

The Innovative Development of Chinese Vocational Education from the Perspective of the Metaverse

Xiaoqing He

Chongqing College of Electronic Engineering, Chongqing, 401331, China

Abstract: The metaverse is an online digital space parallel to the real world, and a ternary-world digital society in which people participate in the virtual reality as a digital identity. It is characterized by immersion, interaction, co-construction and civilization. The metaverse has a broad future to apply to education. The educational metaverse has such characteristics as the deep integration of virtuality and reality, the comprehensive cooperation between students and technology, and the comprehensive connection between schools and society. With the rapid development of various intelligent technologies and the Internet, it provides a strong support for the modernization of vocational education. The educational metaverse constructs rich and realistic scenes similar to the real world, which can provide diverse educational resources, personalized teaching methods, intelligent evaluation methods, and integrated cooperation platforms. It will enhance the adaptability of China's vocational education and improve the cultivation of technical and skilled talents.

Keywords: Metaverse; Educational metaverse; Vocational education.

1. Introduction

As a high-level development product of virtual reality, the metaverse integrates VR/AR/MR, 5G, cloud computing, artificial intelligence, digital twins and other new information technologies. It will become the latest form of the next generation Internet. At that time, human society will enter a new network era. However, the current school system is a product of the great industry era. Since its birth, especially since the last century, criticism about it has never stopped. As early as the 1960s, some scholars put forward the so-called "school extinction theory". With the arrival of the first year of the "metaverse" in 2021, people will not care its concept but turn to a new industry. What kind of impact will the metaverse have on our education? How should we respond to the arrival of the metaverse era? The two questions should be considered by vocational education, which has the closest economic and social ties.

2. The concept and characteristics of metaverse

2.1. The concept of metaverse

Wikipedia defines the metaverse as "a post universe, metaphysical universe, meta world, hyper sensory space and virtual space, which are used to describe an online 3D virtual environment with persistence and decentralization in the future". In essence, the metaverse is a process of virtualizing and digitizing the real world, which requires massive rebuilding of content production, economic system, user experience and physical world content. However, the development of the metaverse is gradual. Supported by shared infrastructure, standards and protocols, it is formed by the continuous integration and evolution of many tools and platforms. It provides immersive experience based on extended reality technology, generates a mirror image of the real world based on digital twin technology, builds an economic system based on blockchain technology, closely integrates the virtual world with the real world in economic system, social system and identity system, and allows each

user to produce content and edit the world.

2.2. The characteristics of metaverse

2.2.1. Immersion

"Perception is reality" is the essential expression of the deep immersion experience of the metaverse. With the support of augmented reality, life records, mirror world, virtual reality and other technologies, the residents of the metaverse can not only obtain the same real experience as the real world, but also further enhance the immersion experience through the life records of the whole life cycle. The metaverse enables users to generate on-site sensory stimulation through the wearable devices of vision, hearing, touch and whole-body sensory experience, as well as through the interaction technology which has low latency and high fidelity. The metaverse improve the quality of online interaction and communication and realize the immersive experience of users. Therefore, through the construction of the "digital twin" world and immersive experience to promote the deep integration of virtual and reality, users can have an immersive feeling of simulating reality and beyond reality in the metaverse.

2.2.2. Interaction

Perceived social contact, co-existence effect and emotional experience are the prominent advantages of the metaverse in social network. The metaverse will bring people a panoramic social perception experience, create the presence effect of virtual and real scenes, and especially provide people with a real social emotional experience. Zuckerberg's conception about metaverse highlights the social interaction of people's entertainment, games, work or life in the metaverse space, and vividly presents the perceptual experience of people's virtual avatars roaming in the metaverse and socializing with others. David Basuki of Robles elaborated the virtual reality integration function of the metaverse social network from the two dimensions of identity and friends. The metaverse residents can use their unique identity to conduct all-round social interaction, such as with friends, lovers and relatives. The cross domain of social contact provided by the metaverse also brings people a surreal social experience. Each individual

can obtain unique social experience in different roles in different metaverses.

