

Digital Transformation Elements and Routes in Higher Vocational Nursing Education Driven by World Skills Competition

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Abstract: The article outlines the digital transformation of higher vocational nursing education driven by the WorldSkills Competition, using China's policy as the key strategic driver. It provides in-depth analyses grounded in the WorldSkills Competition's value concept, exploring characteristics of health and social care competitions and nursing education principles. The article suggests four ways to transform WorldSkills Competition digital education to improve quality and innovation. The four ways are: promoting digital education; innovating the training model; developing the education system; and opening up digital sharing. This promotes digital innovation in vocational nursing education.

1. Introduction

In the contemporary era, China's development has been characterized by the implementation of a series of significant national plans, from the Twelfth Five-Year Plan to the Fourteenth Five-Year Plan. The steady evolution of the Industry 4.0 era has contributed to the enhancement of the policy system of education informatisation ^[1-4]. In July 2024, the Third Plenary Session of the Twentieth Central Committee of the CPC elevated the strategy of digital China to a new level. The overarching objective of this strategy is to enhance the overall effectiveness of the national innovation system, whilst simultaneously deepening the reform of the education, science and technology, and talent development systems. This strategy is pivotal to cultivating a community of

shared destiny, and is of paramount importance to China in this new era. It is a core engine for deepening education reform. The World Skills Competition (WSC), hosted by the World Skills Organisation, is the most influential professional skills competition in the world and is known as the 'World Skills Olympics. The value concept, implementation process and evaluation method of the WSC reflect the demand for the vocational ability of highly skilled personnel^[5]. In the wake of China's Opinions on Promoting the High-Quality Development of Modern Vocational Education, the primary objective of enhancing the adaptability of vocational education has been delineated as 'accelerating the construction of a modern vocational education system and building a technological society ^[6]. In July 2023, the Ministry of Education(MOE) issued a circular with 11 key tasks, including setting up Vocational Education Informatisation Benchmark Schools. The Guidelines for the Construction of Vocational Education Informatisation Benchmark Schools were then released in August, providing more detail on the digital development plan for VET.

However, despite the advancement of China's higher vocational nursing education in the digital sphere, numerous challenges persist. These include inadequate integration of technology, discordance between curriculum and digital requirements, inadequate articulation between levels, and anachronistic practices^[7-9]. Vocational nursing education is crucial in training nursing professionals and skilled personnel, and in disseminating active health concepts worldwide. It is vital for maintaining health throughout life. There is a pressing need for transformation and upgrading. A comprehensive analysis of the World Series (WSC), the digital China strategy, the promotion of digital education, the development of the vocational education system, the innovation of the human training model, and the opening up of digital sharing, provides a valuable reference point for exploring the enhancement of Chinese nurses' global service capacity, the empowerment of global health, and the exploration of the green digital transformation of higher vocational nursing education ^[10].

2. Analysis of the elements of digital transformation of higher vocational nursing education led by the World Skills competition

The WorldSkills Competition, based on 'Excellence, Innovation and Cooperation', began in 1950, which consists six categories^[11]. China joined in 2010 and won the highest number of medals at the 47th WorldSkills Competition in Lyon, France. This event showcased emerging talent and contributed to talent cultivation in the 'Belt and Road' initiative countries^[12]. The 'Health and Social Care Programme' is distinguished by six unique characteristics: 'case-based, integrated, flexible and diversified', reinforcing the three core concepts of 'person-centred care, evidence-based care and intercultural care^[13]. It strengthens the three core concepts of person-centred, evidence-based and transcultural nursing. The development of the WSOS system highlights global demand for top healthcare personnel. The four new requirements for WSOS competitors to build a skilled society in the technological era have prompted China's nursing VET to move towards high-quality development^[14], which is in line with China's modernisation strategy. These requirements indicate the direction for the development of nursing VET to meet the needs of the times.

