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Teaching reform and practice of digital media art in the context of metaverse

Qiang Li, Zexue Liu, Peng Wang
Shenyang Aerospace University, China
Corresponding author E-mail:qiangli@sau.edu.cn

Abstract: Nowadays, with the development of the Internet, digital interaction and display technologies, the concept and application of the metaverse begin to realize commercial application gradually. Metaverse ecological system is focusing on building a new digital virtual world connecting social, gaming, education, and other areas. As one of the important majors in art colleges and universities, digital media art has an inevitable and close relationship with the metaverse in terms of technical means, design content, design creativity and business value. Therefore, in order to conform to the development of the metaverse era, the teaching reform of digital media art major is extremely urgent. This research puts forward some analysis and discussion on how to reform the teaching of digital media art major under the background of the metaverse.

Keywords:metaverse,digital media art,teaching reform,virtual reality

1.Introduction

At present, a new round of scientific and technological revolution and industrial revolution is accelerating in the world, and new generation digital technologies such as artificial intelligence, big data, cloud computing and virtual reality/augmented reality represented by the metaverse are accelerating. In this context, the society needs a large number of diversified, innovative and outstanding scientific and technological talents. However, the traditional training mode of engineering talents cannot adapt to the current development trend of new digital technology, and the major setting and teaching resource allocation have not adapted and changed according to the current trend. Therefore, it is urgent to accelerate the reform and innovation of engineering education. Under the background of the metaverse, it is required to promote the deep integration of information technology and education and teaching, especially in the field of digital media art, it is necessary to integrate digital creative content with computer graphics, sensor technology, human-computer interaction technology, computer network and other technologies, and cultivate comprehensive innovative talents with digital media art creative content creation and digital technology.

The concept of Metaverse integrates cutting-edge digital technologies such as artificial intelligence (AI), extended reality (XR), blockchain, Internet of Things, cloud computing and 5G to build a new form of the next generation Internet, and also provides a new transformation idea from digitalization to intelligence for online teaching mode (Huang Xinyuan, 2022). The metaverse is the foundation of the future digital industry, which will lead the reform wave in science and technology, economy, education and other fields.

In 2004, the Ministry of Education of China added the digital media art major to the professional catalog. This major is a new discipline that is emerging in line with the development trend of information technology. It covers a number of disciplines and is a new direction for the expansion of information science into the field of culture and art (Li Qiang, 2020). The interdisciplinary nature of digital media art major makes it have no fixed mode in teaching content, teaching methods and teaching objectives, and each aspect needs exploration, practice and reform. First of all, from the perspective of curriculum system, most digital media professional courses are still related to the design and production of traditional animation, video after effect and other digital content. At present, the advent of the metaverse era has spawned a large number of digital creativity and content in the form of new technologies, such as virtual reality, augmented reality, mixed reality, interactive design of H5 web and APP for mobile terminals, and motion capture based somatosensory, voice recognition, interactive devices, etc. The transformation of technological, commercial and economic models centering on the metaverse will provide new opportunities for the professional development of digital media art.

2.Metaverse and Digital Media Art

2.1 The Concept and Development of the Metaverse

The concept of "Metaverse" first appeared in the science fiction Snow Crash (Wang Tongju,2021;Kye, 2021; Collins, 2008) published by American writer Neal Stephenson in 1992. In 2021, Zuckerberg, the founder and CEO of Facebook, officially announced that Facebook would be renamed Meta, representing his confidence in the future market of the "metaverse", which also represents the arrival of the metaverse era. However, at present, the concept of the metaverse has not been unified in the academic community. According to studies (Lin, 2022; Kye, 2021), Metaverse is a 3D-based virtual world in which avatars representing actual individuals carry out daily tasks. The METAVERSE is a universe where social, economic, and cultural activities are carried out to create value and where virtual and physical realities interact and co-evolve (Lee, 2021). Another way to think of the metaverse is as a world where daily living and commercial operations are integrated (Chen, 2022).

No matter how the metaverse is defined, digital media technology, content, creativity and other digital art creation elements are essential components of the metaverse era. Therefore, in this context, how to adjust the teaching content, strategies, objectives and methods of digital media art majors in colleges and universities is a problem that we need to study at present.