2.2.3. Co-construction

Co-creation, co-governance and sharing are the basic values of the metaverse. Its core feature is digital creation. Group free creation is the fundamental power for the existence, development and iteration of the metaverse. Since digital avatars are the original people of the metaverse, and digital avatars are the second personality (virtual personality) formed in the virtual space by real people, if the metaverse wants to develop its own unique civilization, it must let all digital avatars participate in the construction of the metaverse, so that a large number of human achievements can be formed, and then civilization can be formed. The development of media technology brings us enriched interaction, which promotes people to interact with others and to rebuild and construct the surrounding environment in the metaverse.

2.2.4. Civilization

The metaverse is not the same as the current virtual world, but rather a highly-developed virtual world. Compared with the current virtual world, the biggest difference between the metaverse and the virtual world is that the metaverse has a virtual civilization that originates from reality, relies on reality but independent of reality. This civilization system has its own complete political system, economic system and cultural system. The social and ecological civilization of the universe is decentralized, sustainable and perfect. It has a complete economic system, a practical legal system and a perfect infrastructure of the universe. Decentralization does not mean chaos, disorder and violence. Under the protection of metaverse trust system and public order rules which are based on the block chain, it can form a good social ecology which fights against Internet giants and curb commercial monopoly.

3. The concept and characteristics of educational metaverse

3.1. The concept of educational metaverse

The educational metaverse can be understood as the educational application of the metaverse. It creates digital identities for teachers, students, administrators and related others. It opens up formal and informal teaching places in the virtual world and allows teachers and students to interact in the virtual teaching place. The virtual world of the educational metaverse can not only be the twin of the real world, but also be automatically generated or manually constructed by teachers and students using AI. With the help of VR/AR terminal, sensor, AI assistant, brain computer interface, the educational metaverse can realize the seamless connection and complete integration of virtual world and real teaching environment. Teachers, students and administrators, as participants or organizers of teaching activities, immerse themselves in the educational metaverse through virtual avatars. They can independently create and participate in teaching activities and naturally respond to the teaching behavior of the virtual and real world. They can break through the constraints of physical laws and geographical space in the teaching process and achieve two-way transmission of information in the virtual and real world.

At present, the metaverse has some applications in education. For example, Tsinghua University has set up the metaverse culture laboratory, Renmin University of China has

set up the metaverse research center, Nanjing University of Information Engineering has renamed the Department of Information Engineering as the metaverse engineering department, Nankai University has launched China's first metaverse journalism and communication college. The virtual campus of the Communication University of China has officially appeared on the Baidu "Greece" metaverse platform. In addition, United States has established the world's first virtual reality high school - the American High School. The University of California Berkeley has rebuilt its campus in the sand table game called My World and held an online graduation ceremony, Morehouse College in the United States has established an immersive virtual laboratory, Shuming Women's University in South Korea has constructed a metaverse campus with the help of three companies. Sungkyunkwan University has held a graduate recruitment fair on the metaverse platform Gather Town. In all the real industry connected with metaverse, the educational metaverse has the broadest prospect. The universe has been applied in the fields such as vocational education, science education, and children's education, which provides a good technical basis for interdisciplinary, cross regional, and instant sharing education, and can solve the problem of unbalanced distribution of educational resources. The education of the universe will bring about a revolution in educational scenes, tools, and allocation of educational resources in the future.

3.2. The characteristics of educational metaverse

3.2.1. Integration of virtuality and reality

The educational metaverse not only stays in the simulation and replication of space, but also integrates the real elements of education (education content, education purpose, role relationship, management mode, etc.) into its logical system, and then derives a new education system based on the association of virtual space and education system, and finally realizes the integration of virtual education space system and real education system, forming the basic conditions for educators, learners and educational activities participants to crossing the virtual and real world. In addition, teachers can create more immersive and simulated teaching scenes in the educational metaverse to guide students to carry out in-depth learning activities. At the same time, students can freely communicate and interact with virtual objects or real objects in the educational metaverse, create their own unique virtual world, and improve their innovation ability.