2.1 Elements of quality enhancement under the orientation of excellence

The WorldSkills Competition encourages excellence in skills and sets a practical approach to vocational nursing education^[15]. This approach includes professional competence, interdisciplinary thinking and a focus on standards in health and social care projects. This helps competitors improve performance, integrate vocational nursing education standards into excellence and innovation, and guide digital upgrading and transformation. The standard of excellence improves the curriculum by analysing the World Championships, project requirements, industry trends and talent needs. This establishes talent training objectives. Digital empowerment of educators for precise instruction, a digital repository of educational resources, optimised pedagogical standards, and virtual practice and diversified scenarios to cultivate nursing students' competencies and literacy. The programme emphasises the importance of teacher training to inspire educators to engage with the World Championships. It promotes international exchanges digitally, helps teachers with learning activities and updates their strategies. The programme aims to develop nursing education quality and align it with international standards.

2.2 Elements of innovation-driven pedagogical change

The WorldSkills Competition 'innovation' concept builds vocational nursing education life-based principles and promotes excellence. The competition's innovative value integrates healthcare projects, injecting vitality into digital transformation in higher vocational nursing education. Innovative scenarios are used to educate individuals by constructing virtual nursing scenarios using VR and AR, such as hospitals and nursing homes, to stimulate interest and enhance adaptability and innovative thinking. Innovative resources are developed, incorporating digital resources based on case studies and providing cases through online platforms to cultivate students' analysis and clinical decision-making skills, and to stimulate their innovative consciousness. The innovation mode, guided by the World Championships innovation, integrates project-based and digital teaching methods. Students collaborate in groups, using digital tools to complete projects, fostering teamwork and innovation. This approach encourages the adoption of new technologies and the transformation of results, thereby promoting continuous development in nursing practice and facilitating the adaptation of nursing education to contemporary industry demands.

2.3 Elements of collaborative education promoted by cooperation

The World Skills Competition's 'cooperation and openness' principle reflects the internationalisation of vocational nursing education^[16].

Its cooperative nature aligns with healthcare projects, indicating a collaborative approach to digital transformation in higher vocational nursing education. Achieving this digital transformation requires joint efforts. Inter-school cooperation and resource sharing are essential. A digital alliance platform should be established, with quality resources shared, inter-school learning promoted, and teacher teaching and research reformed. Integrating production and education is crucial. Talent programmes should be driven by industry demand, with enterprises supplying data and schools

educating suitable talents to enhance students' competitiveness. International exchange and two-way empowerment are vital. Schools should cooperate with international institutions and colleges, introducing advanced elements and allowing students to grow up in an international environment through mutual visits. This will boost China's global nursing presence, develop faculty and promote global health.

2.4 Equalization of Educational Opportunities as a Guarantee of Equity

The WorldSkills Competition's concept of 'fairness and justice' establishes the principle of sustainable development of vocational nursing education.

This, combined with the flexible features of the healthcare programme, contributes to educational equity in the digital transformation of higher vocational nursing education^[17]. Ensuring educational equity in this transformation necessitates the promotion of equitable distribution of resources, with the government and educational institutions increasing investment, particularly in less developed areas. Low-cost resource platforms are also essential to meet the needs of different students and special groups of digital learners. Evaluation must be fair. A diversified digital evaluation system is imperative. This should be based on the characteristics of the project, integrating various factors, utilising digital technology for accurate evaluation, refining practical skills evaluation with reference to the OSCE assessment standards, and enhancing teaching quality with big data. There is also a need for cognitive equity advocacy. Vocational nursing education is key to global health, promoting social awareness of educational equity, encouraging participation in digital and sustainable development, and promoting fair and sustainable nursing education.

3. World Skills Competition Leads Digital Transformation Strategy for Higher Vocational Nursing Education

3.1 Lead the standard by excellence and vigorously promote digital education

3.1.1 Optimization and upgrading of the curriculum system

The Ministry of Education emphasises the importance of digital upgrades in training talent and developing skilled professionals. A review of World Health and Social Care Project standards shows the need for a digital system integrating and optimising the curriculum, including digital nursing skills course modules to meet nursing excellence standards. The objective is to cultivate students' digital nursing skills, equipping them with the competencies to thrive in the contemporary healthcare landscape. A dynamic updating mechanism is being established to build a digital resource library based on industry, the World Championships and international guidelines. This will facilitate exploration of Chinese nursing education standards and enable timely adjustment of teaching content.

