

THE OPTIMIZATION PATH OF HEALTH CARE VOCATIONAL EDUCATION UNDER THE COLLABORATIVE INNOVATION OF INDUSTRY, ACADEMIA AND RESEARCH

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Abstract: With the intensifying aging population in China, the demand for health care service professionals has surged, highlighting the significant gap between supply and demand. Vocational education is regarded as the primary channel for cultivating technical talents in the health care sector. However, challenges such as structural mismatches between education and industry needs, insufficient practical training, and low enterprise participation persist. This study takes Xinyang City in Henan Province as a case to explore the optimization path of health care vocational education through industry-academia-research collaborative innovation. The research integrates collaborative innovation theory and the German "dual system" vocational model as theoretical frameworks. It analyzes the local government's initiatives—such as the construction of the Leishan Jiangu vocational education park and industry-education integration platforms—and identifies key problems like weak coordination mechanisms, limited enterprise engagement, and insufficient "dual-qualified" teaching staff. Based on domestic and international best practices, the study proposes targeted strategies: strengthening collaborative governance mechanisms, enhancing enterprise participation, optimizing curricula and practical teaching systems, and improving policy support. These measures aim to align vocational education with health care industry demands, thus cultivating high-quality talents and supporting sustainable development in the context of population aging.

Keywords: Vocational education; Health care; Industry-Academia-Research collaboration; Aging population; Talent training; Xinyang

1 INTRODUCTION

The intensification of population aging has put forward urgent requirements for the supply of talents for health care (healthy elderly care) services. According to statistics, by the end of 2024, the number of elderly people aged 60 and above in my country has reached 310.31 million, accounting for 22.0% of the total population, of which 220.23 million are 65 years old and above, accounting for 15.6%. The elderly population is large and growing rapidly. It is estimated that around 2035, the proportion of the population over 60 years old will reach 30%, and the elderly population will exceed 400 million. Along with this, there is a surge in demand for health care services such as medical and nursing care, rehabilitation and nursing. However, there is currently a serious shortage of professional talents in the health care field. For example, according to a survey, my country's demand for elderly care workers is more than 6 million, but the actual number of practitioners is only about 500,000, and the talent gap is significant. This contradiction between supply and demand directly affects the quality of elderly care services and medical and health security, and has become a livelihood issue that needs to be solved urgently.

Vocational education is regarded as the main channel for cultivating technical and skilled talents in health care services. However, for a long time [1], there has been a structural and quality mismatch between the education supply side and the industry demand side. The talents cultivated by vocational colleges are difficult to fully meet the actual needs of the industry, and a "two-faced" phenomenon has emerged. In order to solve the structural contradiction between talent supply and demand, the government attach great importance to deepening the integration of industry and education and school-enterprise cooperation, and have elevated it to a national strategy. The "National Vocational Education Reform Implementation Plan" (2019) and the newly revised "Vocational Education Law" (2022) and other policies clearly require the improvement of the modern vocational education system integrating industry and education, encourage enterprises to deeply participate in collaborative education, and encourage enterprises to run schools through tax and fee concessions [2]. Especially in the field of health care, the Ministry of Education, the National Health Commission and other departments will deploy in 2025 to accelerate the training of medical and nursing talents, promote vocational colleges to set up undergraduate majors in health care services, require at least 50% of the courses to be practical training, and encourage in-depth cooperation between schools and enterprises to carry out teaching in conjunction with nursing homes and hospitals. These measures show that taking industry-university-research collaborative innovation as a starting point to promote the organic connection between the vocational education chain and the health care industry chain has become the only way to improve the quality of health care talent training and cope with the challenges of aging.

This paper takes Xinyang City, Henan Province as a case study, focusing on the optimization path of health care vocational education under the background of collaborative innovation among industries, schools and scientific research.

