Journal of Human Resource Development (2025)
Clausius Scientific Press, Canada

DOI: 10.23977/jhrd.2025.070106
ISSN 2616-3357 Vol. 7 Num. 1

Research on the Path of Empowering Enterprises with Digital Transformation through Vocational Education

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Keywords: Vocational Education, Digital Transformation of Enterprises, Paths

Abstract: Digital transformation has been elevated to the height of national strategy and has become a necessary option for all enterprises. Many enterprises have tasted the benefits of digital transformation, but more than 80% of small and medium-sized enterprises in China still face a series of difficulties in the process of digital transformation, the key being the shortage of funds, technology, and talents. In the process of enterprise digital transformation, funding and technology are important, and talent is even more important. The solution to technical problems not only relies on funding, but also on talent. In order to cultivate various types of digital talents that are in short supply in various industries, relevant departments have also introduced a series of policy measures, and many schools are actively adjusting their professional structures and setting up digital related majors. Vocational education can cultivate relevant talents for the digital transformation of enterprises. If vocational education and enterprise digital transformation can be further integrated and developed, it can not only help solve the shortage of digital talents in enterprises, but also achieve high-quality employment for vocational school graduates [7].

1. Definition of related concepts

1.1 Enterprise Digital Transformation

Enterprise digital transformation refers to the use of digital technology and innovative methods by enterprises to redesign and redesign their business processes, organizational structure, products, and services, in order to improve efficiency and create value. It is the process of enterprises transitioning from traditional management models to digital and intelligent management models to meet the opportunities and challenges brought by the digital age[1-2].

1.2 Digital Talents

Digital talents can be divided into chivalrous and broad categories. From a chivalrous perspective, digital talent specifically refers to professional technical personnel who master digital technology. They understand how data is generated, can adapt to rapid iteration of data, and can build digital platforms and perform digital maintenance according to enterprise needs. Broadly speaking, digital talents refer to those engaged in work related to digital transformation, mainly including four categories: (1) digital professional and technical talents, who understand how data is

generated, can adapt to rapid iteration of data, and can build digital platforms and maintain data according to enterprise needs. (2) Digital application talents refer to those who utilize digital tools, means, and methods for daily work. (3) Digital management talents refer to individuals with digital thinking and the ability to operate digital tools for decision-making and management. (4) Digital composite talents refer to digital talents who possess both business understanding and digital technology capabilities[3].

2. Overview of Relevant Theories

2.1 Human Capital Theory

Human capital refers to the knowledge, skills, health, and habits that individuals possess, which can enhance the productivity of workers and convert them into economic value. Unlike material capital, it is intangible and renewable. Education can enhance the knowledge and skills of workers with economic value, thereby improving their labor productivity and promoting economic growth.

2.2 Symbiotic Theory

The theory of symbiosis originated in the field of biology and was proposed by German mycologist Deberg in 1879. It describes the state in which different species of organisms live together based on certain material connections. Symbiosis is a self-organizing phenomenon, in which organisms must rely on and interact with each other in a certain way to form a symbiotic relationship of common survival and coevolution in order to survive. In the theory of symbiosis, symbiotes are mainly composed of three elements: symbiotic units, symbiotic modes, and symbiotic environments. Symbiotic unit refers to the basic unit that constitutes a symbiotic organism or symbiotic relationship, such as organisms of different species, different enterprises, etc, as shown in figure 1. Symbiotic mode is a form of interaction or combination between symbiotic units. Symbiotic environment is the sum of all factors outside the symbiotic unit, including external factors such as politics, economy, culture, technology, etc., which have an impact on the symbiotic unit and symbiotic mode. The theory of symbiosis holds that only by creating a positive symbiotic environment can it be conducive to the development of symbiotic organisms [4].

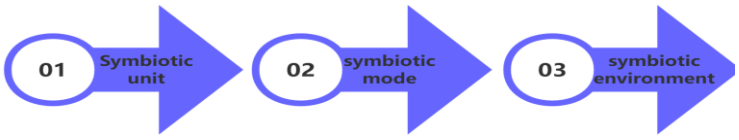

Figure 1: Elements of Symbiosis Theory

3. The Current Situation of Talent Shortage in Enterprise Digital Transformation

In the process of enterprise digital transformation, digital professional and technical talents, digital application talents, digital management talents, and digital composite talents are all indispensable. A large number of enterprises in our country are undergoing or urgently need digital transformation, resulting in a shortage of these talents in the market, especially digital composite talents.