3.1.2 Teaching Quality Assurance and Enhancement

Digital transformation in higher vocational nursing education depends on teaching quality

assurance to supply industry talent, promote innovation and other initiatives. A digital monitoring system, big data and a learning management system are needed to comprehensively monitor and assess the efficacy of the teaching process. These measures ensure teaching quality improves on time. The teacher assessment mechanism must be enhanced to include digital teaching reform, motivating teachers to improve their teaching level and professionalism. Innovative teaching methods must be explored and teaching quality optimised continuously.

3.1.3 Teacher Excellence Building

In the digital age, educators' use of digital technologies is inadequate for planning optimal development^[18]. Participants in the World Championships undergo digital literacy training to cultivate digital awareness, understand the concept of the competition, broaden international horizons and master advanced teaching methods. The training encourages engagement in corporate practice and scientific research, improves practice and innovation, transforms results into teaching resources, develops nursing education SP with the World Championships, and promotes nursing excellence through the competition and digital technology.

3.2 Innovation-driven development and vigorous innovation in human training model

3.2.1 Digital teaching environment innovation

In higher vocational nursing education, innovation is essential. Institutions must promote digital teaching infrastructure and research the digital standard system, focusing on intelligent nursing practical training and virtual simulation laboratories^[19]. Schools must establish a SP training team, introduce VR facilities and online platforms, and construct virtual and real scenarios, requiring high-end equipment for nursing simulation. The World Championships have shown how this new teaching method improves students' first aid and practical skills, and promotes digital improvements to nursing practice teaching^[20]. Using cloud computing and the Internet of Things creates a smart campus where teaching resources can be shared and managed intelligently, improving teaching efficiency and quality, and making it available at any time and in any location.

3.2.2 Teaching method and content innovation

Pedagogies like digital cases and interdisciplinarity should be used, as well as practical, problem-oriented teaching projects and cases based on the case-based features of the relevant competitions^[21]. Students should use digital nursing technology in problem-solving to cultivate innovation and comprehensive analysis ability. Microclasses, virtual simulation software, digital teaching materials and other curriculum resources should be developed. Large language models should be used to enhance students' interest and participation. Teachers and students should collaborate in creating curriculum resources to foster an environment characterised by digital teaching excellence and innovation.

3.2.3 Construction of Innovative Talent Training System

The Ministry of Education says that setting up a new talent cultivation system for vocational nursing education is key to improving the higher vocational nursing profession. This system must be based on the innovation inherent in the World Championship ^[22]. A multifaceted evaluation system must be implemented. The platform will offer digital innovation and practice for students, with a range of online and offline activities. Competition drives creativity and nurtures students' potential. Integrating digital innovation and an innovation credit and reward system is crucial. Students must be motivated to engage in research and academic endeavours, with digital resources provided. Innovative achievements must be digitally transformed, with nursing education and industry working together. Innovative nursing talents must be cultivated.

3.3 Cooperative and synergistic education and vigorous innovation of the vocational education system

3.3.1 Inter-school cooperation alliance construction

Proposed: an alliance between schools for higher vocational nursing education^[23], to share resources and exchange ideas. Schools will interact in many ways, including sharing curricula, teachers, students and resources. They will also collaborate on digital curricula, teaching and research projects. The objectives of this collaboration include: building a results transformation centre-breaking through the bottleneck of the transformation of vocational education -improving school management and education quality -promoting the digital transformation of nursing education

3.3.2 Mechanism Innovation for Deep Integration of Schools and Enterprises

The institution has set up a 'community of industry and education' through its 'industry-academia-research-use' model of school-enterprise cooperation. It has also worked with a number of organisations to carry out activities and tailor-made courses according to industry needs. Various initiatives have integrated schools and enterprises, overcome enrolment limitations and promoted second degree education, job re-employment and mutually beneficial development of individuals and society.

