

# Research on the Digital Transformation and Innovative Ecosystem of Labor Education for New Quality Productivity

Qian Zhu<sup>1</sup>, Yang Li<sup>1</sup>, Yuping Song<sup>2\*</sup>

<sup>1</sup>School of Mechanical and Electrical Engineering, Hunan Applied Technology University, Changde, Hunan, 415000, China

<sup>2</sup>School of Economics & Management, Hunan Applied Technology University, Changde, Hunan, 415000, China

## ABSTRACT

With the vigorous development of new quality productive forces, the traditional labor education model is difficult to meet the demands of the digital age for cultivating innovative and compound talents. This article explores the intrinsic connection between the digital transformation of labor education and the development of new quality productive forces, and analyzes the innovative paths of labor education in terms of curriculum system, teaching mode and practical platform under the background of digital transformation. Research shows that by building an innovative ecosystem featuring the collaboration of multiple subjects, labor education can more effectively cultivate modern talents with digital literacy and innovation capabilities. Further research indicates that during the digital transformation of labor education, it is necessary to be vigilant against potential risks such as technological reliance, the digital divide, and ethical misconduct, and to promote systematic changes in labor education through strategies such as strengthening policy guarantees, optimizing resource allocation, and improving the evaluation system. The digital transformation of labor education is not only a process of empowering education with technology, but also an important measure to reconstruct the labor education ecosystem and serve the development of new quality productive forces.

## KEYWORDS

New quality productivity; Labor education; Digital transformation Innovation ecosystem; Digital literacy

## 1 Introduction

New quality productivity is a new form of productivity driven by scientific and technological innovation, which is profoundly reshaping the social economic structure and labor patterns <sup>[1]</sup>. Against this backdrop, labor education, as a crucial link in cultivating well-rounded talents, is confronted with unprecedented opportunities and challenges. The traditional labor education model has a tendency to emphasize physical labor over mental creation, skills training over value guidance, and individual practice over systematic collaboration. It is difficult to meet the requirements of the digital age for workers' innovation ability, digital literacy and cross-border collaboration ability. Digital transformation offers brand-new possibilities for labor education to break through traditional bottlenecks. Empowered by digital technology, labor education can achieve systematic innovation in terms of concepts, content and models, and thereby build an innovative ecosystem that ADAPTS to the demands of new quality productivity.

The digital transformation of labor education in colleges and universities has become an important path to promote educational modernization. The deep integration of digital technology has not only transformed the forms and means of labor education, but also redefined its connotation and value. Labor education oriented towards new quality productive forces should go beyond instrumental rationality, highlight value guidance, and cultivate new types of workers with a sense of patriotism, innovative spirit and digital literacy through a combination of virtual and real elements and multi-party collaboration. For this reason, this study, from both theoretical and practical perspectives, systematically explores the paths and strategies for the digital transformation and innovative ecosystem construction of labor education, with the aim of providing theoretical references and practical guidance for the high-quality development of labor education.

## 2 The Intrinsic Connection Between New Quality Productivity and the Digital Transformation of Labor Education

New quality productivity is characterized by high technology, high efficiency and high quality, and relies on the leading role of scientific and technological innovation in industrial development <sup>[2]</sup>. This new form of productivity has put forward brand-new requirements for the quality and skills of the labor force. Workers need to possess digital literacy, innovative thinking and the ability to integrate across disciplines. Labor education, as the core approach to shaping the values, knowledge and skills of workers, must respond to the fundamental changes in the talent structure brought about by the new quality of productive forces. Digital transformation is precisely the key bridge connecting new quality

---

\* **Corresponding Author:** Yuping Song, 15173662243@163.com

productivity and labor education. It promotes a comprehensive innovation in the goals, contents and methods of labor education through technological empowerment, enabling it to better adapt to the evolution of labor forms in the digital economy era.

The development of new quality productive forces has given rise to new forms of labor such as digital labor and intelligent labor, shifting the focus of labor education from traditional skills training to the cultivation of digital capabilities and innovative thinking. In the era of digital economy, labor is no longer confined to physical operations in the physical space, but has expanded to activities such as data processing, algorithm design and system optimization in the virtual space. This transformation requires that labor education incorporate digital literacy, programming skills, data analysis and the application of artificial intelligence into its core curriculum system, enabling students to be competent in highly digital and intelligent labor scenarios. The new quality productivity emphasizes the core role of innovation in value creation. Labor education should cultivate students' innovative thinking and complex problem-solving abilities through project-based learning, virtual simulation and practical communities, etc.