3.1 Shortage of digital professional and technical talents

With the development of digital industrialization and industrial digitization, digital transformation has become a necessary task for every enterprise. The digital talent gap brought

about by the digital transformation of enterprises is enormous, and the current digital talent in society cannot meet the rapidly growing demand of enterprises. In recent years, the country has increased investment and construction in digital infrastructure around new infrastructure, further leading to a strong demand for digital talents, especially the huge shortage of digital core technology personnel based on industries[5].

3.2 Shortage of digital application talents

In the digital age, the development of artificial intelligence has led to the phenomenon of machines replacing human labor in various industries. On the one hand, machines have advantages in certain aspects that humans cannot match, such as work efficiency and accuracy; On the other hand, the use of machines also reduces the labor costs of enterprises. But machines require digital application talents for maintenance and use, and there is still a large talent gap in this area in China.

3.3 Shortage of digital leadership talents

Digital leadership talents refer to those who lead the digital transformation work of enterprises. Their main tasks include formulating digital strategic plans, promoting organizational digital transformation, and continuously responding to digital development. Digitization has disrupted the cognition, concepts, thinking, and practices of traditional business leaders. Digital leadership is a key factor in the success or failure of enterprise digital transformation, as digital transformation requires leaders to have sufficient understanding and insight into digitalization itself and its impact, and to be able to respond agilely accordingly. They should be able to quickly apply digital thinking to strategically restructure or adjust the organization, and also be able to respond agilely to the development and changes caused by digitalization, continuously improving and perfecting the organization. Obviously, digital leadership cannot be obtained through simple training, and requires conscious and continuous cultivation by enterprise managers. Therefore, overall, there is a lack of digital leadership in enterprises, and for a long time in the future, there will be a severe shortage of digital leadership talents, which will be the focus of global competition.

3.4 Difficulty in finding digital composite talents

The digital transformation of enterprises must be based on the integration and reconstruction of internal systems. Therefore, without composite talents who understand both digital technology and business, enterprises need to organize and coordinate a large number of internal resources, and multiple departments need to work together in a complex manner. This is a great challenge for managers, and any carelessness in the entire process (such as poor communication, poor cooperation, etc.) may lead to failure. If a company has composite talents with diversified knowledge and abilities, this problem can be easily solved. However, let alone small, medium-sized and micro enterprises, even large banks, Internet enterprises and other institutions that take the lead in digital words are hard to find such complex talents, as shown in Table 1, the current situation of talent shortage in enterprise digital transformation [6].

Table 1: The current situation of talent shortage in enterprise digital transformation

Serial number	content
1	Shortage of digital professional and technical talents.
2	Shortage of digital application talents.
3	Shortage of digital leadership talents.
4	Difficulty in finding digital composite talents.

4. Reasons for Talent Shortage in Enterprise Digital Transformation

4.1 Insufficient talent supply

The low quality of labor and the low education level of traditional enterprise workers will constrain the digital transformation of enterprises. Providing digital training to workers in these traditional industries is a good way to increase digital talent and enhance their job seeking abilities, but it requires a longer process and is also subject to the level of education of workers.

4.2 Insufficient number of digital talents cultivated by schools

Although the country is vigorously developing vocational education, some educational institutions pursue scale but lack connotation construction, the integration of industry and education is not deep enough, and the infrastructure is lagging behind, resulting in a disconnect between talent cultivation and the actual needs of enterprises. There is no quality guarantee in talent cultivation and supply, and it is impossible to achieve a large-scale digital talent supply with quality[7].

4.3 Enterprises face numerous difficulties in cultivating digital talents

When enterprises face digital transformation, they often lack direction and need guidance, let alone building their own training system. Moreover, the difficulty, high investment, and long cycle of cultivating digital talents, coupled with high employee turnover, make it a major challenge to retain these talents after cultivation. Most companies lack a strong long-term cooperative relationship with workers, and their behavior is short-term, resulting in a lack of sustainability in workers' technical training and accumulation.

Many enterprises, especially small and medium-sized enterprises, lack the ability to cultivate talents themselves, and coupled with a lack of willingness, relying on enterprise training for digital talents will be difficult[9].

4.4 Difficulty in cultivating composite talents

In the digital age, compound talents not only need to understand technology, but also business, and the knowledge they need to master involves both natural and social sciences. There are three ways to form such composite talents: firstly, they are involved in both digital technology and business fields, which are already very rare, and coupled with the diversity of business fields, there are very few such talents in each field; The second is to learn business knowledge on the basis of mastering digital technology, but in reality, most technology professionals do not enjoy doing business; The third is to learn digital technology on the basis of mastering the business, which has certain difficulties and requires talents to have strong learning abilities.

