

Research on New Quality Productive Forces in Education

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Abstract

High-quality development is inevitable under the transformation of the principal social contradiction in the new era. As its core driving forces, new quality productive forces are fundamental driving forces for the modernization of education. Based on the characteristics of the education field, the paper systematically explores the connotation, characteristics, and roles of new quality productive forces in education. And the development pathways of new quality productive forces in education are also discussed from the aspects of conceptual innovation, technological empowerment, and mechanism optimization. The integration of elements of educational productivity, dynamic curriculum construction, modular decomposition, whole process control, and teacher-student-machine collaboration proposed in the paper are beneficial for students to participate in the entire curriculum process, enhance the pertinence of education, implement precision education, improve the quality and efficiency of education, and promote the development of educational productivity. The proposal and research of educational new quality productive forces clarify the direction and provide reference for further exploration among peers.

Keywords

Educational New Quality Productive Forces, New Quality Productive Forces, Education Powerhouse, Teacher-Student-Machine Collaboration, Precision Education

1. Introduction

High-quality development is a critical pathway to resolving the contradiction between the people's growing needs for a better life and unbalanced, inadequate development. As the fundamental drivers of high-quality development, new quality

productive forces play pivotal roles in advancing modernization across all sectors.

Education constitutes a paramount national strategy and a fundamental task. Building an educational powerhouse serves as a pioneering task, foundational underpinning, and strategic pillar for national rejuvenation and strength (Xinhua News Agency, 2024). Since the 18th National Congress of the Communist Party of China, the Central Committee has deeply implemented the strategy of invigorating China through science and education to accelerate educational modernization, and set the goal of building an educational powerhouse by 2035 (Xinhua News Agency, 2025). And the realization of educational modernization depends on the high-quality development in education.

Productive forces are the fundamental driving power of social development and the most active and revolutionary elements propelling social progress. With the evolution of eras, technological advancements, and transformations in relations of production, productive forces continuously develop and iterate. In the new era, emerging sciences such as information science, big data, artificial intelligence, life sciences, and quantum science, alongside cutting-edge technologies, catalyze the germination and evolution of new quality productive forces.

As an advanced form of productive forces, new quality productive forces represent a high-stage development of productive capabilities. Proposed and practiced within the context of contemporary global scientific progress and China's high-quality modernization, they inherit the core tenets of the theory of Marxist productive forces while embodying distinct contemporary characteristics—high-tech, high-efficiency, and high-quality—marking a China-innovated advancement in the theory of Marxist productive forces (Zhou & He, 2024; Qiu, 2024; Xiao & Chen, 2024). Developing new quality productive forces is not only an intrinsic requirement but also a key focus of high-quality development, serving as the fundamental forces driving its realization (Jin, 2024).

Educational new quality productive forces represent the new quality productive forces within the field of education, serving as the fundamental forces driving socialist educational modernization and the construction of education powerhouse. Researching educational new quality productive forces, clarifying their characteristics, connotations, and roles, are conducive to promoting their development and maximizing their proactive impact. This endeavor holds significant theoretical research value and practical application worth.

2. Research Status on Educational New Quality Productive Forces

Since the concept of new quality productive forces was first proposed, the academic area has been engaging in theoretical research and practical exploration related to new quality productive forces in the field of education. This has enhanced understanding and practice of educational new quality productive forces, promoting their continuous development.

Bu (2024) and Bu, Su, & Zheng (2024a, 2024b) introduced the concept of physical

education new quality productive forces, conducting deep analysis of their elements, connotations, characteristics, roles, influencing factors, and challenges. This research provides critical references for studying educational new quality productive forces.

Sun (2024) investigated how higher education empowers new quality productive forces and its practical dilemmas. It proposed strategies such as innovating talent cultivation mechanisms, prioritizing basic scientific research, aligning with emerging industrial demands, elevating the status of humanities and social sciences, and improving international talent mobility mechanisms. These measures aim to remove institutional barriers in productive relations and enhance the proactive role of new quality productive forces in education.