Xinyang City is a populous city with an aging rate higher than the national average. In 2020, the population aged 60 and above accounted for 19.27%. By the end of 2023, the number of people aged 65 and above will exceed 1.015 million [3], accounting for about 16.8% of the permanent population. The local health care industry has an urgent need for development, but there are still shortcomings in the supply of vocational education, such as insufficient layout of nursing-related majors and weak practical teaching. In recent years, Xinyang City has attached great importance to vocational education reform, and has taken industry-education integration as an important breakthrough in the development of vocational education. It has invested in the construction of the "Leishan Jiangu" industry-education integration vocational education park, and plans to integrate health care vacation bases and research bases into it, promoting the coordinated development of "health care + research + tourism". Xinyang Vocational and Technical College and other colleges and universities are also actively exploring school-enterprise cooperation models, such as co-building industrial colleges with nursing institutions and implementing the "1+1+1" talent training model, which has significantly improved the practical ability of graduates [4]. In this context, it is of great theoretical value and practical significance to study how to further optimize the path of health-care vocational education through collaborative innovation between industry, academia and research.

2 LITERATURE REVIEW

Current status of research on industry-education integration and health-care vocational education: Domestic scholars have discussed the issue of industry-education integration in vocational education. Chen Nianyou and other scholars pointed out that industry-education integration is a deep cooperation between vocational education and industry, and its essence lies in the collaborative education of vocational colleges and industry enterprises to improve the quality of talent training. Industry-education integration is regarded as a fundamental way to solve the contradiction between the supply side of talents and the demand side of industries, which is conducive to improving the adaptability of vocational education. In recent years, research has focused on the institutional mechanism, operation mode and policy effect of industry-education integration. For example, some studies have sorted out the evolution of China's industry-education integration policy and believed that it is necessary to improve the long-term mechanism of school-enterprise cooperation and eliminate the interest barriers between schools and enterprises. In the field of health-care vocational education, with the implementation of the "Healthy China" strategy, relevant research has gradually increased. Wang Hui and others analyzed the strategic opportunities and problems faced by the training of health-care tourism talents in higher vocational colleges, and proposed to seize the window period of rapid development of the health-care industry to improve the talent training plan. Ke Jie and others focused on the current status of health care professional construction in Hainan, pointing out that the current level is mainly junior colleges [5], and the undergraduate level is in urgent need of development, and the quality of technical and skilled personnel training needs to be improved in the integration of industry, academia and research. Lin Yuting and others conducted a special study on the integration of industry, academia and research in Hainan's health care vocational education, sorted out the problems of disconnection between education and industry needs, insufficient enterprise participation, and lack of practical training resources, and proposed strategies such as strengthening school-enterprise cooperation, optimizing curriculum settings, and promoting scientific research transformation. Overall, domestic literature emphasizes that deepening the integration of industry and education is the key to improving the quality of health care vocational education, and health care talents that meet industry needs should be cultivated through collaborative innovation mechanisms.

Research on collaborative innovation and dual system model: "Industry-university-research collaborative innovation" as an advanced form of industry-education integration has also attracted attention. Wang Haijun and others explained in journals such as technology and economy that collaborative innovation emphasizes the complementary advantages and resource sharing of innovation subjects such as universities, scientific research institutions, and enterprises, and build an interest-aligned partnership to jointly carry out innovation activities. This concept originates from the "Triple Helix" theory. Etzkowitz and Leydesdorff proposed that the collaborative interaction of universities, industries, and governments can generate continuous innovation momentum [6]. Research on vocational education from the perspective of collaborative innovation shows that school-enterprise-research collaboration can accelerate the transformation of scientific and technological achievements into teaching content and enhance the ability of vocational education to serve industrial development. Abroad, Germany's "dual system" vocational education model has been widely studied for its successful experience. The "dual system" refers to the combination of practical training in enterprises and theoretical learning in schools, and is jointly cultivated by enterprises and vocational schools. It is a highly effective model for cultivating skilled talents. Research points out that Germany has about 350 nationally recognized occupational standards, which are jointly formulated and implemented by the government and industry in accordance with the law to ensure that the training standards are consistent with job requirements. As the main body of training, enterprises bear about 2/3 of the training costs (equivalent to 15,300 euros per student per year) and regard the training of apprentices as the best way to obtain skilled workers. Apprentices acquire skills and socialization abilities that meet market needs by learning in real scenarios, thereby greatly improving their employment competitiveness. This model has been successfully operated for a long time and is considered an important factor in maintaining the competitiveness of Germany's manufacturing industry. Some domestic scholars have summarized the inspiration of the "dual system" for my country's vocational education in the following aspects: strengthening the training model of combining work and study, improving legal protection, increasing the enthusiasm of enterprises to participate, and changing social concepts. In summary, Chinese and foreign literature provides reference for this study: deepening the

collaborative innovation of industry, academia and research is the general trend, and typical model experience (such as Guiyang Health Vocational College and Germany's dual system) can provide useful ideas for the reform of health vocational education.

