



Application of Future 5G Technology in the Development of Higher Vocational Education

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Abstract. Industrial convergence will be an inevitable trend in the 5G Era. Crossover cooperation among professional technicians in different trades or posts will be a certainty. These impel higher vocational education to speed up reform, adapt to the requirement of 5G development and meet the challenges positively. This article aims at exploring the challenges the higher vocational colleges meet, and analyzing the application strategies they adopt in 5G new format.

Keywords: 5G era · Vocational education · Challenges · Strategies

1 Introduction

The Ministry of Industry and Information Technology issued commercial licenses for 5G in 2019, meaning China is entering a critically rapid period of 5G development and to be a leaders of new era mobile communication technology. 5G technology has more advantages in terms of operating speed, connection density and capacity, and has built a three-dimensional digital environment for modern industries. It has built a digital highway for the development of science and technology, providing an important information channel for the development of big data, internet of things and artificial intelligence. 5G also has great impact on social operation management mode, business mode and education mode. As a cradle of fostering talents, it is urgent for higher vocational colleges to combine the needs of 5G era, conform to the trend of times and to be ready for 5G vocational education in the future.

2 The Impact of the 5G Era on New Business Formats

2.1 Cross-border Integration

With the incoming of 5G, integration of industrial chain is to be an essential development tendency in the future. Base on the mode of Big Data+Platform, tremendous progress and reform have been achieved in algorithm and computing capacity, which can promote

connection of industrial chain, provide scientific basis for information forecasting and aggregate productivity factors. From the perspective of mode of production, production efficiency is increasing, standardization is being replaced by individualization, human resource is being replaced by automation technologies. Moreover, with technological breakthrough [1], 5G technology makes the network reliability and security, and makes intelligent production and service possible. At last, with development of crossover cooperation, working space is expanded, the ways of production organization is changed by technical means, rote of labors in production differs from that in the past. Based on Fig. 1, the 5G technology’s development has become the leader and mainstream of the industry and higher vocational education also should need to strengthen innovation in combination with social development.

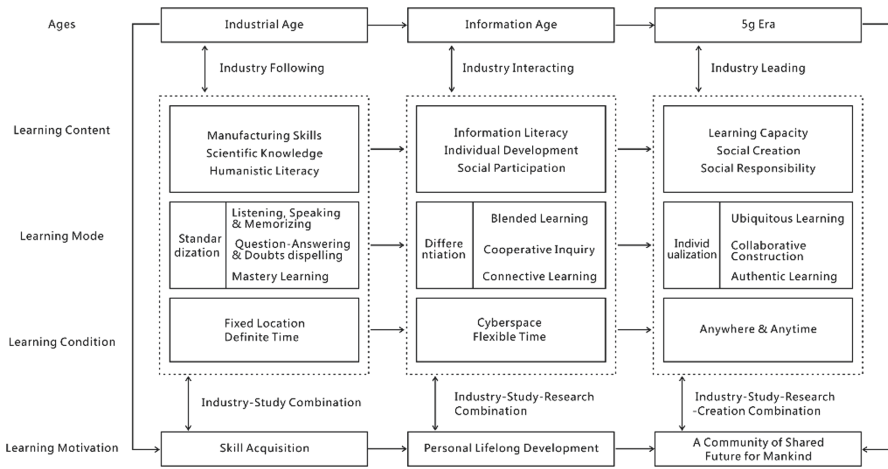


Fig. 1. The development of 5G education in higher vocational college

2.2 Rapid Iteration of New and Old Post

With the arriving of 5G era, the change of the trade will surely influence the employment market, meaning that, the employment market needs to adapt to the new industrial development. Besides, 5G technology prompts a rapid iteration of new and old post, where reform is being driven by technological innovation and technological development is put more on capital-intensive and technology-intensive business. As a result, the advantages of labor resource in labor-intensive business are disappearing, more and more employees are losing their positions, or have to transfer to a new post. The good news is that 5G era is also making compensation, with new technology improving products, bringing more new positions and developing innovative space. Thus, modern higher vocational education should take the opportunity to improve cultivation of talents, training more advanced labor force who can master automation technology accurately and efficiently rather than traditional manual labor force. With 5G technology supporting big data, artificial intelligence and other technologies, flexible judgment is to be made by combining

goals of modern information development [2]. Besides, here comes two trends. The general labor force capital is decreasing, for there is higher compatibility of labor force. On the other hand, talent capital is increasing by vocational training. As a consequence, higher vocational colleges should aim at the transition from general labor force post to talent capital post, and heightening employees' capital value.