4.5 The development environment for technical and skilled talents is not perfect enough

Due to historical reasons, college students have long been regarded as the "pride of heaven". Even though we have entered the era of popularization of higher education and the number of college students has surged, our views and expectations of college students have not changed. The employment concept of college students still remains at the level of seeking "iron rice bowls" or decent positions in the 20th century. Nowadays, the "iron rice bowl" refers to professions such as civil servants and teachers. As a result, there has been a trend of taking civil service exams and becoming a teacher. The phenomenon of high education and low employment for the sake of a

position is no longer new. The 'iron rice bowl' is limited. In the context of exam oriented education, parents participate in the process of their children's education from kindergarten to university in order to seek such positions. Children are taught that if they cannot obtain a decent position like a civil servant, their life will not be considered successful, and they will betray their parents and their own thoughts. The number of technical skilled talents is difficult to meet the needs of digitZal transformation in enterprises, which is closely related to such educational methods, as shown in Table 2, the reasons for talent shortage in enterprise digital transformation [8].

Table 2: Reasons for Talent Shortage in Enterprise Digital Transformation

Serial number	content
1	Insufficient talent supply.
2	Insufficient number of digital talents cultivated by schools.
3	Enterprises face numerous difficulties in cultivating digital talents.
4	Complex talents are difficult to cultivate.
5	The development environment for technical and skilled talents is not perfect enough

5. Research on the Path of Empowering Enterprises with Digital Transformation through Vocational Education

5.1 Establish a precise and flexible professional setting mechanism

5.1.1 Digitalization+optimization of professional settings

Whether it is traditional industries or aging industries with labor shortages, digitization and intelligence are inevitable trends. Therefore, in the wave of digital transformation of enterprises, professional settings must keep up with the trend of the times and meet the employment needs of enterprises.

The manufacturing industry is the mainstay of the national economy, and China's manufacturing industry is developing towards high-end and intelligent directions. There is a shortage of mid to high end skilled talents who have received higher education and possess innovation capabilities. Therefore, the professional settings of vocational education should adapt to the needs of the development of high-end manufacturing and technology industries.

Due to the digital transformation being carried out in various industries, and the different application scenarios of enterprises in different industries, the combination of digitalization and traditional enterprises requires schools to set up more interdisciplinary programs and cultivate more versatile talents. For example, in response to issues related to food security, ecological civilization, human health, and rural revitalization, "digital+" smart agriculture majors such as smart agriculture, smart forestry, smart animal husbandry, smart water conservancy, and agricultural intelligent equipment engineering can be established. For example, offering artificial intelligence majors in fields such as smart commerce, smart finance, smart justice, smart healthcare, and smart cities[10].

5.1.2 Flexible adjustment of professional settings

The cultivation of vocational education is oriented towards the job, and what is learned should be directly applied in practice. The ideal state is seamless integration with the job. In the era of digital economy, the environment, market, and products are rapidly changing, and the demand for professional and technical talents by enterprises is constantly changing. In order to adapt to these needs, vocational education institutions must flexibly set up different types of majors. Under the digital transformation of enterprises, data has become the core resource for business operations and decision-making. By utilizing technology, basic data can be mined, and through professional market

logic analysis, the value of data can be maximized, thereby empowering enterprises to innovate and develop. Therefore, compound talents who master technology and possess market logic thinking have become the target of competition for enterprises. Flexible adjustment of majors can eliminate traditional majors that are not applicable, establish new digital related majors, cultivate digital talents in the profession, or adopt the form of "digitalization+" traditional majors mentioned earlier to cultivate composite talents needed by society.

5.2 Building a Digital Centered Teaching Innovation System

5.2.1 Innovative digital teaching resources

The cultivation of digital application-oriented talents requires the "three education" reform to revolve around digital applications, explore digital teaching methods and approaches, innovate digital teaching resources, strengthen the construction and application of digital textbooks, promote vocational education informatization teaching reform, and improve the quality of digital teaching in courses. The cultivation of digital application-oriented talents is also based on the practicality of digital teaching resources. Practical resources need to be jointly created by vocational colleges and enterprises, and the latest digital technologies, products, and tools of industrial development should be introduced into the curriculum. Real life content should be enriched into theoretical courses, and new practical training and simulation projects should be developed. At the same time, teaching content should be updated according to the latest requirements of various digital application positions based on workflow. This teaching resource and teaching method can help students understand mathematics the cutting-edge application of technology quickly meets the requirements of application-oriented talents for enterprise digital transformation, which is conducive to students' "zero distance" employment and their further education.