3.2.2. Cooperation between people and technology

As a technological ecosystem connecting virtuality and reality, the educational metaverse has made the relationship closer between educational subjects and technology through the highly integration of technologies such as intelligent perception, cloud computing and block chain. The advantages of intelligent technology are mainly reflected in speed, accuracy, efficiency, weight bearing capacity, etc., while the advantages of educational subjects are mainly reflected in thinking and logical reasoning, learning and skill improvement, collaboration and experience accumulation, etc. With the advantages of education subject and technology, transforming teachers' innovative thinking into a real scene of virtual space can greatly promote students' thinking improvement. In addition, the education metaverse attracts teachers and students to actively use intelligent technology on a large scale. By analyzing the education big data after use can also provide feedback to guide teachers to teach and

students to learn individually, thus realizing the coordinated development of people and technology.

3.2.3. Connection between schools and society

The educational metaverse eliminates the "wall" and boundary between education and society by connecting virtual and real space. In the educational metaverse, with the support of digital intelligent technologies such as the Internet of Things and block chain, schools and society can be connected closely, and there is no longer a wall between schools and society. In addition, with the apple of the educational metaverse, the vision of truly personalized education, precise education, lifelong learning and building a skilled society will come true. Knowledge learning and ability development will be further integrated. Virtual space will greatly promote the interaction between theory and practice, make learning more efficient to transform explicitly and implicitly, and truly promote the comprehensive development of knowledge and ability.

4. The Predicament of Vocational Education Talent Cultivation in the Intelligent Age

Vocational education cultivates high-quality technical and skilled talents with professional knowledge and practical ability. It is an important part of the national education system and human resource development. It undertakes the mission of cultivating technical and skilled talents for economic and social construction, which is crucial for the industrial upgrading and innovation. In the past decade, China's vocational education has made a considerable development. It has successively gone through three stages: "accelerating the construction of a modern vocational education system", "establishing the orientation of type education", and "creatively proposing the construction of a skilled society". However, with the evolution of the Internet from Web 1.0 to Web 2.0, to Web 3.0 to the metaverse, vocational education still faces many problems such as how to adapt to the development needs of the intelligent era and how to cultivate high-quality technical talents.

4.1. Dislocation of cultivation objectives leads to waste of educational resources

For a long time, China's vocational colleges have regarded cultivating high-quality technical and skilled talents as the goal, and invested a lot of human, material and financial resources. However, as for the actual educational effect, it is not ideal. There is still a certain distance from the original goal of cultivating high-quality technical talents. From the perspective of educators, most vocational colleges' investment in educational resources mainly focus on optimizing hardware facilities and teaching environment, hoping to improve students' skill level. But they often neglect the cultivation of comprehensive ability, which is crucial for students' subsequent career development. Such cultivation results in low efficiency of educational resources allocation. The investment of a large number of educational resources has not brought about corresponding improvement in the high-tech talent's cultivation. From the perspective of educates, most vocational college students expect their universities to be located in better regions, better cities, better hardware and software environments. They hope that they can simply acquire a skill and live on it in the future. From the perspective of talents users, most enterprises hope to recruit

new employees, especially new graduates, who can work well after simple training or even without training, to create profits and value for the enterprise. It is true that most vocational colleges cannot play an ideal role in the cultivation of high-quality technical and skilled talents. The school often teaches students basic or outdated technical knowledge. This kind of technical knowledge is feasible for maintaining the operation of mass enterprises, but it is totally not enough for the operation of technology-based enterprises, especially for intelligent enterprises with fast technology iteration.