Han (2024) emphasized cultivating new quality productive force in university Party school education through high-efficiency management approaches, cultivating talents with strong political commitment, ideological steadfastness, high competence, and disciplined work ethics to serve socioeconomic development.

Liu & Zhang (2025) focused on education-driven new quality productive forces, proposing to innovate the mode, improve the quality, and strengthen the cooperation between industry, academia, and research in continuing education in universities. These efforts aim to lead the development, support the upgrading, and promote the growth of new quality productive force.

Symposium (2024) documented extensive discussions among experts and scholars in university quality-oriented education theory and practice, exploring strategies for cultivating high-quality talents to serve and advance new quality productive forces.

Lu et al. (2024) proposed that higher education empowers new quality productive forces through digital transformation. This includes revolutionizing education modes to cultivate new laborers, harnessing data resources to create new objects of labor, and building digital ecosystems to generate new means of labor.

Bi & Zhang (2024) examined the role of new quality productive forces in ideological and political education from theoretical, value-based, motivational, and practical logic perspectives. This enhances systematic understanding of educated objects, scientific evaluation of pedagogical methods, precise and latent knowledge transfer, and multidimensional communication of educational content.

Zheng (2024) analyzed the driving role of new quality productive forces in vocational education digitization, addressing challenges and practical implementations based on the characteristics of new quality productive forces and the demands of modern vocational education.

Wang & Li (2024) explored the relationship between new quality productive forces and China-style educational modernization, discussing their reciprocal interactions—how new quality productive forces drive educational modernization and how education reciprocally fuels the development of new quality productive forces.

Analysis indicates that current research mainly focuses on the developmental

role of educational elements in new quality productive forces, with only a limited number of scholars conducting preliminary explorations into the conceptual framework of educational new quality productive forces. Systematic and independent research on this concept remains insufficient. As fundamental, pioneering, and strategic productive forces, in-depth studies on the connotations, characteristics, proactive roles, and developmental pathways of educational new quality productive forces are essential. Such research will refine and mature the theoretical system, enhance the capacity to address contradictions and challenges in building an education powerhouse, and accelerate the realization of educational modernization.

3. Educational New Quality Productive Forces and Their Characteristics

3.1. Educational New Quality Productive Forces

Educational new quality productive forces represent a qualitative leap from traditional educational productive forces, serving as new driving forces for high-quality educational development. They are characterized by educators endowed with scientific innovation spirit, advanced educational technologies, and modern pedagogical concepts and methods. These educators utilize cutting-edge means of labor to cultivate objects of labor with comprehensive qualities—encompassing moral, intellectual, physical, aesthetic, and labor education—in a high-quality and efficient manner. Educational new quality productive forces not only emphasize the accumulation and transmission of knowledge but also prioritize the cultivation of innovative capabilities and the development of soft thinking skills, aiming to meet the demands of the new era, new economy, and emerging industries.

3.2. Characteristics of Educational New Quality Productive Forces

Educational new quality productive forces emphasize the central role of innovation in educational development. They aim to enhance the technological elements of educational productivity through innovative reforms, establish institutional mechanisms aligned with building an education powerhouse, optimize the allocation and efficient utilization of educational resources, develop first-class disciplines and universities, improve the quality and effectiveness of knowledge inheritance and innovation, elevate talent cultivation standards, and promote high-quality educational development. While inheriting the core traits of new quality productive forces—high-tech, high-efficiency, and high-quality—educational new quality productive forces also possess unique characteristics distinct from other productive forces.