3.3.3 Expansion of international cooperation and exchange

The World Championship epitomizes the value of "high, precise and sophisticated". In this context, China undertakes several initiatives. It strengthens cooperation with international nursing schools and institutions, conducting education programmes to introduce advanced elements for the cultivation of international talents. Moreover, China broadens students' horizons by means of exchange student programmes, facilitating their participation in competitions and exchanges. Additionally, it reinforces collaboration with international nursing organisations. Through these efforts, China aims to augment its international nursing influence and augment its discourse power.

3.4 Equitable guarantee promotion strategy, vigorously open digital sharing

3.4.1 Balanced allocation of digital education resources

In the context of global digitisation of vocational education, China has established a balanced system of resources and policy leadership^[24]. The government has increased its investment in transforming higher vocational nursing education to help underdeveloped regions and weak colleges and universities. It has built an international platform to break down restrictions^[25], promoted cross-border collaborative education, leveraged demonstration projects and global power to enhance literacy, and contributed to China's global education balance.

3.4.2 Improvement of fair evaluation and incentive mechanism

Digitalisation is key to developing a fair evaluation system, enhancing objectivity, precision and comprehensiveness^[26]. China's approach to global youth education emphasises an international digital evaluation model focusing on nursing literacy^[27]. China's strategy includes a student-centred approach, the World Championships concept for evaluation, and exploring incentive mechanisms to address bias. The country is also innovating global evaluation processes and enhancing student competitiveness.

3.4.3 Publicize and promote the concept of educational equity

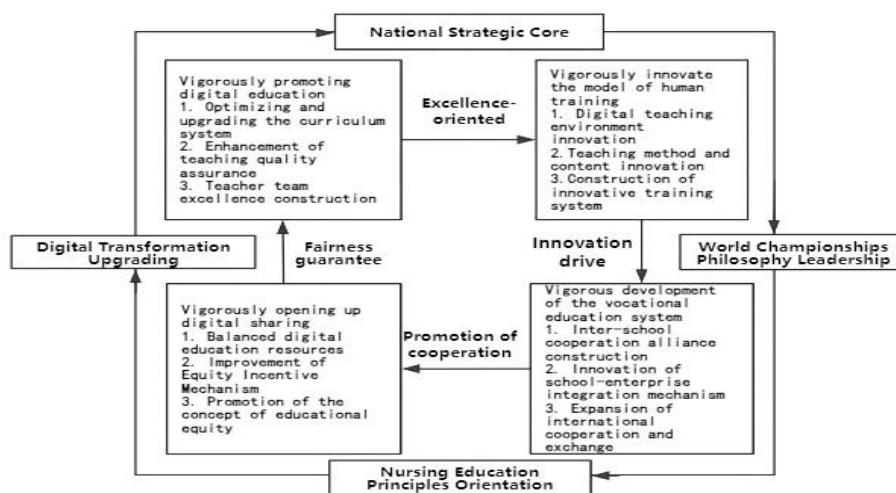


Figure 1: The Pathway of Digital Transformation in Higher Vocational Nursing Education under the World Skills Competition.

Chinese colleges and universities are using IT to break down barriers to education by integrating digital tools into global equity processes^[28]. Open education is key to digitalised educational equity^[29], spreading the idea of educational equity through various means, guiding teachers and students in developing suitable concepts, and encouraging inclusivity through international campus cultural activities. Sharing and exchanging global case activities is vital for sharing China's experience. Collaboration is key to exploring educational equity, leading digital transformation and

fair development, and demonstrating China's commitment and leadership. Figure 1 shows the research path.

4. Conclusions

The WorldSkills Competition identifies and nurtures exceptional young talent in science, technology and skilled trades. Technological innovation, especially digital, has driven professional and technical advancement. The WorldSkills Competition has set advanced standards and frameworks for higher vocational nursing education in a competitive environment focused on excellence. Craftsmanship is vital for professional quality in higher vocational nursing. Openness and innovation are also crucial for new ideas and overcoming system limitations. The WorldSkills Competition has impacted digital transformation in higher vocational nursing education. The "four vigorously" digital strategy will be pivotal in cultivating high-precision skilled talents in China's vocational nursing education. It will provide valuable reference for exploring the digital transformation of higher vocational nursing education.

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