3 THEORETICAL BASIS

This study is based on the collaborative innovation theory and school-enterprise cooperation theory. First, the collaborative innovation theory of industry, academia and research explains the internal mechanism of collaborative education of multiple subjects. The collaborative innovation theory believes that different subjects can form an innovative force of "1+1>2" through resource sharing and complementary advantages [7]. Specifically, in the cooperation between industry, academia and research, enterprises, universities and scientific research institutions establish a collaborative partnership based on aligned interests, and carry out innovation activities in accordance with the principle of "cooperative research and development, sharing of results, and sharing of risks" to achieve technological breakthroughs and joint training of talents. This theory emphasizes the importance of interest ties and goal orientation, and provides guidance for building a long-term cooperation mechanism between schools, enterprises and research institutes in the field of vocational education. Secondly, school-enterprise cooperation and dual education theory are important supporting theories for vocational education. Modern vocational education theory emphasizes experiential learning and work process orientation, requiring teaching content to connect with actual positions to achieve alternating integration of learning and work. The German "dual system" model is based on this theory, which gives equal weight to school education and enterprise training. On the one hand, schools provide systematic knowledge and basic skills training [8]; on the other hand, enterprises provide practical training in real situations, and the two complement each other. The dual education theory emphasizes legal and institutional guarantees, and ensures the stable operation of cooperation by clarifying the responsibilities and interests of all parties. In the context of my country, the new "Vocational Education Law" clearly states that vocational colleges should focus on the integration of production and education, school-enterprise cooperation, and provide incentives for enterprises that are deeply involved. This provides a legal basis for the implementation of "dual" education at the practical level. In short, the collaborative innovation theory and the dual education concept together constitute the theoretical framework for analyzing the problem in this article: the former focuses on the macro multi-subject collaborative mechanism, and the latter focuses on the micro talent training model. The combination of the two is helpful to explore the optimization path of health care vocational education from the two levels of institutional mechanisms and practical paths.

4 ANALYSIS OF THE CURRENT SITUATION OF PRACTICE IN XINYANG CITY

Xinyang City is located in the southern part of Henan Province. It is a populous city and an old district. The aging situation is severe. The data of the seventh census shows that in 2020, the proportion of people over 65 years old in Xinyang is 15.20%, which is higher than the national average; by the end of 2023, the number of people over 65 years old in the city will exceed 1.015 million, accounting for 16.8% of the permanent population. At the same time, Xinyang's health care industry has a certain foundation. Xinyang is famous for its ecological livability, has good traditional Chinese medicine and hot spring health care resources, and is building a health care industry cluster featuring elderly care, health preservation, and rehabilitation nursing. However, there is a shortage of local health care service professionals, and grassroots medical and elderly care institutions are facing a "labor shortage", while many graduates from vocational colleges have difficulty finding jobs, which reflects the mismatch between talent training and industrial needs.

The Xinyang Municipal Government attach great importance to the connection between vocational education and industrial needs, and regard "grasping vocational education is grasping development and people's livelihood" as a consensus. In recent years, a series of policy documents have been issued to increase financial investment and promote the reform of vocational education integration. The municipal government has listed the construction of "Xinyang Vocational Education New City (Leishan Jiangu)" as a key project, integrating land and financial resources to create a highland for industry-education integration. Leishan Jiangu Industry-Education Integration Vocational Education Park takes the integrated development of "health care + research and study + tourism" as its concept, plans to build a health care resort base, a research and study practice base, etc., and integrates health care industry elements into the vocational education park, aiming to achieve the simultaneous layout of the education chain and the health care industry chain. In addition, Xinyang is actively striving to become a national pilot city for industry-education integration. In March 2024, it established the "Xinyang High-tech Zone Municipal Industry-Education Consortium", which will work together with the government, schools, industries, and enterprises to establish professional committees such as industrial development, school-enterprise cooperation, and technological innovation to explore the closed-loop mechanism of "demand co-research - resource co-construction - results sharing".