2.2 Current situation of digital media art major

Digital media, a new discipline, has a remarkable feature, that is, digital, interactive, three-dimensional, video, sound, image, text and other multimedia teaching contents are closely combined. The mode of running a school can be either to build a new department or to distribute the curriculum in the existing relevant discipline system; The degree awarded includes literature and art, science, engineering, arts and art, involving film and television, design and creativity; The level of education can include undergraduate, master's and doctoral degrees, as well as non-academic and interdisciplinary degrees. From the setting of digital media professional courses in various colleges and universities at home and abroad, no matter which major of digital media, the core basic courses are very similar. These core basic courses are some introductory or elementary courses that

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all digital media majors must master. These courses help guide students into the digital media professional field, and also lay a good foundation for further learning advanced courses in different professional directions. Although the core basic courses of digital media preferred by various schools have their own characteristics and emphasis in content, they have a high degree of consistency in the setting of the following core courses: graphic technology and animation history, basic graphic theory, art and color science, three-dimensional technology, light and shadow art, laws of motion, etc.

2.3 The relationship between digital media art and metaverse

With the expansion of the metaverse ecosystem, more and more design talents suitable for this field are needed. Digital technology and content are the core of the metaverse, so the digital media art major in colleges and universities has become the main source of training talents for the construction of the metaverse. As a new media, the metaverse cannot be separated from the traditional digital media art features in the design creation process, and the combination of art and a new generation of digital technologies (5G, AI, big data, VR/AR, etc.) will also produce a new form of artistic creation and expression.

Virtual human

The metaverse is a large virtual world, which can also be said to be relative to the parallel world in our real world. If you want to enter the world of universe, you must virtualize us and bring our consciousness into the metaverse, and we will become avatars namely virtual human. According to Grabch et al. (2002), virtual humans are computer-generated characters that react to verbal and non-verbal cues in human-like ways by expressing their emotions, using language, and using body language. They can offer forms of support that are easily accessible to anyone with an internet connection (Pauw,2022). The virtual human in the metaverse can be divided into two types, one is externally controlled, and users can control the virtual human on the screen through terminal devices. The other is to wear these devices on various positions of the user's body through special devices. When the user moves, the virtual human in the metaverse will also make corresponding actions. A large number of applications of metaverse virtual human are based on the landing of computer vision capture technology. Most of the facial expressions of digital virtual humans use depth of field cameras to capture three-dimensional lattice cloud images of human faces, and then transmit facial actions and expressions to digital humans in real time.

Different from traditional animation character design, virtual human technology needs the support of basic theories and application technologies such as artificial intelligence, motion capture, image recognition, psychology, etc. Therefore, we should adjust the corresponding curriculum system for digital media art majors in this field, and cultivate interdisciplinary talents who integrate technology and art.

VR/AR/MR

VR (virtual reality) technology is a computer simulation system that can create and experience a virtual world. It uses computers to generate a simulation environment. It is a system simulation of multi-source information fusion, interactive three-dimensional dynamic scene and entity behavior, which immerses users in the environment. AR (Augmented Reality) technology is a technology to calculate the position and angle of

camera image in real time and add corresponding images, videos and 3D models. The goal of this technology is to put the virtual world on the screen and interact with the real world. With the improvement of CPU computing power of portable electronic products, augmented reality will be used more and more widely. MR (Mixed Reality) hybrid reality technology, which includes both augmented reality and augmented virtual, is a further development of virtual reality technology. This technology builds an interactive feedback information loop between virtual world, real world and users by introducing real scene information into virtual environment to enhance the reality of user experience.

VR/AR/MR, as the entrance of the metaverse, has a relatively broad application space and development potential in the future. In the teaching system of digital media art, we should increase the content of VR/AR theory and practice, cultivate students' vision of the possibility of future technology, and be able to create content for it.

Video Game

The design and production of video game products include script programming, story creation, scene modeling, character animation, interactive programming, interface and other digital media fields. The metaverse can be seen as an extension of the virtual game world. In addition to the natural similarity with the metaverse, the virtual world of metaverse also use game engines such as Unity3d or Unreal as their creation tools. Even VR/AR/MR technologies are all based on these game engines. Therefore, traditional video game design is still one of the main research directions of digital media art in the future metaverse era. The difference is that game design in the metaverse era will be a multimodal form integrating various human-computer interaction technologies. This will be a challenge for digital media art students in colleges and universities.

3.Exploration of teaching reform

In view of the problems faced by the digital media art major in the context of the new generation of information technology revolution represented by the metaverse, such as unreasonable professional settings or insufficient teaching resources, and the mismatch between the talent training model and social needs, a series of national strategies, such as "Made in China 2025", have been proposed from the national level to actively respond to a new round of scientific and technological revolution and industrial reform, and support service innovation driven development. Since February 2017, the Ministry of Education has actively promoted the construction of new engineering and new liberal arts, also in response to the development of current new technologies. Under this opportunity, combined with the characteristics of the metaverse, and taking this as the direction, the future development of the digital media art was analyzed and explored.