2.3 Normality of Cross Team Collaboration

When industrial structure is perfected, employment situation is optimized, backward-development technology causes discordance between industry and employment structure. In order to guarantee scientific personnel cultivation, higher vocational college need to take positive response to modern revolutionary technological change and make ICT literacy as the core according to future career development in 5G era. Compared to traditional technology, 5G technology performs an obvious promotion effect on economic development. It gradually presents a multi-field development mode. Further study on industry, post and the principles of the position, engaging in 5G technology should be taken. Training with different kinds of teaching resources, like AR and VR resources, needs adopting to contribute to the combination of human and technology, thus to improve production value by technology together with technique. For the post, the employees engaged in 5G technology are required to grasp the ability of network planning, mobile communication, big data and diversity of technical work. In the meantime, it is essential to strengthen professional technology and to facilitate cross-profession communication and collaboration, on the purpose of developing cross team collaboration among different industries. For the professional technology itself, technology frontier should be reinforced, trends should be grasped longitudinally, and self-learning as well as professional cooperation should be also stressed.

3 Challenges of Future Vocational Education in 5G Era

3.1 Value Diversification of Talent Cultivation

As artificial intelligence and digital economy in 5G era is growing, career boundary has become increasingly blurred, causing obvious tendency among cross-major and cross-post. Great change of labor connotation certainly promotes employment, while it also requests more about labor's sustainable learning ability, information literacy and social emotion. Considering the requirement of talent development in 5G era, Higher vocational college ought to cultivate top-level talents with professionalization and high attainment. As shown in Fig. 2, the number of majors which is related with 5G in Chinese Higher Vocational Colleges is upward from 2019–2021. If deep into the data, most of our higher vocational colleges still adopt single-major teaching philosophy while developing vocational curriculum at present. What's worse, sustainable learning ability, the way of thinking in 5G era and cognitive ability are not brought into vocational curriculum yet. Most colleges are beginning to emphasize information literacy, yet, the teaching content cannot meet the demands of digitization and intellectualization [3]. All of above leads to the situation that professional skills and knowledge are limited in personnel cultivation. Thus, what the students learn cannot meet the demands of development characteristics in the current era.

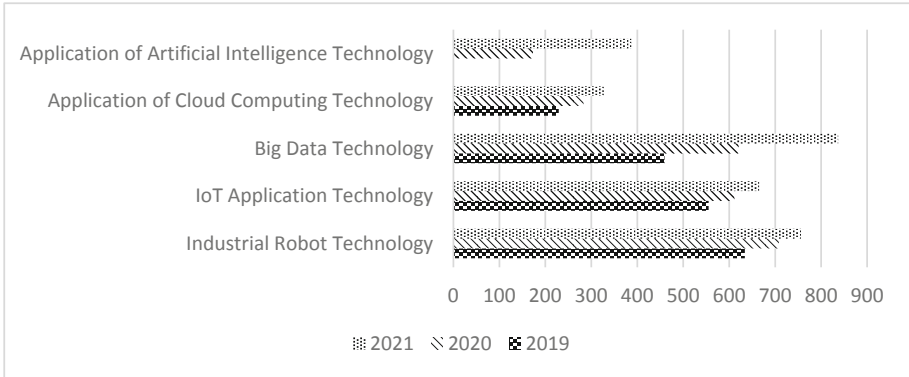


Fig. 2. Number of 5G-related majors established in higher vocational colleges in recent three years

3.2 Intellectualization of Learning Mode

In 5G era, higher vocational college is more than a place where knowledge and skills are taught to students, but an intellectualized educational platform. Intelligent learning is going to be the important content in education. To suit this intellectualization learning mode, higher vocational college should set up teaching management mode for fragmented knowledge and competitive learning, optimize space modality in campus, improve the management system and adopt scientific management, in order to accelerate an intellectualized and open campus. Besides, they should also highlight the conception of students-oriented, establish innovative teaching environment and offer students intellectualized and open circumstance [4]. Yet, under contemporary system, secondary colleges, together with credit system and student- status management, are basic components and still play a pivotal role in higher vocational colleges. Differentiation brought by online teaching among learners is an unfavorable factor to wisdom teaching, that, higher vocational colleges should make reform according to teaching management in industrial stage.