The digital transformation of labor education is not only an external requirement of new quality productive forces, but also an internal need for its own development. Traditional labor education is confronted with problems such as lagging course content, monotonous teaching forms, rigid evaluation systems and insufficient resource integration, making it difficult to achieve the goal of cultivating high-quality talents. Digital technology has injected new vitality into labor education. Technologies such as virtual reality, augmented reality and digital twins can create highly realistic labor scenarios, enabling students to carry out repetitive and high-risk practical operations in a safe environment. Precise teaching supported by big data analysis can provide personalized learning plans based on individual differences among students, thereby achieving teaching according to students' aptitudes. Online collaboration platforms have broken the time and space limitations of labor education, making cross-regional and cross-cultural labor practices and exchanges possible.

### 3 The Practical Path of Digital Transformation of Labor Education

The core of the digital transformation of labor education lies in the reconstruction of the curriculum system<sup>[3]</sup>. Labor education courses oriented towards new quality productive forces need to break through the traditional model dominated by physical labor and construct a three-level curriculum structure of basic, extended and innovative types. Basic courses focus on the popularization of labor values and digital literacy, extension courses strengthen digital skills training in line with professional characteristics, and innovative courses guide students to solve complex practical problems through project-based learning. This pyramid-shaped course matrix not only ensures the wide coverage of labor education but also provides personalized development paths for students from different professional backgrounds. In terms of course content, labor education should incorporate elements such as digital technology, artificial intelligence ethics, and data science, enabling students to master digital skills while understanding the social impact of technological applications.

The empowerment of labor education by digital technology is reflected in the reconstruction of teaching models. Technologies such as virtual simulation, augmented reality and digital twins have created a teaching environment that integrates virtual and real elements for labor education. Students can simulate high-risk and high-cost practical operations in the virtual space and then transition to applications in real scenarios. This teaching mode that combines virtual and real elements not only reduces practical risks but also enhances learning efficiency. Blended learning organically combines online resources with offline practice. Students complete theoretical knowledge learning and simulation training through online platforms and conduct hands-on operations at on-campus practice bases or on-site in enterprises. The personalized learning path recommendation system supported by big data analysis can customize the most suitable learning content and pace based on students' knowledge foundation, learning progress and ability tendency, achieving large-scale teaching according to individual aptitude.

The key link in the digital transformation of labor education is the reconstruction of the practical platform. The practical platform for labor education in the digital age needs to break through the boundaries of the campus and build an open ecosystem featuring collaboration between schools and enterprises as well as integration of industry and education. Colleges and universities can jointly build digital labor education bases with leading enterprises and industrial parks, introduce real projects and working scenarios from enterprises, and enable students to master the latest technologies and methods in practice. The innovation and entrepreneurship platform combines labor education with innovation and entrepreneurship education. Through methods such as creative incubation, innovation competitions and entrepreneurial practices, it cultivates students' innovative spirit and entrepreneurial ability. Digital platforms have further extended the boundaries of practical resources. Virtual laboratories supported by cloud computing can offer remote operation opportunities for high-cost and high-difficulty equipment, enabling students from schools with weak resources to also obtain high-quality practical experiences.

The construction of the teaching staff is an important guarantee for the digital transformation of labor education. The level of digital literacy of teachers directly determines the effectiveness of digital transformation. Colleges and universities need to enhance teachers' capabilities in digital technology application, online teaching design, and data-driven evaluation through specialized training, enterprise practice, and academic exchanges. Teacher training should avoid the simple indoctrination of technical operations and highlight the deep integration of digital technology and labor education, enabling teachers to creatively apply digital tools based on the characteristics of their subjects and the needs of students. Meanwhile, universities should establish cross-school and cross-regional teacher development communities, and promote the dissemination and popularization of best practices through forms such as experience sharing, case studies and cooperative research.

#### **4 The Construction of an Innovative Ecosystem for Labor Education Oriented Towards New Quality Productive Forces**

The construction of an innovative ecosystem for labor education requires the collaborative participation of multiple subjects <sup>[4]</sup>. The government, schools, enterprises, communities and families play different roles in labor education. Only by forming a joint force can the benefits of labor education be maximized. The government provides institutional guarantees for the innovation of labor education through policy guidance and resource input. As the main battlefield of labor education, colleges and universities need to play a core role in curriculum development, teaching implementation and evaluation reform. Enterprises offer real projects, practical venues and industry mentors to make labor education closely meet the demands of the industry. Communities and families provide students with daily labor opportunities and value cultivation, fostering their labor habits and sense of responsibility. This innovative ecosystem of multi-subject collaboration can break down the barriers between education and society, enabling labor education to take root in the real soil.