3.1 Building an interdisciplinary curriculum system

The universe is a huge digital ecosystem, which includes technologies such as the Internet, artificial intelligence, big data and virtual reality augmented reality, as well as digital content creativity, aesthetics, art and other design humanities. Therefore, the creation of the metaverse ecosystem requires interdisciplinary knowledge collaboration to complete or realize. To construct an interdisciplinary curriculum system requires not

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only the strengthening of teachers' professional quality, but also the establishment of a corresponding student incentive system to stimulate students' interest in learning. First of all, in the content construction of the curriculum system, more interdisciplinary content of "computer science+digital art" should be integrated.

Taking virtual reality technology as an example, virtual reality is one of the important contents of the metaverse technology system, and its 3I characteristics, namely immersion, interactivity and imagination, have become the basis for the development of the metaverse. At the same time, virtual reality technology also integrates 3D modeling, interactive design, programming, creativity and other technologies and content. Virtual reality courses should be integrated into the digital media art professional courses, and they should focus on technology or artistic creation according to the students' backgrounds.

In addition, the promotion of the teaching direction and objectives of the curriculum starts from two aspects: first, the curriculum design and graduation design encourage interdisciplinary teams to carry out technology complementation and exploration research; second, promote the joint cultivation of relevant scientific research and enterprises to enable teaching teams and students to conduct in-depth practical application testing. In addition, targeted curriculum system building and adjustment were carried out through college selected courses, external teachers, joint education and other ways to strengthen professional technical support and penetration related to digital product design and development.

3.2 Building an interdisciplinary teaching and research system

Under the background of metaverse technology, the demand for social products and services tends to integrate multidisciplinary technology into comprehensive design. Especially in the field of digital media, digital products (digital games, mobile APP, web platforms, intelligent interactive devices, etc.) not only need to meet the needs of aesthetic, user experience, human-computer interaction and other design fields, but also need to be assisted by engineers, especially computer software technicians. Therefore, building an interdisciplinary industry university research system can greatly improve the integration of disciplines and feedback teaching, so that students can integrate with society and provide students with practical ability. In addition, human-computer interaction technologies such as virtual reality will also be widely used to provide technical support and content design for virtual simulation projects in aerospace, machinery and other related disciplines, so as to achieve greater interdisciplinary cooperation.

3.3 Building a laboratory platform supporting the Metaverse

The development of the metaverse technology provides a new positioning point for the technical output of digital media, plays a leading role in driving and pulling, promotes the cross integration and sharing of multiple disciplines, and meets the needs of the current social transformation for digital media talents. In addition, we will strengthen the practical involvement of talent training and the combination of schools and enterprises, and provide pilot projects for high-tech cutting-edge applications in local engineering colleges. From the formation of advantages to the construction of the system, we will actively start from the future development situation and the actual needs of social talents, cultivate students' relevance and creativity, train students' divergent thinking and critical thinking, help students establish a sense of mission and value, let the cultural

attributes of technology really integrate into the engineering education culture, and let the concept of new engineering be implemented in teaching materials, classroom and extracurricular.

3.4 School enterprise cooperation

In order to improve the quality of undergraduate talent training, deepen the integration of industry and education, and school enterprise cooperation, the Department of Higher Education of the Ministry of Education of China organized relevant enterprises to support universities to jointly carry out the project of industry university cooperation and collaborative education. Through the cooperation between schools and enterprises, teachers are trained to optimize the teaching staff, and the cooperation with enterprises that complement each other's advantages across disciplines is emphasized to achieve the purpose of learning from each other's strengths and complement the shortcomings of digital media art in computer technology. In order to strengthen the practical teaching ability of teachers in line with the metaverse market, the "double qualified" teacher training and assessment mechanism is implemented, professional teachers are encouraged and required to go to enterprises related to the teaching profession to study, and students are led to visit and practice in metaverse related enterprises, feel the enterprise's workflow process and system, enhance students' awareness of the enterprise development process, and enterprise personnel are invited to enter the classroom to train students' professional ability. In addition, the enterprise project oriented teaching mode and the studio system divided by professional direction can also stimulate students' interest and cultivate their practical ability.

4. Conclusion

Digital media art majors in the context of the meta-universe have posed new challenges to the curriculum content and the requirements for cultivating students' abilities. Unlike the traditional digital industry market, the metaverse era has given rise to some new forms of technology and market demands. Therefore, digital media art majors, as emerging interdisciplinary majors in higher education institutions, should adjust and adapt the direction of teaching strategies to cope with the current rapidly developing digital technology revolution. The study proposes the teaching concepts and methods of skill integration and multidisciplinary cross-fertilization to provide reference for cultivating digital media professionals in the metaverse era. Interdisciplinary curriculum system,teaching and research system and laboratory platform are considered to be a suitable teaching system for cultivating talents for the metaverse ecosystem in digital media art major.

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