Local vocational colleges represented by Xinyang Vocational and Technical College have made useful explorations in the training of medical and health care talents in recent years. Vocational schools closely connect with the needs of local health care industry upgrades and dynamically adjust their professional structures. In the past three years, new health-related majors such as elderly care and management, medicinal diet therapy, etc. have been established, and some redundant old majors have been eliminated, so that the matching degree between majors and regional industries has reached 92%. The school has also been recognized as the first batch of Henan Province's healthy elderly care

education and training bases and elderly care service talent training bases, and undertakes the provincial civil affairs industry elderly care skills competition and other tasks, and the status of the regional health care talent training center has been gradually established. The school actively expands cooperation with health care institutions. For example, it co-established the "Health Care Industry College" with Xinyang Shengde Nursing Center and implemented the "1+1+1" talent training model, that is, one year of on-campus learning, one year of corporate internship, and one year of post-job training, focusing on the integration of theory and practice. This model allows students to hone their skills in the real environment of nursing institutions, greatly improving the practical ability and employment willingness of graduates, and more and more graduates stay in the local elderly care service industry for development. For example, the school, the Municipal People's Hospital and the Shanghai Jiaotong University School of Medicine team jointly established the "Dabie Mountain Aging Research Institute" to explore the "industry-university-research-medicine" collaborative innovation model, carry out geriatric medicine and health care service research, and provide the latest scientific research support for teaching. This is a beneficial attempt by universities, hospitals and scientific research institutions to jointly educate people.

At present, Xinyang Vocational College has established cooperative relations with more than 290 enterprises, of which 251 are listed as off-campus internship bases, and 35 industry-education integration training bases have been built to achieve full coverage of professional cooperation such as health care. The school and enterprises have jointly developed 47 courses, compiled 14 textbooks, sent thousands of teachers to each other for training, and promoted training forms such as order classes and named classes, initially forming a virtuous cycle of "enrollment is recruitment, admission to school is admission to the enterprise, and graduation is employment". For example, in cooperation with a nursing enterprise, a "customized class" was opened, and students signed contracts to become prospective employees while in school. The course content was customized according to job requirements, and they could start work after graduation, which greatly improved the fit between talent training and job requirements. These measures have significantly improved the quality and quantity of Xinyang's health care talent training. Overall, Xinyang City has made positive progress in policy guarantees, school-enterprise cooperation platforms, and industrial college construction, but there is still room for expansion in deepening collaborative innovation and improving the level of talent training.

5 EXISTING PROBLEMS

Although Xinyang City has achieved certain results in the integration of industry, academia and research in health and wellness vocational education, there are still many shortcomings and challenges. These problems are universal to a certain extent, which restricts the improvement of the quality of health and wellness talent training and needs to be analyzed in depth:

The system and mechanism are not sound, and the synergy is insufficient. At present, the cooperation between schools, enterprises and research is mostly carried out in the form of projects or agreements, lacking a stable and long-term synergy mechanism. Schools and enterprises often operate independently, and due to the absence of effective mechanisms for interest and risk sharing, it remains difficult to establish a stable and long-term cooperation framework. For example, some cooperation remains at the level of short-term internship bases or order classes, lacking in-depth equity cooperation or joint school-running mechanisms. Once the external environment changes, the cooperative relationship is prone to loosening. In addition, there is a lack of a platform for overall coordination among multiple subjects, and it is difficult to efficiently integrate resources between governments, colleges and universities, industry organizations, and scientific research institutions, and the synergy of collaborative innovation has not yet been fully stimulated.

The degree of enterprise participation is not high, and the connection between schools and enterprises is not tight. Although the government has introduced incentive policies for industry-education integration enterprises, it has limited appeal to local small and medium-sized health and wellness enterprises. Some health care enterprises are not very enthusiastic about participating in vocational education, believing that the investment is slow to take effect and the cost is high, so they lack motivation. This has led to the fact that school-enterprise cooperation is mainly concentrated in a few demonstration enterprises, with a narrow coverage. The boundaries of rights and responsibilities between enterprises and schools in talent training are not clear enough. Enterprises play more of a role of "cooperating to provide internship places" and are not deeply involved in the teaching process. In Xinyang, there are limited large-scale health care institutions in the local area. Enterprises participate in school-running mainly to provide training bases. There are no cases of enterprises investing in co-building vocational colleges or leading professional construction, and a stable, deeply integrated partnership between schools and enterprises has not yet been fully established.