1) Innovation in Educational Philosophy

The fundamental goal of education is to cultivate qualified talents meeting the needs of the times. The cores of education are: “Whom to cultivate, what kind of talents to cultivate, and for whom to cultivate”. Therefore, educational reform and development must revolve around students. Traditional higher education mainly

focuses on evaluating the workload of teachers. Very little substantive emphasis is placed on teaching quality and student cultivation quality. In contrast, modern education prioritizes student-centered teaching, with the fundamental task of “cultivating virtue through education” and the focus on developing students’ comprehensive qualities—moral, intellectual, physical, aesthetic, and labor education. Assessment emphasizes students’ moral character, and the abilities of knowledge application and innovation, particularly fostering their ethical integrity and creative capabilities.

New-generation educational practitioners must center on students and leverage smart education platforms and AI-assisted tools to innovate teaching modes, methods, and evaluation mechanisms. They should establish students’ active role as learners, guiding them to engage proactively in the entire teaching process and consciously cultivate their five-dimensional qualities (moral, intellectual, physical, aesthetic, and labor education). Technologies such as big data, cloud computing, and artificial intelligence provide foundations for implementing student-centered educational philosophies, enabling proactive student learning and precise teacher instruction, thereby enhancing the quality and efficiency of talent cultivation.

2) Empowerment by High-Tech

Science and technology constitute the primary productive forces, driving the development of new quality productive forces through innovation. New-generation educational practitioners are capable of applying advanced educational techniques and tools, iterating and innovating knowledge and techniques to evolve into digital-intelligent laborers. The advancement and application of technology redefine requirements for talent cultivation, giving rise to new types of objects of labor. These labor objects now require mastery of more sophisticated and technology-intensive contents. Furthermore, cutting-edge technology continuously catalyzes the digital-intelligent transformation of educational tools, enriching and enhancing the quality of labor resources (means of labor), thereby elevating the level of educational new quality productive forces.

3) High Integration of Productive Elements

The student-centered educational philosophy requires students to assume part of their learning responsibilities actively, engage with course design and employment, and thus embody dual roles as both laborers and objects of labor. They must simultaneously receive education, pursue self-directed learning, cultivate self-improvement spirit, and participate in the entire educational process. Under the innovation-driven development paradigm, labor resources (means of labor) serve not only as tools for cultivating objects of labor but also as entities that require continuous updating, becoming objects of labor themselves in need of refinement. In this context, educators act as both talent cultivators (educational laborers) and recipients of continuous innovation and re-education, while also functioning as objects of labor. This integrated nature of productive elements injects dynamic energy into productivity development, effectively enhancing the holistic advancement of

educational new quality productive forces.

4) Highly Digitized Productive Elements

Under the context of modern technological advancement, data has become the fundamental element of educational new quality productive forces, with digitization serving as a key feature. In a data-driven technological landscape, educators and learners possess advanced digital literacy and theoretical foundations, labor resources (means of labor) exhibit digital-intelligent characteristics, and objects of labor enable digital production and quantitative evaluation. The high degree of digitization across productive elements elevates the level of educational productivity, advancing the digitalization and precision of talent cultivation.

5) Teacher-Student-Machine Collaborative Education

The implementation of student-centered educational philosophies, combined with the digitization and high integration of productive elements, strengthens interconnectivity and collaboration among all components. Teachers use smart education platforms for teaching, while students use smart education platforms for learning and feedback. The smart education platform records, analyzes, and provides real-time feedback on teaching and learning situations, highlighting teaching and learning difficulties and problems. Teacher-student-machine collaboration provides new teaching mode, precision education and enhances educational quality.

6) Optimization of Educational Productive Relations

Productive forces determine productive relations, while productive relations, in turn, influence productive forces. Productive relations that align with the development of productive forces can further advance productivity. Educational new quality productive forces define the educational systems and mechanisms. High-quality and efficient educational new quality productive forces can drive deep reforms in educational systems and mechanisms, establishing productive relations that better adapt to and foster the development of high-quality productive forces.

4. Educational New Quality Productive Forces Are the Fundamental Driving Forces for Educational Development

Productive forces are the fundamental drivers of economic and social development. Educational new quality productive forces, integrating advanced technologies and harmonizing various elements through teacher-student-technology collaboration, enable high-quality, efficient, and precise education, serving as the foundational forces for building an education powerhouse.