4.2. Few teaching methods lead to low learning efficiency

For a long time, the teaching of vocational colleges in China has been guided by the traditional basic theory. It is regarded as a scientific way when theoretical teaching goes first than practical teaching. Therefore, in the daily teaching process, theoretical teaching is not only prior to practical teaching, but also its proportion of class hours is higher than practical teaching. From the perspective of teachers, most of them believe that it is difficult to improve technical skills without rich theoretical knowledge. As a result, most teachers focus on how to let students master the theoretical knowledge related to technical skills, rather than guiding students to improve their technical skills through practice. From the perspective of students, most of them have poor ability for theoretical learning. Even though they make a lot of effort on the theoretical learning, their knowledge are limited and easy to forget. Their theoretical knowledge may even fade away during the practical learning. The goal of the teaching design of "theory strongly supports practice" is not achieved. From the perspective of society, most enterprises will directly carry out practical teaching rather than theoretical teaching when training new employees, which will not only achieve better training results, but also enable employees to master the skills required for their posts in a relatively short time. Therefore, the traditional teaching method of "theory before practice" in schools is not necessarily scientific and effective. On the contrary, if a period of practical teaching is carried out first, students can understand the technical skills required for their future work first. Then theoretical teaching and practical operation are carried out on this basis. Such teaching method will not only improve students' enthusiasm and efficiency in learning theoretical knowledge, but also achieve the best results of two-way promotion between theory and practice.

4.3. Traditional evaluation means lead to insufficient innovation ability

For a long time, by examination or by test, the student evaluation in vocational colleges in China is mainly based on how much knowledge they have mastered. The subject of evaluation is teachers. In the traditional process of cultivating technical talents, teachers play an absolutely dominant role in the teacher-student relationship so that students lack the internal motivation for growth. Specifically, teachers are the authority in knowledge. Students complete various learning tasks in strict accordance with teachers' requirements, and teachers comprehensively give students' scores or grades according to students' examinations and daily performance. Is the result of student evaluation the most important factor in its subsequent development? Or another question, what is education except knowledge? Here, Einstein has a saying about education: "The value of college education is not to learn many facts, but to train the brain to think". In fact, he

not only put forward a new proposition about the value of education, but also put forward another dimension of education value beyond knowledge, namely thinking. Looking back at Chinese education from this perspective of thinking, there is a weakness, especially about vocational education. Therefore, according to the traditional evaluation method, schools, teachers and students all focus on knowledge rather than thinking. Critical thinking and creative thinking are not valued and trained, and students' innovation ability is weak.

4.4. Inadequate school-enterprise cooperation leads to insufficient effective supply

Vocational education connects schools and enterprises, education and industry, learning and work. The combination of work and learning is the way vocational education must go. The cooperation between schools and enterprises is a distinctive feature of vocational education. The integration of industry and education is an important support for vocational colleges to cultivate talents. In the long-term practice of running vocational colleges, we adhere to the integration of industry and education by promoting new technologies and skills of the industry, enrich the technical content of vocational education courses, increasing the effective supply of high-quality technical and skilled talents, and enhancing the adaptability of vocational education. The above theory about running a vocational college has been widely recognized. However, in reality, the above theory has not been effectively implemented. From the perspective of colleges, the traditional education system focuses on its own development and ignores the economic and social development. There is a lack of consensus on the integration of industry and education. Some people think that there is an irreconcilable contradiction between welfare attribute of schools and the profit-seeking attribute of enterprises, and the two cannot be integrated in their development. From the perspective of the government, the national and provincial institutional construction in the integration of industry and education is still weak. Rules are not powerful and feasible. The driving force and effectiveness of enterprises' participation in vocational education are insufficient. From the perspective of enterprises, there are difficulties for two-way unblocked integration of production and education. On the one hand, teachers in vocational colleges lack the ability to serve the development of the industry, and also lack the motivation to learn advanced industrial technology. On the other hand, enterprises lack the motivation to provide their own advanced technology to schools, and also lack the mechanism to promote employees to provide superior curriculum resources and teaching services for schools.