5.2.2 Creating digital application scenarios

Relevant departments cooperate with enterprises to build virtual simulation training rooms and bases, develop virtual simulation training resources based on workflow and working environment, and create application scenarios for enterprises' digital transformation.

5.2.3 Building a three-dimensional competition system

Competitions are an important measure to test teaching effectiveness and promote students' ability improvement. Therefore, it is necessary to actively encourage students to participate in innovation and entrepreneurship competitions, and allow teachers and students to participate in various course competitions to promote teaching, academic performance, practical training, and teaching reform through various competitions. Due to the complex and interdisciplinary requirements of digital majors, using a competition system to support practical abilities in the training process is also one of the categories of industry education integration. In the three-dimensional competition system, various competitions should be integrated with regular teaching, and school skill competitions should be designed reasonably, such as competition rules, reward standards, etc. A sound and normalized team of vocational skill competition guidance teachers should be established to make school skill competitions regular and systematic. Emphasis should be placed on establishing various guarantees for the competition system, such as laboratory guarantees, funding guarantees, and institutional safeguards. Finally, it is important to pay attention to the post competition summary and revise the next competition plan. Through various competitions, students are encouraged to enhance their comprehensive vocational abilities, achieve the goal of promoting their abilities through competitions, and obtain corresponding certificates,

providing support for their future internships, employment, and career transformation.

5.2.4 Enhance scientific research level and promote digital teaching

As the main body of higher education, vocational colleges should also undertake scientific research tasks. Teachers should strengthen the research on the application of digital technology. Firstly, it can deepen teachers' understanding of digital professional knowledge and technical skills, and bring significant optimization of classroom effects through direct first-hand teaching materials; Secondly, providing advanced theories for digital technology education and teaching, enhancing students' theoretical foundation, and discussing research results with students are also beneficial for improving teachers' teaching level; Thirdly, conducting application-oriented scientific research, strengthening cooperation with enterprises, and jointly promoting the development and innovation of products and technologies, allowing students to participate in research, is conducive to the cultivation of high-quality digital technology skilled talents, as shown in Figure 2.

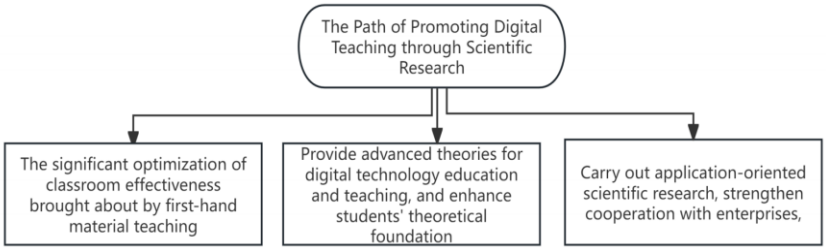

Figure 2: Ways to promote teaching improvement through scientific research

5.2.5 Actively undertake social service functions and increase practical teaching

Higher education itself has the function of serving society, and enhancing social service capabilities can not only test the results of digital application research, but also improve students' practical abilities, and better cultivate high-quality digital talents who are "zero distance" from employment positions.

5.2.6 Pay attention to characteristics and create brand features for vocational education

Although vocational education and regular undergraduate education belong to the level of higher education, they belong to different types. Therefore, vocational education should not only strengthen students' theoretical foundation, but also pay more attention to the cultivation of their ability to use technology to solve practical problems. Classroom teaching should focus more on the integration of theory and practice, as well as practical teaching based on work situations.

5.2.7 Exploring the horizontal education mechanism of vocational colleges and cultivating versatile talents

To achieve the talent cultivation goals of vocational education, vocational colleges can explore a horizontal collaborative education mechanism based on projects, and carry out cross disciplinary and cross college talent cultivation projects and digital application technology research and development projects. Schools can adopt a matrix organizational structure, with traditional departmental structures vertically and cross departmental projects horizontally, as shown in Table 3. Such organizations can flexibly cultivate digital composite technical and management talents.