Talent cultivation is pivotal to educational advancement. Educational practitioners of new quality productive forces possess advanced pedagogical concepts and mastery of cutting-edge technology. They deeply understand and adhere to the fundamental mission of “cultivating virtue through education”, address the core educational questions of “whom to cultivate, how to cultivate them, and for whom to cultivate them”, and implement student-centered educational philosophy.

By executing high-quality, efficient educational strategies, high-quality talents aligned with the demands of socialist modernization can be nurtured.

New quality labor resources (means of labor) powered by advanced technology such as big data, cloud computing, and artificial intelligence enable comprehensive monitoring, intelligent analysis, and scientific evaluation of the entire teaching-learning process. These tools provide robust support for innovating and implementing multidimensional teaching modes, methods, and evaluation mechanisms. Digital-intelligent labor resources (means of labor) break temporal and spatial constraints on learning and communication between teachers and students, facilitating self-directed student learning. Additionally, new-generation educational resources create platforms for teacher-student-machine collaborative education, achieving precise education and enhancing efficiency and quality.

The student-centered educational philosophy fosters students' sense of responsibility and initiative, encouraging them to engage in self-cultivation proactively.

The qualitative leap in educational productivity drives deep reforms and practices in education, establishing new educational relations of production. This transformation eliminates systemic and institutional barriers hindering educational development, propelling high-quality educational advancement. It serves as the fundamental force for building an education powerhouse and cultivating high-caliber talents essential for socialist modernization.

5. Development of Educational New Quality Productive Forces

New quality productive forces emerge through continuous changes and dynamic accumulation in social modes of production and conditions. They are driven by revolutionary technological breakthroughs, innovative allocation of productive elements, and profound industrial transformation and upgrading. From implementing the Science and Education Rejuvenation Strategy, the Talent Strengthening Strategy, to the Innovation-Driven Development Strategy, China has consistently upheld its conviction in independent innovation, adhered to a distinctive Chinese path of independent innovation, adopted a problem-oriented approach, and strived to explore the laws of educational innovation. The development of educational new quality productive forces represents the fundamental solution to advancing China's educational reforms, practices, and the construction of an education powerhouse.

5.1. Fundamental Principles for the Development of Educational New Quality Productive Forces

The development of educational new quality productive forces must be grounded in the fundamental mission of "cultivating virtue through education". It should focus on addressing the core questions of "whom to cultivate, what kind of talents to cultivate, and for whom to cultivate", while clearly defining cultivation objectives, goals, contents, and requirements. This requires deepening technological

innovation and application, advancing educational system reforms, and enhancing the efficiency and effectiveness of productive element allocation. Adhering to the student-centered educational philosophy, it is essential to innovate teaching modes, methods, and evaluation mechanisms, strengthen teacher-student-machine collaboration, elevate precise education standards, and promote high quality, efficient educational development.

5.2. Strengthening Innovation in Educational Science and Technology

Science and technology constitute the primary productive forces, while innovation serves as the primary driving force and the core impetus for productivity development. The advancement of educational new quality productive forces requires not only absorbing advanced societal technology but also actively pursuing self-innovation and self-improvement. The development and application of technology such as information science, big data, artificial intelligence, and virtual reality have elevated the quality of educational resources, enriched the contents of labor objects, and improved educational quality and efficiency. These technologies also underpin reforms, innovation, and practical implementation of teaching modes, methods, and evaluation mechanisms, fostering healthy interactions among teachers, students to enable coordinated, precise, and personalized education. As hubs for the convergence of education, technology, and talent cultivation, universities must focus on national strategies, critical technologies, local characteristics, and industrial demands to drive scientific innovation. By highlighting unique strengths and comparative advantages, universities can provide robust technological, intellectual, and human resource supports for the development of both educational new quality productive forces and broader societal new quality productive forces.