Mechanism innovation is the source of vitality for the innovation ecosystem of labor education. Colleges and universities need to establish a cross-disciplinary and cross-departmental coordination mechanism for labor education, break down professional barriers and organizational obstacles, and achieve the integration of labor education in terms of courses, teaching staff and resources. Innovation in the credit recognition and transfer system can encourage students to participate in diverse labor practice activities and incorporate the achievements of labor education into the academic evaluation system. The reform of the teacher assessment and incentive mechanism can attract more outstanding teachers to devote themselves to the cause of labor education, forming a teaching staff that combines full-time and part-time teachers and has a reasonable structure. The deepening of the school-enterprise collaboration mechanism promotes the two-way flow of talents, technologies and resources, enabling the mutual reinforcement of labor education in colleges and universities and the innovative development of enterprises.

The innovative ecosystem of labor education needs to highlight the balance between digital empowerment and humanistic guidance. Digital technology is an important booster for innovation in labor education, but the application of technology must serve the essence of education. While introducing virtual simulation, online platforms and big data analysis into labor education, it is necessary to retain the core values of hands-on practice, physical labor and emotional communication, and avoid the weakening of the labor experience by technological reliance. Digital ethics education should be an important part of labor education, guiding students to think about the social impact and ethical boundaries of technology application, and cultivating a responsible awareness of technology use and innovation. This balance enables labor education to embrace technological changes while adhering to its original intention of nurturing people, and to cultivate new types of workers who not only master digital skills but also possess humanistic sentiments.

The sustainability of the innovation ecosystem depends on resource integration and platform support <sup>[5]</sup>. The construction of a labor education resource platform can achieve inter-school resource sharing and complementary advantages, reducing repetitive investment and resource waste. Open course libraries, virtual laboratories and practice base networks can expand the coverage of high-quality resources and promote educational equity. The digital management platform, through data collection and analysis, provides scientific basis for labor education decision-making, achieving precise policy implementation and dynamic adjustment. These platforms together form the infrastructure of the labor education innovation ecosystem, enabling multiple entities to collaborate efficiently and resources to be optimally allocated.

#### **5 Conclusion and Prospect**

The digital transformation and innovative ecosystem construction of labor education oriented towards new quality productive forces is a systematic project that requires coordinated changes in concepts, technologies, systems and

cultures. This study, through analysis, indicates that the digital transformation of labor education is not only a process of technology empowering education, but also an important measure to reconstruct the labor education system and serve the development of new quality productive forces. Through curriculum reconstruction, model innovation and platform construction, labor education can better cultivate innovative talents who adapt to the digital age. Through multi-party collaboration, mechanism innovation and resource integration, the innovation ecosystem of labor education can form a virtuous cycle of sustainable development.

The future development of labor education needs to further highlight the integration of digital empowerment and humanistic guidance. While the application of technology continues to deepen, labor education should pay more attention to the cultivation of labor values, enabling students to deeply understand the significance and value of labor. The integration of digital technology and labor education also needs to deepen from the tool level to the conceptual level, so that technology can truly serve the all-round development of people. In addition, labor education needs to enhance forward-looking research on the development trends of new quality productive forces, promptly adjust educational content and methods, and enable talent cultivation to better adapt to the demands of future society.

## Funding

Hunan Applied Technology University, First-class Mechatronics Engineering major (NO: HYYLZY202403)

## About the Author

Qian Zhu, Bachelor's Degree, Teaching Assistant, Administration.

Yang Li, Bachelor's Degree, Associate Professor, Investigation into the Design and Service Behavior of Thermal Barrier Coating Materials.

Yuping Song, Master's Degree, Associate Professor, Logistics Management.

## References

- [1] Lei L , Guo S , Qi B . Optimization Study of Regional Digital Innovation Capability Driven by the Synergy of Information Ecology and Digital Transformation: Dynamic QCA Analysis Based on Provincial Panel Data[J]. *Sustainability*, 2025, 17(16):7534-7534.
- [2] Bashrawi A A M, Sharafi A A M, Elgendy A I, et al. Agentic AI systems and the future of entrepreneurship: a perspective on co-agency, innovation, and ecosystem transformation[J]. *International Entrepreneurship and Management Journal*, 2026, 22(1):27-27.
- [3] Smolka M, Neudert P, Bögner F, et al. Anticipatory alignment work: The politics of anticipation in an emerging innovation ecosystem of neuromorphic computing[J]. *Futures*, 2026, 176:103756-103756.
- [4] Sarah B, Moyses A L L, Yoshiaki S, et al. Enabling Co-Innovation for a Successful Digital Transformation in Wind Energy Using a New Digital Ecosystem and a Fault Detection Case Study[J]. *Energies*, 2022, 15(15):5638-5638.
- [5] Ampong O K, Martey E, Micah R A. Digital behaviour change ecosystems for sustainable innovation[J]. *Discover Sustainability*, 2026, 7(1): 183-183.