5. Educational metaverse empowers the innovative development of vocational education

Today there are two different views on the metaverse. One is that the metaverse is an important direction for future development. The other is that the metaverse is "foam" with great uncertainty and even risks, but the development of the metaverse is unstoppable. Many enterprises have declared to take the metaverse as the core development direction in the future, and have invested a lot of material, financial and energy in original innovation. Large cities in many countries have begun to build the metaverse, and a large number of

universities have promoted the integrated development of "metaverse +education". Therefore, the educational metaverse will certainly promote the profound reform and development of vocational education. Specifically, educational metaverse will empower the innovative development of vocational education, which is mainly reflected in the following four aspects.

5.1. Provide various educational resources

The virtual world of the educational metaverse can provide rich and realistic scenes similar to the real world. The boundary between the virtual world and the real world is no longer clear, so it can naturally provide learners with various educational resources, and meet their demand of different learning experiences and needs. It enables learners to have an immersive learning experience, and to gradually change from a rational initial participation to a full concentration of emotional intervention, so as to achieve a fully immersive learning of "flow" experience. Based on the collaborative creative function of the educational metaverse, the educational metaverse can not only jointly build and create rich educational resources, but also directly cooperate with governments, schools, teachers, enterprises, etc. to jointly create rich, comprehensive and personalized educational resources, which realizes the sharing of educational resources and highlights the maximization of the value of educational resources. Moreover, it can optimize the allocation of educational resources, eliminate the regional differences and urban-rural barriers of current educational resources, and promote the effective circulation of educational resources. High-quality educational resource can be fully allocated among different education at all levels, different regions and different schools. Different learners can enjoy rich and diverse educational resources.

5.2. Provide personalized teaching methods

The educational metaverse will promote significant changes in teaching methods, teaching practices and teaching technologies. It will realize the innovation of teaching models, promote the reform of teaching forms, and improve the quality of talents training. On the one hand, the educational metaverse can greatly extend the current teaching and learning space, enrich the teaching and learning methods, change the teaching and learning methods, and finally innovate new teaching theories, new teaching practice, new teaching methods and new teaching processes. On the other hand, the educational metaverse will promote the reform of teaching form from the aspects of teaching objectives, teaching fields, teaching subjects, teaching forms and teaching processes. Students can make use of learning resources, learning tools and learning environments in the educational metaverse to conduct an interest-oriented or task-oriented learning according to their own needs. According to their own teaching design, teachers can make use of all kinds of intelligent "virtual people" in the educational metaverse. Then we can achieve a diversified and integrated teaching form with multiple forms of participation, multiple links and multiple emotional environments. At the same time, the educational metaverse can completely and objectively record every detail of the teaching process. The intelligent analysis technology can provide teachers with a real, reliable and dynamically-presented tool to implement, intervene and optimize the teaching process, and provide strong support for students' knowledge creation, inspirational innovation and

group wisdom.

5.3. Provide intelligent evaluation means

The education metaverse takes big data, block chain, artificial intelligence and other technologies as the building blocks, and uses the data collection, processing and value discovery of big data, timestamp and consensus protocol of block chain technology, intelligent processing of artificial intelligence to solve the problems of education data such as difficult collection, incompleteness, inaccuracy and discontinuousness, so as to achieve a comprehensive and developmental intelligent teaching evaluation. On the one hand, the subject of student evaluation can be expanded from teachers to schools, parents, enterprises and themselves. The diversity of evaluation subjects provides an important guarantee for accurate and comprehensive education evaluation. On the other hand, the evaluation method is expanded from examination and test to the whole process evaluation. The intelligent technologies can transform the massive data into the process record, which achieves the process evaluation at different levels, such as "before class, during class, and after class", "school, family, and society". It is helpful for timely evaluation and effective intervention according to the current status and historical records of students. Precise evaluation of process and results is realized. At the same time, the educational metaverse can support various learning activities such as inquiry-based learning, experiential learning, thinking training, and problem-solving practice and so on. Then learning evaluation naturally transits from knowledge-centered to thinking training, which helps develop critical thinking and creative thinking, and promotes students' all-round development.