5.3. Cultivating Supportive Social Environment for the Development of Educational New Quality Productive Forces

The growth of educational new quality productive forces relies on conducive societal environment. National, regional, and institutional stakeholders must vigorously foster a supportive social atmosphere to promote and incentivize the development of educational new quality productive forces. Educational authorities should provide training, learning, and practical opportunities to enhance educators' capacity to utilize advanced labor resources (means of labor). Increased financial support should be directed toward key disciplines and courses, driving overall development through targeted initiatives.

Educators must actively engage in advancing educational new quality productive forces by implementing student-centered philosophies, innovating teaching modes, refining pedagogical methods and evaluation mechanisms, stimulating students' intrinsic motivation to learn, and executing teacher-student-machine collaborative education to improve teaching quality and efficiency. As specialized

learners, students must consciously embrace their central role in education, proactively participate in learning processes, and commit to self-directed growth and innovation

The development of educational new quality productive forces is inseparable from the advancement of social productive forces. The current abundance of educational platforms and tools provides critical support for improving teaching practices (by teachers), enabling self-directed learning (by students), and refining teaching modes, pedagogical methods, monitoring systems, and evaluation methodologies. These tools not only enhance the efficiency of course learning but also elevate the quality of student development.

5.4. Accelerating the Development of Smart Education Platform

The advancement of educational new quality productive forces relies on digital smart education platforms. Existing domestic education platforms have played a significant role in advancing China's educational digitization. However, current platforms still face issues such as inadequate functionality, unstable operations, and data silos between systems. To address these challenges, it is essential to strengthen digital infrastructure for education, improve data interoperability mechanisms, ensure secure data flows, and promote digital-intelligent and equitable education. These efforts will foster the balanced and coordinated development of educational new quality productive forces.

5.5. Enhancing Curriculum Development

Curriculum is the main carrier and an important mean of labor for talent cultivation. Strengthening curriculum construction can effectively enhance the level of new quality productivity in education. Strengthening the construction of ideological and political education in the curriculum can ensure the correct direction of talent cultivation; strengthening the dynamic construction of course contents can ensure its cutting-edge nature; increasing industrial materials can align the curriculum with the industry. Refining course contents and modularizing knowledge system can lay the foundation for implementing process management.

High-quality curriculum process management can also promote educational new quality productive forces. The implementation of curriculum can be divided into several phases such as pre class, class, and post class. Teachers release pre class and post class tasks. Students complete the work and feedback questions to teachers. Teachers carefully design classroom contents and teaching methods based on preparation and homework situation, highlighting key and difficult contents, attracting students to participate efficiently, and improving classroom quality and efficiency. Smart education platform can record and analyze students' learning situation, facilitate timely communication between teachers and students which provides good conditions for the implementations of the teacher-student-machine collaboration mechanism and curriculum process control. Strictly monitoring the course process and proper evaluation mechanism can activate students'

enthusiasm for participation which is conducive to achieving precision education, improving the quality and efficiency of education.

5.6. Improving Educational Systems and Mechanisms

Educational Systems and Mechanisms belong to relations of production. To adapt to the development of educational new quality productive forces, it is imperative to deepen reforms in educational systems and mechanisms. The focus of the reform of education is to optimize the allocation of resources. Through reform, more resources should be allocated to advantageous areas where the educational new quality productive force can rapidly develop. Leveraging the Double First-Class University Initiative as an opportunity, efforts should focus on national strategic demands, critical core technology, and local advantages which can strengthen comparative advantages, highlight distinctive features, and establish long-term mechanisms for high-quality educational development and talent cultivation.

6. Conclusion

Given education's foundational and strategic roles in national economic and social development, this paper analyzes and explores educational new quality productive forces. It examines the connotations and characteristics, discusses the fundamental role in educational advancement, and proposes development strategies. These studies are beneficial for the development of educational new quality productive forces, for the high-quality development of education and the construction of education powerhouse, and also provide reference for the continued research of peers.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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