The connection between majors and needs is not tight, and the course content and practical teaching need to be optimized. On the one hand, the setting and level of health care majors need to be improved. At present, most health care-related majors in Xinyang are set up at the higher vocational and secondary vocational levels, and undergraduate talent training has not yet been carried out, which is insufficient in meeting the needs of high-end positions in the health care industry. On the other hand, the curriculum system is not closely connected with the cutting-edge needs of the industry. Some college courses still focus on theoretical teaching, and the content of courses such as elderly care and new Chinese medicine rehabilitation is updated slowly, and the latest technologies and specifications have not been absorbed in a timely manner. For example, emerging cross-cutting contents such as smart elderly care and rehabilitation engineering are not covered enough in the curriculum. The more prominent problem is the weak practical teaching. Although some internship bases have been established, due to the limitations of venues, equipment and management,

students' practical opportunities and practice time are still insufficient, making it difficult to truly achieve the purpose of training skills. Some practical trainings are reduced to simulation exercises and are out of touch with real nursing situations. The practical teaching guidance force is also insufficient. The number of corporate mentors is limited and it is difficult to invest energy in the long term, which affects the effectiveness of practical teaching.

"Dual-qualified" teachers and scientific research support are relatively weak. Health and wellness vocational education requires a "dual-qualified" team of teachers who understand professional theories and have practical experience. However, in reality, such teachers are scarce: medical nursing teachers mostly come from academic colleges and lack front-line elderly care experience; and part-time teachers with industry backgrounds often lack teaching ability and find it difficult to systematically undertake courses. The mechanism for full-time teachers to go deep into enterprises for training is not sound, and the improvement of practical ability is limited. In addition, vocational colleges have weak scientific research capabilities and it is difficult to transform scientific research results into teaching content. At present, the cooperation between industry, academia and research institutes is mostly at the level of employment and training. There are not many R&D platforms jointly built by schools and enterprises, and the channels for teachers and students to participate in enterprise technological innovation are limited. This makes it difficult to integrate new technologies and processes into the teaching content in a timely manner, and talent training cannot fully meet the needs of industrial upgrading.

Talent training level and regional talent retention problem. The health care industry needs not only a large number of front-line nursing staff, but also high-level compound talents such as medical, management, and social workers. At present, Xinyang vocational colleges are mainly at the junior college level, and there is a lack of talent training at the undergraduate level and above. The "ceiling" of health care talents in the region is relatively low, and high-end talents mostly flow to developed areas. There is also a phenomenon of loss of local outstanding graduates, and they are not willing to stay in grassroots nursing institutions for development. This is related to salary and benefits, and also reflects that the local health care career development channel is not smooth, the talent promotion space is limited, and it is impossible to attract and retain high-quality talents, thus forming a vicious cycle of "talent outflow and job vacancies".

6 COUNTERMEASURES AND SUGGESTIONS

Focusing on the above-mentioned problems, this study proposes the following path suggestions for optimizing health care vocational education:

(1) Improve the industry-university-research collaboration mechanism and establish a stable and long-term cooperation framework. Strengthen top-level design to promote effective alignment between colleges, enterprises, and research institutions. It is recommended that the government take the lead in forming an industry-university-research collaboration council or alliance, responsible for drafting a long-term cooperation charter to guide joint actions. Joint projects should be established in key areas such as talent cultivation and technological innovation, enabling all parties to share the outcomes and jointly bear the investment risks. For instance, the "school-enterprise joint venture" model may be explored, in which enterprises contribute capital and equipment while schools provide venues and teaching staff, with resource allocation and benefit-sharing mechanisms linked to the operational performance of the institution. This model fosters an interest-aligned and mutually supportive partnership between schools and enterprises. In addition, collaborative innovation platforms—such as health and wellness technology research centers and skill master studios—should be established. Regular coordination meetings can be held to align talent training objectives with industry development needs. Through institutionalized mechanisms, sustained and effective multi-stakeholder collaboration can be achieved.