Table 3: Construction of a Digital Centered Teaching Innovation System

Serial number	content
1	Innovative digital teaching resources.
2	Creating digital application scenarios.
3	Building a three-dimensional competition system.
4	Enhance scientific research level and promote digital teaching Actively undertake social service functions and increase.
5	Actively undertake social service functions and increase practical teaching
6	Pay attention to characteristics and create brand features for vocational education
7	Exploring the horizontal education mechanism of vocational colleges and cultivating versatile talents

5.3 Establishing a joint mechanism for cultivating digital practical abilities

Starting from the cultivation of practical abilities and talent transfer, schools, industry associations, enterprises, vocational training institutions, etc. cooperate to jointly carry out activities such as curriculum research and development, skills training, enterprise recruitment, internship employment, etc., connect various links, and jointly build a practical education system that integrates digital courses, certification, and employment, and construct a scientific and reasonable digital talent joint training mechanism.

The cultivation of digital practical abilities can be carried out from three levels: school simulation practice, school enterprise cooperation projects (social practice, social services), and on-the-job internships in enterprises, as shown in Figure 3. The three levels progress layer by layer: the first level is the simulation application of knowledge and technology; The second level is the practical application of knowledge and technology, but it is discontinuous and fragmented; The third level is based on the requirements of the position, using knowledge and technology to solve practical problems. Students can have a deep understanding of the position, and their vocational skills will be continuously improved.

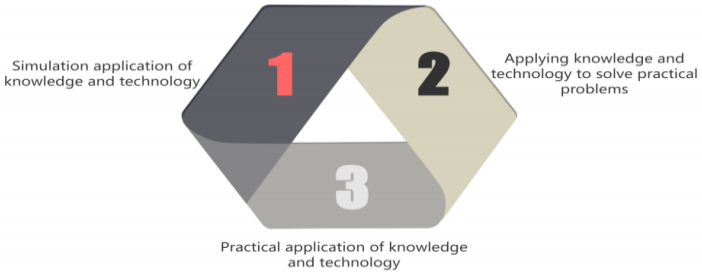

Figure 3: Cultivation of Digital Practice Ability

5.3.1 School simulation practice

Although the first level of practice is mainly focused on schools, in order to make the practice closer to reality, it also requires the joint participation and deep cooperation of industries and enterprises.

Firstly, industry associations and enterprises should deeply participate in the professional planning, curriculum design, "three education" reform, and quality evaluation of vocational colleges, ensuring that talent cultivation in vocational colleges is carried out around the practice of enterprise digital transformation. Secondly, the construction of simulation training, simulation training and other training scenarios in vocational colleges should invite enterprises and vocational training institutions to participate together, so as to make the training scenarios as close to reality as possible.

Once again, enterprise experts actively participate in the teaching process of simulated training, bringing frontline digital technology and experience into the classroom. Finally, train vocational college teachers to master the most cutting-edge digital knowledge and technology, in order to cultivate high-quality digital talents. The way vocational colleges in our country carry out practical teaching is still very primitive, far from the actual operation of enterprises, mainly because many teachers themselves do not have practical experience in enterprises. Therefore, it is very necessary for enterprises or good vocational training institutions to carry out training for vocational college teachers.

5.3.2 School enterprise cooperation projects (social practice, social services)

The second level of practice can utilize practical platforms to enhance students' practical abilities by completing projects. The evaluation of students' learning outcomes adopts a combination of process and results evaluation mechanism, promoting the improvement of students' comprehensive skills and innovative qualities. Practical courses can also be directly moved to enterprises or related venues. The original integration of industry and education, as well as school enterprise cooperation, mainly aimed to cultivate students' practical skills. With the transformation and upgrading of China's industries and the development of the digital economy, higher requirements have been put forward for the talent cultivation of vocational education. Therefore, in order to meet the needs of cultivating innovative technical and skilled talents at a higher level, the vocational education talent training model cannot remain at the level of simple school enterprise cooperation, but needs to integrate with enterprises, carry out common technology development and research, deepen innovation in scientific research and talent cultivation mechanisms, create practical bases for school enterprise joint training, carry out horizontal scientific research projects in school enterprise cooperation, and encourage research teams to recruit students to achieve project practice and talent cultivation.

5.3.3 Enterprise on-the-job internship

The third level of practice is to collaborate with digital transformation enterprises and organize graduating students to intern in the company. In the current difficult situation faced by enterprises, the government can provide certain cost subsidies to reduce labor costs and provide a large number of interns to help accelerate digital transformation. In today's world, science and technology are advancing rapidly, and the teaching content of vocational colleges often cannot keep up with the pace of digital technology development. Therefore, through on-the-job internships, on the one hand, students can gain real practical training and enhance their practical abilities; On the other hand, it can reduce the cost of retraining for enterprises after recruiting graduates. The on-the-job internship not only alleviates the shortage of labor in the digital transformation of enterprises, but also increases employment opportunities for college students.

