

The Impact of Virtual Image Interaction on College Drama and Film Education: Impact, Change, and Future Path

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Abstract: In recent years, virtual reality technology has become a computer simulation system that can create and experience virtual worlds. Virtual reality technology and its virtual images are comprehensively constructed from three major systems: interactive system, perception system, and computing system. At present, virtual image interaction has had a structural impact on college drama and film education. On the one hand, it breaks the temporal and spatial limitations of traditional drama education and expands the boundaries of theatrical directing art. On the other hand, it also exposes the practical difficulties in the current education system, such as insufficient technological equipment, single teacher structure, and lagging curriculum system. This article proposes innovative strategies and paths for higher education drama and film education, emphasizing the establishment of an interdisciplinary curriculum system to cultivate composite drama and film talents with dual abilities of "technological literacy and humanistic spirit". This study not only enriches the theoretical framework of digital representation in director art education, but also provides practical reference for the transformation of drama and film education in universities.

Keywords: Virtual Image Interaction, College Drama and Film Education, Drama Performance, Drama Director, Embodiment

1. Introduction

Virtual reality technology, commonly known as VR, originated in the 1960s and is a computer simulation system that can create and experience virtual worlds. Virtual reality technology and its virtual images are comprehensively constructed from three major systems: interactive system, perception system, and computing system[1]. Although the term "interaction" was first used in computer science, with the integration and development of media, the concept of "interaction" has long been expanded and extended, focusing on human-machine collaboration in the production and reception process, as well as the interactive experience between the audience and the image[2].

2. Virtual image interaction creates highly immersive virtual scenes

Nowadays, virtual image interaction is widely used in various fields, especially in large amusement parks, home theaters, museums, archives, etc. Its biggest feature is its high immersion, which can visually present the scene in front of the audience and immerse them in virtual scenes[3]. At present, the 360 degree dome cinema in Qingdao Polar Ocean Park is a typical example of presenting a continuous aesthetic virtual environment through the motion video stream of virtual images. At present, the 360 ball screen cinema in Qingdao Polar Ocean Park presents a virtual environment with continuous aesthetics through the motion video stream of virtual images, in order to create highly immersive virtual scenes. The total area of the dome cinema is 380 square meters, with a viewing screen diameter of 22 meters and a projection screen area of 600 square meters. It can accommodate nearly 300 people watching movies at the same time. The appearance of the cinema is designed as an independent spherical building, with a built-in giant spherical canopy that extends from the ceiling to the ground. It uses spherical projection and combines virtual imaging, naked eye 3D and other technologies. Through the joint operation of 5-8 high-definition projectors, a giant spherical image of up to 600 square meters can be pieced together. The total area of the dome cinema is 380 square meters, with a viewing screen diameter of 22 meters and a projection screen area of 600 square meters. It can accommodate nearly

300 people watching movies at the same time. The appearance of the cinema is designed as an independent spherical building, with a built-in giant spherical canopy that extends from the ceiling to the ground. It uses spherical projection and combines virtual imaging, naked eye 3D and other technologies. Through the joint operation of 5-8 high-definition projectors, a giant spherical image of up to 600 square meters can be pieced together. The audience does not have a fixed seat when entering the cinema, and can choose to sit, lie down, or stand up to watch the movie. When the marine creatures in the virtual image "swim" over the audience's heads, one can always hear the cries of surprise from the crowd that are "right in front of them" and "seem within reach". At the same time, the three-dimensional surround sound also echoes in the spherical buildings, with a strong sense of wrapping. About a hundred audiences are simultaneously swept into the virtual field, and will make physical movements such as waving, standing up, and cheering along with the plot. They are highly immersed in virtual environments such as space fortresses, underwater worlds, and cliffs, and the scene is magnificent. Unfortunately, the duration of a single film in this cinema is about 15-20 minutes. Due to its limited duration, the films it plays are mostly animated videos that simply pursue visual impact, lacking richer narrative plots and thematic connotations.

In the early stages of film, the viewing mode of "keeping the audience in a space of continuous motion at all times" had already emerged. Hale's Tours places the audience in a model train carriage, with the windows serving as screens. When the carriage shakes, the physical experience of motion can be simulated together with the projected images on the windows[4]. Among them, 'placing the audience inside the train carriage model' refers to the direct contact between humans and the 'natural' physical environment. It is precisely placing the audience in a simulated environment, and the extension of touch generates spatial directional suggestions in the brain. In addition, 'carriage shaking' and 'image projection on the car window' activate the audience's past life experiences and experiential cognition through the extension of audio-visual perception. And this model is still being used today. In the "Star Journey" VR cinema of the "Huachanglong Valley Fantasy New Continent" amusement park, the audience needs to wear 4D glasses and board the train carriage model. The train model is placed in a simulated cave with large screens at both ends. When the experience begins, the train model will travel rapidly back and forth along the tracks on the ground in the cave. The carriage not only realistically simulates the shaking and back and forth movement of the train, but also can rotate and spin 360 degrees according to the plot, carrying the audience back and forth in the large screens at both ends of the cave. At this moment, the audience is embedded as an embodiment in this spatial field. Although the simulated cave environment is not large and the distance between the two large screens is short, the strong motion images on the screen and the fast-moving carriages completely change the real physical space, creating a visual surround effect similar to auditory surround sound, highly reproducing the visual and auditory impact of the explosion on the train. Not only that, the fragments of the explosion and the barrage of bullets were also pushed straight in front of us by the 4D glasses, and the audience's terrified screams echoed in the cave one after another. The ultimate audience increasingly experiences illusions under the realistic effects of this virtual image, completely immersing themselves in Star Wars. Due to the overly realistic reproduction of the effect, in order to prevent children from being frightened, this VR cinema prohibits children under 120 centimeters and the physically weak and disabled from entering to watch.