5.4. Provide integrated cooperation platform

The educational metaverse can provide an educational environment with deep integration of virtual and real world, which expands the school field, creates an educational environment for individuals, schools and society, provides a platform for in-depth cooperation between schools and enterprises, and achieves a win-win situation for schools, students and enterprises. From the perspective of schools, the educational metaverse can provide rich educational resources and realistic practice situations. It is helpful to integrate practice and learning. It will solve the problems such as the disconnection between knowledge teaching and work training. From the perspective of enterprises, education metaverse can help enterprises minimize the resources occupied by school-enterprise cooperation and effectively avoid the "fireplace effect". Students will become the biggest beneficiaries. They can not only freely enter and exit the educational universe according to their learning needs, improve the alternation frequency of work and study, integrate theoretical knowledge and practical skills, strengthen their professional skills, but also break through the limitations of physical space to practice in different enterprises according to their own majors, hobbies and career plans.

References

- [1] Xianming Xiang. Criticism as the premise and basis of construction -- a preliminary study of the contemporary ideological value of the American "school demise theory" in the middle of the 20th century [J]. Comparative Education Research 41.07(2019): 3-12.
- [2] Shuo Mao. The first year of the "meta universe"[N]. China Information Weekly, 2021-11-29:008.
- [3] Wikipedia entry of "metauniverse" : <https://zh.wikipedia.org/wiki/%E5%85%83%E5%AE%87%E5%AE%99>
- [4] Bolger R K. Finding wholes in the metaverse: Posthuman mystics as agents of evolutionary contextualization [J]. Religions 12.09(2021): 768-768.
- [5] Jie Xing, Guodong Zhao and Yuanzhong Xu. Metacosmic Token [M]. Beijing: China Translation Publishing House, 2021.
- [6] Chung H K. Metaverse friend making system design and implement[J]. Journal of the Semiconductor & Display Technology 20.03(2021): 97—102.
- [7] Guodong Zhao, Huanhuan Yi and Yuanzhong Xu. Metauniverse[M]. Beijing: China Translation Publishing House Co., Ltd., 2021.
- [8] Lingzhi Fang and Huangnan Shen. Changes in Technology and Civilization: A Study of the Concept of the Metauniverse [J]. Industrial Economic Review 01 (2022): 5-19.
- [9] Zheng Zhong, Jun Wang, Di Wu, Sha Zhu, and Shuaizhen Jin. Exploration and Analysis of the Application Potential and Typical Scenarios of the Educational Metauniverse [J]. Open Education Research 28.01(2022): 17-23.
- [10] Lele Hu. On the Metauniverse and the Reform and Innovation of Higher Education [J]. Journal of Fujian Normal University (Philosophy and Social Sciences Edition) 02(2022): 157-168.
- [11] Jinwu Zheng. The universe of the Yuan Dynasty "ripped open" from education [N] China Science Journal, 2022-01-06:003.
- [12] Geping Liu, Nan Gao, and Hanlin Hu. Education Metauniverse: Characteristics, Mechanism and Application Scenarios [J]. Open Education Research, 2022 (01): 24-33.
- [13] Guoqing Xu. Fundamental Transformation of Vocational Education Talent Training Mode in the Intelligent Age [J]. Education Research 03, (2016):61-62.
- [14] Tiancong Hao and Weiping Shi. A new exploration of the misunderstanding and path of China's high skilled talents training in the pre service stage -- based on the perspective of the growth of high skilled talents [J]. Journal of Hebei Normal University (Education Science Edition) 06(2017): 67-72.
- [15] Yingyi Qian. Critical Thinking and Creative Thinking Education: Concept and Practice [J]. Tsinghua University Education Research 04(2018):1-16.
- [16] Emily, B & Paul, C. A grounded investigation of game immersion(C). Extended abstracts of the 2004 Conference on Human Factors in Computing Systems, 2004.
- [17] Geping Liu, Nan Gao, and Hanlin Hu. Education Metauniverse: Characteristics, Mechanism and Application Scenarios [J]. Open Education Research, 2022 (01): 24-33.