

Research on the Development of Rural Vocational Education empowered by Information Technology*

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Abstract—Under the background of rural revitalization strategy, with the completion of the revision of China Vocational Education Law, rural vocational education has ushered in unprecedented opportunities for development. By analyzing the present situation and existing problems of vocational education development in rural areas of the northwest of China, how information technology can empower the development of rural vocational education is explored. On the basis of the existing conditions, update the information technology major, build a data platform, improve the vocational education teaching system, and establish a long-term cooperation mechanism for the integration of industry and education between schools and enterprises, so as to improve the recognition of vocational education, promote rural economic development, narrow the gap between urban and rural areas, and provide high-level vocational and technical personnel for the country.

Keywords—Rural areas, Rural revitalization, Information technology empowerment, Vocational education, Analysis of the situation

I. INTRODUCTION

According to the “Main Data Bulletin of the Third National Agricultural Census (No.5)” issued by the National Bureau of Statistics of China, the number of farmers in the western region reached 4.11 million, accounting for 31.88% of the total in China [1]. There are a large number of farmers in the rural areas of the northwest, and agricultural development is the top priority of rural revitalization. However, there is a serious loss of skilled talents in the northwest of China, the proportion of government investment is unbalanced, the agricultural infrastructure is backward, the number of local enterprises is small, enterprises and agricultural production mostly adopt the traditional business models and production models, the teaching quality of vocational and technical schools is poor and there is no complete teaching system. The country proposes to implement the rural revitalization strategy, which is to take effective measures to change the backwardness of rural areas and narrow the gap between urban and rural areas as much as possible.

With the advancement of science and technology, information technology has become the backbone of economic

activities and social production. It has become a practical problem to use modern agricultural information technology to empower the development of rural vocational education under the background of rural revitalization. How to improve the vocational and technical training curriculum system, cultivate information technology talents, establish a data platform to improve the productivity and quality of the agricultural industry, and change the current situation of economic development lag caused by the loss of skilled talents in rural areas has become an inevitable need and irreplaceable key path for rural revitalization.

II. CURRENT SITUATION OF VOCATIONAL EDUCATION DEVELOPMENT IN NORTHWEST RURAL AREAS

A. Prejudice hinders the development of vocational education

According to the “Statistical Bulletin of The Ministry of Education of China in 2021”, the gross enrollment rate of senior high school students is 91.4%, the proportion of junior high school graduates entering ordinary senior high school is about 60.43%, and the proportion entering secondary vocational school is about 39.44%. Nearly 10% of students drop out [2]. Due to the long-term implementation of “elite education” in China, most people in rural areas of the northwest of China believe that vocational colleges are synonymous with low learning ability, lack of ambition. Secondary vocational schools become buffers for older teachers before they retire, shelters for teachers with weak teaching ability, and alternative places for students who want to continue their studies. In the rural areas of the northwest of China, the farming life that has been inherited from generation to generation makes these peasants believe that only by stepping out of the countryside can they have a better life. When these students enter the system guaranteed by the state, they are equivalent to getting a “golden rice bowl”, which is a glorious thing. These students lack learning ability and have no positive learning motivation due to the influence of external factors. As a result, teachers have some difficulties in starting follow-up teaching and practical activities, their teaching cannot get the response and cooperation from students, and teaching activities cannot achieve the expected results. In addition, there are no large-scale enterprises in the rural areas of the northwest, and the graduates of secondary vocational schools cannot find suitable jobs. The wages of employed

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students are far lower than those of ordinary workers. The unsatisfactory employment situation makes the public's

prejudice against secondary vocational education become more and more fierce.