6. Conclusion

The digital transformation of enterprises has brought about the digitization of industries and even the entire economy, which naturally has a significant impact on the education industry, especially vocational education closely related to economic and social development. The digital economy centered on digital technology and data elements will penetrate into all aspects of vocational education development. At the same time, in order to cultivate the talents needed for enterprise digital transformation, vocational education institutions themselves must undergo digital transformation. The digital transformation of enterprises has put forward new requirements for the digital development and digital talent cultivation of vocational education, and provided

implementation scenarios and conditions for vocational education talent cultivation programs. It not only puts forward energy output requirements for vocational education, but also inputs new energy to vocational education, empowering vocational education and promoting its adaptive development.

Acknowledgement

This work was supported by Research Project of China Vocational and Technical Education Society's 2024 Branch: Strategy Research on Empowering Enterprises with Digital Transformation through Vocational Education (Project No.: ZJ2024B072);

This work was supported by the "Research on the Training Model of New Business Applied Talents in Higher Vocational Colleges under the Background of Digital Economy Transformation", Shaanxi Institute of Education Sciences, (Project No.: SGH23Y3098);

This work was supported by the Research Project on Network Ideological and Political Work in 2024: Study on the Path of Integrating Shaanxi Red Culture into Network Course Ideological and Political Education (Project No.: 2024WS-A04);

This work was supported by the "Research on "Integration of Industry and Education, School Enterprise Cooperation" Education Reform and Development Project of China Electronic Labor Society in 2024: Research on the Reform of Craftsmanship Talent Training Mode under the Background of School Enterprise Cooperation (Project No.: Cea12024156);

This work was supported by the Research on The "Digital Empowerment Education" project of the Chinese Association for Adult Education in 2024: Research on the Path of Digital Transformation Empowering University Teaching Work (Project No.: 2024-SJYB-076S);

This work was supported by the Research on Special Project of "Teacher Research and Development" in the "14th Five Year Plan" of the China Tao Xingzhi Research Association for 2024: Research on the Path of Promoting the Integration of Industry and Education in New Business in Higher Vocational Colleges in the New Era (Project No.: ZTHJS2024146);

This work was supported by the Research project of Shaanxi Open University (Shaanxi Industrial and Commercial Vocational College) in 2024: Research on Promoting the deep integration of "Four chains" in Shaanxi (Project No.:2024KY-B04);

This work was supported by the Research Xi 'an Social Science Fund in 2024: Research on Xi 'an's Promotion of the Deep Integration of Innovation Chain Industrial Chain Capital Chain Talent Chain (24GL04);

This work was supported by the Research Project of Shaanxi Institute of Education Science in 2024: Study on the Revolutionary Classroom Model of Core Curriculum for Finance and Accounting Majors in Higher Vocational Colleges (Project No.:SGH24Y3130);

This work was supported by the Research Research project of Data Analysis Education and Training Committee of Chinese Adult Education Association in 2024: Construction of Digital Competency Evaluation Model and Coping Strategies for Open Education Teachers (Project No.:2024-SJYB-074S);

This work was supported by the Research Project of China Electronic Labor Society in 2024: Construction of Digital Competency Evaluation index System of higher education Teachers and research on Improvement Path (Project No.:Ceal2024155);

This work was supported by the Research 2024 Chinese Educational Accounting Association Project: Research on Optimization Strategy of University Budget Performance Management (Project No.:JYKJ2024-007MS);

This work was supported by the Research Scientific Research Program Funded by Shaanxi Provincial Education Department (Project No.:22JZ017)

This work was supported by the Research 2023 National Open University Key Research Project:

Open University Comprehensive Budget Performance Management Research (Project No.:Z23B0017);

This work was supported by the Research 2023 Research project of Shaanxi Open University (Shaanxi Industrial and Commercial Vocational College) : Research on Digital Learning Achievement Certification of Higher Continuing Education (Project No.:2023KY-A05);

This work was supported by the Research 2023 China Adult Education Association 14th Five-Year Educational Research Planning project: Research on Adult Continuing Education Learning Achievement Certification based on block-chain technology (Project No.:2023-019Y);

This work was supported by the Research Research topic of Internet Ideological and Political Work in 2024: Research on the Path and Mechanism of Internet Course Ideological and Political Construction for Higher Vocational College Students Empowered by Digital Technology (Project No.:2024WS-A03);

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