(2) Strengthen the role of enterprises as the main body and encourage in-depth participation in school-enterprise cooperation. Actively implement the recognition and preferential policies for enterprises integrating industry and education, and give priority to enterprises participating in school operation in terms of tax reduction and exemption, financial subsidies, and financial credit. Establish evaluation indicators for enterprise participation in vocational education, and include the number of practical training positions provided by enterprises, the number of times they participate in course development, and the number of graduates received in the evaluation of corporate social responsibility to enhance the enthusiasm of enterprise participation. Encourage large-scale health care institutions to organize or participate in the organization of vocational schools, such as establishing health care vocational training centers, senior citizen universities, or cooperating with universities to set up "enterprise order classes", and enterprises will participate in the whole process of enrollment, teaching and assessment. Promote the training model of "enrollment is recruitment, and admission to school is admission to enterprise". Give priority support to deep cooperation enterprises in terms of land use, credit, etc., to form a win-win situation of "enterprises get talents, schools get resources, and students get skills".

(3) Optimize the professional and curriculum settings and enhance the adaptability of talent training. Adjust the professional layout according to the development trend of the health care industry, actively develop health care service vocational undergraduate education on the basis of higher vocational education, and cultivate high-level skilled talents in management, rehabilitation, and nursing. Establish a dynamically updated curriculum system and closely follow the new standards and technologies in cutting-edge fields such as medical and nursing integration and smart health care. Invite industry experts and excellent front-line nurses to participate in the compilation of textbooks and the formulation of curriculum standards to ensure that the teaching content keeps up with actual needs. Promote modular curriculum reform, decompose job skills into learning modules, and facilitate students' personalized improvement. Increase the

proportion of practical courses and strictly implement the requirement of no less than 50% of practical teaching hours. Expand the practical training conditions inside and outside the school, build a nursing practice center and rehabilitation training room with real-life simulation, and regularly update the equipment to be close to the clinical and nursing sites. Implement the work-study alternation training system, such as setting up a concentrated practice semester every academic year, so that students can stay in hospitals and nursing institutions for long-term internships and improve their skills in a real environment. Through the dual optimization of courses and practical links, the ability and quality of graduates will be more in line with the requirements of health care positions.

(4) Strengthen the construction of a "dual-qualified" teaching staff and improve the ability to integrate teaching and practice. Implement special plans to build a team of teachers with both theoretical level and practical experience. First, promote the teacher enterprise practice system, and stipulate that teachers of health care majors in vocational colleges must have a certain amount of time to work or practice in hospitals and nursing homes every 2-3 years to update their industry experience. Give teachers treatment guarantees and subsidies during their enterprise practice to relieve their worries. Secondly, recruit professional talents with rich experience in health care practice from the society as full-time and part-time teachers, especially introducing industry masters and inheritors of intangible cultural heritage medicine in the fields of nursing, rehabilitation, and traditional Chinese medicine. Schools can set up "industry professor" positions or studios, flexibly introduce hospital head nurses, rehabilitation therapists, etc. as mentors, undertake practical training guidance and course teaching. Secondly, schools and enterprises jointly build teacher training bases, regularly hold training courses on new knowledge and new technologies in health care, and improve the professional level of teachers. Schools and enterprise masters establish a "dual mentor system", teachers learn practical skills from enterprise mentors, and enterprise masters learn teaching methods from teachers, so as to achieve mutual employment and mutual training. Through these measures, teachers can understand both educational laws and industry practices, so as to better guide students in teaching.

(5) Improve policy support and guarantees to create a good development environment. Government departments should introduce supporting policies to provide support for the integration of industry, academia and research in health care vocational education. First, funding guarantee: set up special funds to support vocational colleges and health care enterprises and institutions to jointly build training bases, research and development centers, etc., and provide financial support for the development of industry-university-research collaborative projects. Second, talent policy: give preference to the employment of graduates from health care vocational colleges, such as grassroots employment subsidies and career development promotion channels, to attract more outstanding talents to engage in elderly care services. Public institutions are encouraged to recruit graduates of health care majors with advanced skills certificates to enhance their career attractiveness. Third, evaluation and incentives: The results of industry-education integration will be included in the quality assessment indicators of vocational colleges, and colleges with remarkable results will be commended and given additional resources. A benchmark demonstration mechanism will be established to select outstanding industry-education integration cooperation projects, outstanding teachers and corporate mentors, and create an atmosphere of support for industry-university-research integration in the whole society. Fourth, legal guarantees: Accelerate local legislation, such as formulating the "Regulations on Promoting Industry-Education Integration in Xinyang City", clarifying the rights and responsibilities and incentives of each subject, and guaranteeing the implementation of the collaborative education mechanism from a legal perspective. Through policy synergy, escort the reform of health care vocational education.