TABLE I. INFORMATION TECHNOLOGY MAJOR OF SECONDARY VOCATIONAL SCHOOL IN NORTHWEST RURAL AREA

Number	Provinces	The school	The name of major	The main courses
1	Shaanxi	Shaanxi Ziqiang Secondary Vocational School	Computer application	Comprehensive practical training of graphic design, Photoshop, Flash animation design, web design, computer assembly and maintenance, basic knowledge of database.
2		Bin County Vocational Education Center	Computer network technology	Networking technology and network management, network operating system, network database, web page production, computer network and application, network communication technology, network application software, JAVA programming foundation, server configuration and debugging, network hardware configuration and debugging, computer network software training, etc.
3	Gansu	Yongdeng County Vocational secondary Vocational school	Computer application	Computer application foundation, computer assembly and maintenance, Visual Basic language, professional English, computer graphic and animation design, computer network foundation and local area network construction and management, database development and application, advertising design and production, website construction and webpage design, multimedia design and production.
4		Qingyang Vocational and Technical College	Electronic information engineering	SQL Server database design, switching and routing technology, Linux operating system, Java programming, computer assembly and maintenance, enterprise network construction technology, network security technology, ASP.NET dynamic website development technology, network cabling, web design and layout.
5	Ningxia	Ningxia Industrial School	E-commerce major	Commodity information collection and editing, web editing, web design and production, network marketing, customer service and management, e-commerce data analysis and application, website operation, mobile commerce.
6	Qinghai	Haibei Prefecture Vocational and Technical School	Application of digital media technology	Graphic and image processing (Photoshop), digital video and audio production (After Effects, Premiere), special effects synthesis and column packaging, scene design and production, etc.
7	Xinjiang	Tiemen Guan Vocational and Technical College	Computer application (office-automation realm)	Office software, use and maintenance of office equipment, document and file management, software and hardware maintenance and marketing of computer equipment and network, use and maintenance of digital products, network cabling, marketing, e-commerce application, foundation and application of typesetting technology, foundation of art design, text and text mixing.

B. The development of rural vocational education lacks the support of information technology

In recent years, with the continuous updating of information technologies such as IOT(Internet of Things), AI(Artificial Intelligence), Cloud Computing, Mobile Internet and Big Data, has been widely used in the field of agriculture, which has greatly facilitated the lives of farmers. As information technology is a key factor in the development of agriculture and the promotion of rural economic income. Vocational schools in the rural areas of the northwest of China closely follow the national rural revitalization strategy, and most of them have set up information technology majors. As can be seen from Table I, information technology majors in these schools do not reflect local regional characteristics and are not connected with local rural industries. The informatization construction in the rural areas of the northwest of China is in a backward state. There is no scientific management system in the whole agricultural industry chain. Most of the planting and breeding industries adopt traditional ways, without advanced planting and breeding technology and equipment, and there is a lack of corresponding professional talents in information technology. Without a long-term cooperation mechanism between schools and enterprises, the knowledge learned by students in the classroom cannot be

practiced in time, students lose their interest in learning, students cannot find a suitable job after graduation only by relying on the theoretical knowledge they have learned in class. The rural construction cannot get fundamental changes.

C. The development of rural vocational education is frequently hindered due to poverty and lack of schooling

Vocational education has the dual attributes of "economy" and "education", and its development is inextricably linked to the level of the local economic development. The economic development in the northwest of China is in a backward state, the scale of education cannot keep up with the needs of local economic development, and the government's investment in ordinary high school education is excessive and unbalanced. Educational equality not only refers to the fairness of students' rights to receive education, but also considers whether the distribution of educational resources is fair. The public's prejudice against vocational education already exists, which is aggravated by the imbalance of the government's investment in funds and emphasis on it. While the gross enrollment rate of senior high school education is 91.2%, most of the students in the rural areas of the northwest of China who fail to enter school are from poor families. According to Maslow's hierarchy of needs, people will only consider the problem of

self-actualization when they are satisfied physically and materially. The students of secondary vocational schools are mainly children from poor rural families who are not admitted to regular high schools and migrant children who are excluded from the urban education system. However, ordinary high school education and secondary vocational education are not in the compulsory education stage. According to incomplete statistics, a high school student spends about ¥30,000 in three years, which is already the income of a farming family in the rural areas of the northwest of China for one year. Therefore, students choose to give up the opportunity to study in vocational schools.

D. The training model of rural vocational education colleges and universities is hollow, the construction of rural digital infrastructure is limited

In recent years, when choosing employment, teachers give priority to ordinary high schools or junior high schools. The number of teachers in vocational schools has declined sharply, and it is hard to find a teaching position in general high schools, as shown in Figure. 1.

