemporary educational ecosystem.

As has been observed, "every industrial revolution in human history has been driven by transformations in productive forces" [7]. In turn, changes in productive forces stimulate reforms in educational systems through the demands of the labor market. The First Industrial Revolution, symbolized by the invention of the spinning jenny, dramatically altered the demographic balance between agricultural and industrial workers, prompting education to evolve from an elite model toward mass and secular education capable of meeting the demands of mechanized large-scale production. The Second Industrial Revolution, characterized by electrification, promoted the standardization and institutionalization of education. The Third Industrial Revolution, which emerged in the latter half of the twentieth century and is often referred to as the Scientific and Technological Revolution, was marked by advances in electronic information technologies and automation. It facilitated a shift whereby "knowledge production moved from fragmented and independent exploration toward active engagement with broad, interdisciplinary social contexts" [8], thereby fostering a much closer relationship between education and social practice. The second and third industrial revolutions established both the conceptual and technological foundations for subsequent transformations in educational paradigms, giving rise to successive models ranging from experience-oriented education to computer-assisted education and eventually data-driven education.

The Fourth Industrial Revolution, driven by artificial intelligence and the Internet of Things, represents an even more far-reaching process of social transformation. The smart education paradigm generated by this revolution can be understood as a deep integration of its predecessors. Computer-assisted and data-driven educational paradigms have served indispensable preparatory functions in the formation of smart education. Experience-oriented and computer-assisted paradigms laid the groundwork for the initial restructuring of educational practices, while the data-driven paradigm enriched and expanded these reforms. Building upon these earlier developments, the smart education paradigm has achieved a qualitative breakthrough rather than a mere quantitative extension. Educational approaches such as blended learning and the flipped classroom exemplify this transformation by leveraging the characteristics of the "Internet Plus" era. While preserving the advantages of face-to-face instruction, these approaches combine the interactive strengths of traditional classroom settings with the learner autonomy fostered by open educational environments. They establish an educational ecosystem in which the private learning space is primarily responsible for knowledge transmission, whereas the public learning space facilitates knowledge internalization through interaction and collaboration. Lower-order cognitive objectives and higher-order cognitive objectives are strategically distributed across these complementary domains, thereby enhancing students' capacities for integration and inquiry, application and reflection. The challenge for contemporary education is to strengthen the connections between these domains and to achieve greater concentration of educational resources, smoother integration of educational processes, and closer alignment between educational practice and learners' developmental needs.

Characterized by dynamic flows of knowledge and irreplaceable flows of human emotion, the smart education paradigm offers considerable advantages and substantial opportunities for further innovation.

Educational resources within the smart education paradigm are not only more readily accessible but can also be customized according to individual needs. Guided by principles of personalized and differentiated education, instructional approaches increasingly incorporate human-machine collaboration and adaptive learning technologies. At the same time, the integration of artificial intelligence and virtual reality creates immersive learning environments that transcend conventional spatial and temporal constraints. In an era of technological predominance, "if digitalization is the indispensable pathway toward educational informatization, then educational intelligence represents the inevitable outcome of educational modernization" [9]. The smart education paradigm broadens the horizons of what education can achieve. Building upon the practical achievements of earlier educational paradigms, it integrates educational resources, technological platforms, temporal and spatial dimensions, instructional processes, learning environments, and educational participants into a unified ecosystem. In doing so, it realizes a profound integration with the realities of the contemporary educational context and establishes a comprehensive framework for the future development of education.

5. Conclusion

The smart education paradigm in the age of artificial intelligence is not only the outcome of transformations in modes of knowledge production but also the product of the technological mediation of educational theory and practice. Driven by a new wave of artificial intelligence technologies, particularly generative AI, the deep integration of intelligent technologies with higher education is undoubtedly fraught with challenges, yet its prospects remain exceptionally promising. Rooted firmly in the humanistic mission of education, the smart education paradigm places human beings at the center of social interaction. It actively responds to changing modes of social cognition and adapts to the evolving needs of human development. Through the dynamic interplay between the provision of knowledge resources and learners' feedback, it continually rekindles curiosity and a sense of novelty, enriches students' learning experiences, and fosters a virtuous educational ecosystem characterized by teacher empowerment, enhanced classroom quality, improved student outcomes, and more effective learning.

Fundings

Jiangsu Higher Education Teaching Reform Research Project, *Innovation and Practice of Smart Teaching Paradigms in Higher Education Based on the "One Platform and Three Terminals" Smart Teaching System in the Intelligent Media Era* (2023JSJG687); the Key Project of the Jiangsu Provincial Education Science Planning Program, *Innovation and Practical Pathways for Smart Teaching Paradigms in Higher Education in the Age of Artificial Intelligence* (B/2025/01/208); and the Teaching Innovation Special Project of China University of Mining and Technology, *Teaching Innovation and Practice for Foreign Literature (II) Based on the Enhancement of Aesthetic Literacy* (2024JX04)

References

[1] Jiang, W. K. (2024). Research on the practical pathways through which new quality productive forces lead educational innovation [in Chinese]. *Journal of Qiqihar University (Philosophy and Social Science Edition)*, 5, 61–66.

[2] Gai, K. C., & Han, W. L. (2024). *New quality productive forces* [in Chinese]. China Social Sciences Press.
[3] Zhu, Z. T., Jin, Z. J., Hu, J., & Wu, D. (2024). Digital intelligence empowerment for the new-quality development of higher education: Teachers' new roles in the era of generative artificial intelligence technology [in Chinese]. *E-Education Research*, 6, 6–15.
[4] Zhang, Z. J., & Ma, L. (2024). The theoretical logic and pathways through which education promotes the development of new quality productive forces [in Chinese]. *Journal of Hebei Normal University (Educational Science Edition)*, 33.
[5] Li, M. (2023). *Education informatization 2.0: Exploring pathways for smart teaching reform in local universities* [in Chinese]. Social Sciences Academic Press.
[6] Wang, X. Y. (2022). Awakening teachers' sense of practice in online teaching from the perspective of habitus and field [in Chinese]. *Contemporary Educational Science*, 52.
[7] Jiang, C. H., & Jin, Z. W. (2024). Education empowering new quality productive forces: Theoretical logic and practical pathways [in Chinese]. *Chongqing Higher Education Research*,110.
[8] Ren, Y. Z., & Cao, Y. (2019). Higher education transformation in the context of the Fourth Industrial Revolution [in Chinese]. *China Higher Education*, 5, 16–19.
[9] Yang, X. M. (2014). The connotation and characteristics of smart education in the information age [in Chinese]. *China Educational Technology*, 1, 32–36.