3.3 Influence of Educational Equality

The start of 5G era helps higher vocational college gain more channels, obtain more abundant education resources and achieve teaching optimization. Even those in under-developed regions can obtain high-quality teaching resources from outside. For another, teaching or learning resources are no longer limited to schools, students can search related learning resources by themselves on internet, bringing more advantages in theoretical study and skill acquisition. The development of 5G technology helps to contribute favorable conditions for vocational education evolution, employment and poverty alleviation. However, from the actual condition, there still exist some problems in applying these high-quality teaching resources. For example, systematics measures of college and individual's applying these resources are to be set up, which makes it difficult for both of them to explore appropriate teaching resources [5]. Even, there are great

differences in the economic structure and industrial form of different regions in China, the high-quality resources may not suit the demands in underdeveloped regions. In 5G era, it helps vocational students in underdeveloped regions easier access high-quality resources, they are more likely to get impacted by the content and thoughts within the resources. By comparing these, more talents in underdeveloped regions choose to come into economically developed areas. Consequently, this kind of talent flow is enlarging educational equality.

3.4 Open and Life-Long Education Platform Construction

In traditional vocational education, it aims at promoting one-time employment, while in 5G era, it requests learners to employ persistent and diversified study mode based on their interest, hobbies, career development and even their family background.

Moreover, every individual can share his professional knowledge or skills, search for professional resources or talent, construct information connection channel. And even, they can complete their learning or service in informal ways with the help of 5G. But unfortunately, higher vocational colleges still adopt enclosed classroom teaching mode because of the current educational environment, the influence and limitation of scientific and technological level, management strategies or mentality. Even if colleges develop the teaching mode of school-enterprise cooperation and production-education integration, these are passive adjustment that colleges have to take for their development. The education mode, which can establish open teaching resources, considers further study for continuing learners and realize long-life study, is impossible to achieve yet. It is eager that higher vocational college should reexamine definition and mode of vocational education, to set up an open long-life education mode.

4 Application Strategies for Future Vocational Education in 5G Era

4.1 5G Concept to Improve Teaching

In 5G era, students in vocational college are facing more complicated occupational development environment, meaning they need to respond the current career development situation positively by combining profession connotation and future career development. As for vocational colleges, they ought to comprehensively evaluate their teaching characteristics and external influence factors, set up new personnel training mode on the basis of broader industries and career development rather than the traditional single major training method. They should also break traditional linear employment logic and cultivate pluralization and diverse talented personnel. Higher vocational education needs to grasp the concept of modern education in personnel cultivation, apply prospective educational philosophy, in order to set the closest link to production line and service and to perform much better in serving the society [6]. 5G era lays stress on developing standard of talent cultivation, optimizing assessment system, persevering in new technology research and innovation, thus, encouraging innovative and intelligent professionals. Hereby, higher vocation colleges should concentrate on cultivating high-level

and comprehensive talents, and take initial employment together with long-term continuing vocational education as vital educational content, but not focus on academic career and employment in personnel cultivation.

4.2 Reinforcing Coordination to Break the Traditional Professional Layout

Future vocational educational profession design and layout is required to be well programmed in 5G era. Specialty setting ought to suit local present status of economic development and strategy, playing its own value and advantages in informatization; for instant, developing 5G+ Project to evolve digital development projects, expanding digital industry, promoting internet of things, cloud computing and artificial intelligence, etc., and exploring digital finance. In the light of current industry development trends, higher vocational colleges ought to deploy market investigation, construct majors and curriculums, and intensify digital finance majors. Firstly, it is necessary to weed out the majors that cannot fit the market development or are out of date, and to set up the new one based on the demands of the market, such as internet finance, big data technology and artificial intelligence services. In this way, it will be doing a good job in supplying talent force for regional industries and economic development.

What is more, considering the teaching and situation of professional development, higher vocational colleges should regulate the connection between specialty and industry by creating superior specialty and featured majors, developing school-enterprise cooperation, promoting implementation of modern apprenticeship and practicing industrial 1+X certificate system, with the purpose of promoting work in all areas by drawing upon experience gained in the work on key points. Finally, it is helpful to set up “2 with 5” specialty clusters with the demands of big data and inclusive finance. Taking internet finance major as an example, higher vocational colleges can establish a specialty cluster with a core of financial management major, combining 5G technology, digital economy, inclusive finance, international finance and rural finance. As for international trading, a diversified specialty cluster based on international trading, combining business English and Cross-border e-commerce. Driven by high level major clusters, it is easier to cultivate high-competent talents with high-tech capability and entrepreneurial spirit, thus to promote the regional economic development.