At present, the rural vocational schools in the northwest of China rarely set up vocational qualification institutions, students do not have vocational qualification certificates but only academic certificates after graduation. Most of the in-service teachers do not have vocational qualification certificates, which is contrary to the training mode of "double-qualified teachers" and "1+X" certificate. The construction of

The rural development is inseparable from the support of information technology. Due to the remoteness and poverty of the western region, the information technology resources are quite limited, and the diffusion tension of technology on basic education is slightly insufficient. In addition, the standards and quality of teaching resources are different, and a large number of resources have been developed in various provinces and cities[3]. Scattered on their respective platforms, it is impossible to further promote the application on a larger scale. The purpose of vocational education is to supply labor force to the market, and market demand is the main consideration in running vocational education schools. However, the curriculum setting and teaching content of rural secondary vocational education in the northwest of China are out of line with the characteristics of local enterprises and the actual demand of the market. Taking Qingyang City in Gansu Province and Luochuan City in Shaanxi Province as examples, the apple industry in these two places has achieved certain achievements with the assistance of national policies, but the curriculum settings of vocational middle schools in these two places do not involve the use of modern information technology for apple planting, production and marketing. Vocational schools and enterprises, villages and towns cooperation, etc. have not taken substantive actions, which makes the rural vocational education running lack of vitality. The digital construction in the rural areas of the northwest of China is backward. Agricultural production, animal and plant breeding all adopt this traditional breeding method, and the number of information-based enterprises is very small, exposing the "digital gap" with the development of the eastern region.

III. INFORMATION TECHNOLOGY EMPOWERS VOCATIONAL EDUCATION DEVELOPMENT IN NORTHWEST RURAL AREAS

A. Build digital villages, increase poverty alleviation through education, and eliminate public prejudice

The prejudice in people's mind is a big barrier, and the limitation of concept and thinking is the biggest obstacle to the development of rural vocational education. With the promulgation of the "Vocational Education Law of the People's Republic of China", the government should strengthen the publicity of vocational education, so that the society and students can see the development prospect of vocational education, know that vocational education is as important as general education and enjoys equal opportunities [4]. At the same time, make good use of information technology to connect IoT, Big Data processing, Neural Networks, E-commerce, AI, etc. let the local vocational schools conduct research on local issues, and build a complete production, sales and tourism industry chain. For example, use IoT or IoE to automatically monitor and manage the temperature and humidity of greenhouse vegetables and fruits, livestock breeding, etc., use Big Data to predict the planting effect and processing time of agricultural products, use the Internet platform, Big Data analysis to calculate the share of the sales market, etc., so as to facilitate the life of the masses, effectively improve the quality of people's life and deeply integrate information technology with rural revitalization. The role of modern information technology has been brought into full play, allowing the masses to see substantial changes in

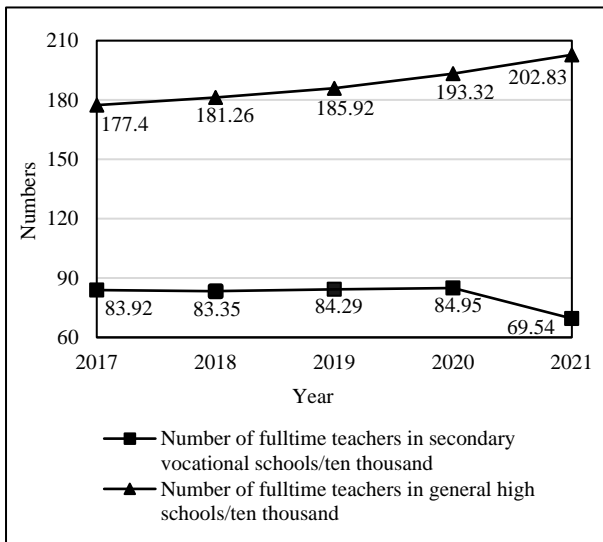


Fig. 1. Comparison of the number of full-time teachers in secondary vocational schools and general high schools in the past five years

various intelligent facilities, digital management system and public database in vocational education are restricted by policies and funds. The school's vocational education concept is backward, and it is unable to form a school-running model that suits local characteristics. Teachers will only follow the script and follow the common school-running model and ideas. Information technology education is superficial, which is unable to be integrated into the talent training system.

vocational education and its bright prospects for development. At the same time, according to the data, the main reason for students to drop out of school in the rural areas of the northwest of China is the heavy financial burden of the family. The government should comply with the national funding policy for vocational education, and guide the local people to establish a correct view of education and employment through various ways to promote the development of rural vocational education.