In summary, optimizing health care vocational education requires multiple measures. Only by improving the collaborative mechanism, stimulating corporate motivation, connecting with the industry to optimize teaching, building a dual-teacher team and improving policy guarantees can a strong synergy of industry-university-research collaborative innovation be formed, the quality of talent training can be continuously improved, and the talent needs for high-quality development of the health care industry can be met.

7 CONCLUSION

In the era of collaborative innovation between industry, academia and research, health and wellness vocational education has ushered in an opportunity period and a challenge period for quality development. Taking Xinyang City as an example, this paper finds through empirical analysis that the local area has made certain progress in promoting industry-education integration and school-enterprise cooperation, such as building a health and wellness industry-education park, co-building an industrial college, and carrying out medical-education collaboration. However, there are still prominent problems such as an imperfect coordination mechanism, weak enterprise participation, and misalignment between teaching supply and industry demand. These problems are common across the country and restrict the quality and scale of health and wellness skilled talent training.

In order to solve the above problems, this paper draws on the typical experience of Guiyang Health and Wellness Vocational University and the German dual system model. The case of Guiyang Health and Wellness Vocational University shows that vocational colleges must adhere to the characteristics of running schools and deepen the integration of industry and education in order to cultivate high-quality technical and skilled talents in order to connect with the emerging health and wellness industry. Its innovative measures such as the "Four Hundred Projects" and "Three Integrations and Four Chains" are worth learning. The German dual system emphasizes the deep collaboration between schools and enterprises and the combination of work and study under legal protection, providing us with a mature paradigm. Based on comprehensive analysis, this paper proposes optimization path suggestions from the aspects

of collaborative mechanism construction, enterprise main role, curriculum practice reform, teacher team construction and policy support, striving to be targeted and operational.

Strengthening the collaborative innovation of industry, academia and research is of great significance to the high-quality development of health care vocational education. On the one hand, it will effectively bridge the gap between education supply and industry demand, cultivate sufficient, well-structured and high-quality health care service talents, and alleviate the current talent shortage dilemma under the background of aging. On the other hand, it will help promote the transformation and upgrading of vocational education itself, improve the school-running level and social service capabilities through collaborative innovation, and achieve a benign interaction and win-win development between vocational education and health care industry. Especially for old areas like Xinyang, the collaborative innovation health care vocational education model can not only serve the local people's livelihood, but also cultivate new growth points for the regional economy.

It should be pointed out that the collaborative innovation of industry, academia and research is a systematic project, involving changes in policies, concepts and systems, and it cannot be achieved overnight. In practice, it should be carried out step by step according to local realities, and experience should be summarized and strategies adjusted in a timely manner. For example, we should first establish several pilot school-enterprise-research alliances, and gradually promote them through pilot projects; we should focus on cultivating typical examples and give play to the benchmark effect. In the process of promotion, the government, colleges, enterprises, and scientific research institutions should update their concepts and work closely together to truly form a joint force for collaborative education. Only in this way can we explore a path to optimize health and wellness vocational education with local characteristics.

In short, under the background of population aging and the Healthy China strategy, health and wellness vocational education has great potential. Through collaborative innovation between industry, academia, and research, we are expected to build a new ecology of vocational education with deep integration of industry and education, continuously improve the fit between talent training and industrial development, and provide a steady stream of high-quality skilled talents for the elderly cause and health and wellness industry. This is not only the due meaning of vocational education serving national strategies and local development, but also the only way to achieve its own high-quality development. The practice and exploration of Xinyang City provide us with a vivid example. Looking to the future, with the improvement of relevant policies and the deepening of efforts of all parties, collaborative innovation between industry, academia, and research will surely promote health and wellness vocational education to a new level on a larger scale and at a higher level, and achieve the goal of high-quality development. The health care talent training system established on this basis will provide solid talent guarantee and intellectual support for actively responding to the challenges of aging and improving people's health and well-being.

COMPETING INTERESTS

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