4.3 Creating Modern Teaching System with 5G Superiority

5G era also drives vocational education to meet reform. Higher vocational colleges need to analyze the regulation of vocational education development and adopt teaching reform by making good use of 5G technology. There is a necessity that a large number of financial resources are invested in teacher construction and teacher’s cultivation, aiming to build a sophisticated teaching group. For instance, the “Hundred-Thousand-Ten Thousand Teacher Project”. Cultivation is mainly combined information technology and specialized courses, competition of courseware production and contest of information technology is carried out in order to strengthen their information abilities, therefore, to establish a group of influential and professionalized online teaching masters.

In the meantime, higher vocational college will kick its way to 5G self-regulated learning era by bursting the restraints of traditional education and establishing new

vocational education mode with 5G technology and smart campus service system. By renewing education concept and 5G vocational education concept, 5G+ smart campus, artificial intelligence data center and service platform are constructed, forming smart campus data center, making intelligent teaching service, smart classroom, smart training base, smart workshop and kinds of smart learning venues possible, therefor, to fulfill All-in-One intelligent education environment, and to promote teaching system analysis and reform.

When constructing specialty cluster, higher vocational colleges can set up an internal “cloud architecture” to accelerate intellectualization in specialty cluster, digitization in learning environment and resource construction. Intelligent teaching mode, which can be administrated closely with open sharing of resources, will be founded by integrating learning elements of every major and big data. That, students can learn anytime anywhere, or even the way of fragmented, personalized and mobile learning is becoming possible. Furthermore, it can describe students’ psychology and behavior, forming their construct life-cycle big data, in this way, offering personalized learning content and learning situation warning, and promoting the development of vocational education.

4.4 Taking Responsibility to Guarantee Education Equity

In 5G era, higher vocational colleges in different regions can access and achieve full coverage of high-speed internet. With the support of information technology and hardware, it is possible to share or optimize vocational education resources, narrowing the traditional gap between teaching and learning. The sharing in 5G future education shall be a two-way relationship mode, including information sending and information receiving, which also entails asymmetry. In another words, the application of 5G technology can amplify the consequence of the imbalanced regional economy development, cause huge change in how people think and bring major difference among types and condition of employment, which cannot be made up by 5G technology.

To ease this consequence, higher vocational colleges should take careful consideration on the type of faculty and features of regional economic development, to construct featured schools and majors, improve docking between industry and specialty and regulate and perfect mechanism of major construction. Moreover, it is necessary to optimize and improve professional evaluation index and information management system, and eliminate unqualified majors, so as to be the college which is indispensable to regional economy development. At last, 5G technology can be used for targeted poverty alleviation, helping to develop the education in undeveloped regions, and guaranteeing education equity.

4.5 Promoting Long-Life Education

Vocational education is becoming a part of long-life education in 5G era. Working force must combine the demands of the society development to form the concept of long-life education and continuing learning with the purpose of improve individual knowledge and skills. Higher vocational colleges can meet this need by using 5G technology to apply credit bank management, control the cost of credit recording, credit converting and certification [7]. In this way, students can fulfill long-life education by accumulating

credits. Higher vocational colleges should break framework of thinking restriction and improve employability of vocational education. It is important to improve students' leaning performance by constructing of academic or credit archives, summarizing and storing students' education information, like vocational skill level certificates or online educational outcomes.

5 Conclusion

In summary, in the context of the 5G era, the reform is rising in vocational education, which promotes the development of the industry and influences the Industrial economy. It also gives an impetus to economic change, consummate the education. With the innovation of 5G educating technique and tools, it is more convenient to obtain or share education resources, and it is possible to break the limitation of time and space to make learners to learn anytime anywhere. However, higher vocational colleges should construct featured majors, set the aim of developing talents scientifically, improve the docking between social service and vocational education and promote teaching practice and reform. That, it is positive to cultivate more innovative talents, to supply favorable conditions for 5G future cultivation of modern vocational talents, to positively meet the challenges in 5G era, and to promote innovation in vocational teaching and learning.

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