B. E-commerce integrates production and marketing, and implements the integration of production and education

There are many kinds of agricultural products in the rural areas of the northwest of China, which have great market development potential. The rise of Internet E-commerce and policy support have provided better resource guarantees for promoting rural areas, while the rational use of information technology provides technical support for improving the E-commerce network and establishing a logistics distribution network[5]. But from the current point of view, there is a shortage of information technology talents in the rural areas of the northwest. In order to maximize the effect of information technology on rural revitalization, the government must not only carry out system and mechanism innovation, give full play to institutional advantages, industrial advantages and regional advantages, and attract college students and information technology talents to return to their hometowns for work, but also cultivate information technology talents through local vocational schools. The government should provide financial, fiscal, land and other support to enterprises that meet the requirements and are identified as integrated enterprises of industry and education. The government should also implement additional education surcharge, local education surcharge reduction and exemption and other tax and fee concessions. The government is the main body of education investment, and its investment in education is inclined to the construction of vocational education. According to the characteristics of local economic development, it cultivates talents who are proficient in agriculture and information technology. Although there are few large-scale enterprises in the rural areas of the northwest of China, the conditions for running vocational education in rural areas should be improved comprehensively, and schools should be supported to establish a long-term cooperation mechanism with these local enterprises, so as to build digital villages and improve the life quality of villagers.

C. Introduce information technology talents and reform the curriculum system of vocational schools

China Vocational Education Law requires that professional course teachers (including internship instructors) in vocational schools should have corresponding work experience or practical experience for a certain number of years and reach the corresponding technical skill level [4]. In view of the current situation of weak rural vocational education teachers, firstly, the government must issue policies, establish a talent introduction mechanism, increase teachers' salaries, such as linking teachers' professional titles with rural service years, implementing a two-way flow mechanism for regional vocational colleges, and breaking the one-way trend of rural teachers flowing to cities under the dual structure of urban and rural areas [6]. While vigorously attracting talents,

vocational schools should also reform the selection mechanism of teachers and improve the threshold of vocational teachers, which requires teachers in vocational schools to be "double-professionally-titled" teachers. These teachers should undertake not only education and teaching, but also the local informatization reform and construction.

Reform the current curriculum system in the rural areas of the northwest. The rural enterprises in the northwest of China are small in scale and quantity. Agriculture and agricultural products are the main part of the rural areas in the northwest region. Based on the development of agriculture, information technology is the way to promote economic development. In practice, the development of information-based education based on information technology is an inevitable need and an irresistible trend for rural revitalization [7]. Therefore, the government should integrate resources according to local characteristics and first set up specialized courses and information technology majors that are suitable for local characteristics in local county-level vocational middle schools. On this basis, improve the county, city, province education network, and expand the radiation range of rural vocational education. Under the reformed curriculum system, students are guaranteed to obtain three certificates upon graduation. After the students meet the assessment requirements of the company that has a cooperation mechanism with the school, they can enter the company to work, build a practical and characteristic industry-education integration line, promote the development of agricultural industry, and realize the closed-loop cooperation between market demand and rural vocational education.

D. Reform the information technology major to empower the construction of digital villages

As a highly practical profession, information technology can be widely used in various fields. Under the background of rural revitalization, information technology, as a key factor to develop agriculture and promote rural economic income, is a major that rural vocational schools in the northwest of China must offer. Although the specific courses are different, they all belong to the major of information technology. In order to maximize the effect of information technology and enable students to truly learn knowledge and technology, the government should increase investment in hardware for schools, lengthen the use time of computer rooms, improve network coverage, strengthen the information construction of rural networks and promote the comprehensive integration of education, technology and industry. So as to make information technology play a role in promoting product production efficiency, and combine AI, Big Data and IOT to build a network platform that helps people live broadcast and sell products. The school provides students with a wealth of practical opportunities. Under the good cooperation mechanism established by the schools and enterprises, students cooperate deeply with units, participate in the development of the information technology of local enterprises, and are encouraged to participate in various competitions. Students' interest in learning can be stimulated and students' learning digital information literacy in northwest rural areas can be improved. To explore the in-depth integration of information technology and curriculum teaching,

and integrate information technology education into the talent training system of vocational schools [6].

IV. CONCLUSION

Under the strategic background of national rural revitalization, the social division of labor has gradually become the main trend of social development. Rural development requires a large number of information technology talents to develop agriculture and breeding industry, and to achieve the informatization and technologization of agricultural production and breeding industry. The re-development of vocational education and the increasingly mature information technology will undoubtedly bring opportunities for rural revitalization. With the support of national policies, vocational education and information technology implement the integration of production and education, and strive to cultivate information technology talents. Advanced technical knowledge is used to build villages and help to develop rural revitalization. So that the public and society can establish a correct outlook on employment and schooling, prejudice against vocational education can be eliminated, and can make young people stay in the country, and bring vitality and hope to rural development.

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