3. Human machine collaboration extends human sensory functions

Virtual image interaction is the process of human-machine collaboration during production and reception, which prompts the audience to use interactive tools to produce actions, thereby extending human sensory functions and increasing interactivity[5]. The "Jinling Digital Art Exhibition" at Nanjing Deji Art Museum creatively uses virtual reality tools to recreate virtual bodies in digital art exhibitions, enriching the audience's on-site experience. There is a 110 meter long and 3.6-meter-high ultra high definition LED giant screen in the exhibition hall, which displays digital animated images imitating the traditional famous painting "Imitation of the Song Dynasty's Jinling Map". The film includes 533 virtual "people in the painting" and more than 20 interaction points. During the exhibition, the audience can stroll in front of the screen and simply connect their personal phones to "enter the painting in one second" - they can have their own digital character image in the painting and become any "painting person". The audience can then use the smart wristband worn on their body to capture their full body movements, and the real movements emitted by their physical body can be presented in real-time on the virtual body of the "painted person". They can even trigger personalized storylines through random movements. This globally pioneering "portrait like" approach combines virtual image interaction, military grade spatial positioning system, next-generation sound effects, and other technologies with

indoor high-precision positioning system UWB, Unity engine, and intelligent management system to enable audiences to quickly interact and independently decide exhibition content in real time, completely subverting the digital form of traditional cultural relics. It is precisely with the help of these complex interactive tools that the audience watching the exhibition can travel through any Song Dynasty resident depicted in the painting, strolling through the city of Jinling. The virtual body recreated by the audience on the giant screen has no delayed response and can present the physical movements of the audience in real time. The virtual body can even randomly perform real-time movements such as shopping, selling goods, listening to plays, and watching fireworks, with rich and realistic details that are stunning. At the same time, the famous paintings in the giant screen can accommodate hundreds of people to interact at the same time. A group of people wearing wristbands can be seen everywhere, holding mobile phones and gathering in front of the giant screen, sometimes swinging their bodies for movement, and sometimes cheering due to the effects of random interaction. People have forgotten the real time and space, disregarding their image, completely immersed in the former glory of the ancient capital Jinling.

Of course, in the actual design of interactive tools, the characteristics of various human senses should be taken into account. Interactive tools need to comprehensively schedule all human senses and must achieve harmony and unity. For example, among many manufacturers of VR glasses, the most common and difficult problem they have faced is "VR motion sickness" - head mounted displays can cause users a certain degree of dizziness. It is widely believed that one of the reasons for this is that the eyes and balance system present conflicting information. The audience visually sees themselves in motion, but in reality their upper body is in a stationary state. When the actual motion does not match the visual movement, the body's sensory imbalance can easily lead to vestibular nerve dysfunction. And this individual feeling difference also hinders some users from fully immersing themselves to a certain extent[6]. Therefore, during the process of watching movies or playing games, VR large-scale motion sensing interactive all-in-one machines often have much better effects than wearing VR glasses alone, and are less likely to cause dizziness. Nowadays, head mounted displays are also constantly iterating and upgrading in technology. The PICO brand, which focuses on VR glasses research and development in China, has also launched a motion tracker after updating to the fourth generation, which can capture full body movements and encourage the audience to engage in sensory movements throughout the body. Cognitive individuals are not passive observers, but active participants. For virtual image interaction, virtual reality devices such as VR glasses, controllers, motion trackers, VR rotating aircraft, VR seats, and virtual images themselves are powerful tools for extending human sensory functions.

4. Virtual image interaction enhances the interactive experience between the audience and the image

The Canadian XR short film "The World of Young Lu" is a typical example of changing audience cognition by extending visual perception through virtual images. It participated in the screening of the 14th Beijing International Film Festival, where audiences could experience the spiritual world of individuals with autism firsthand through virtual interactive tools. The total duration of the film is 20 minutes, showcasing two stages of autism in children and adolescents. When the audience wears an Oculus head mounted display, they can choose to enter the character from two perspectives: "gaze" or "withdraw". By rotating the seat and handle, they can control limb movements. When the audience chooses the "pull away" perspective, the head mounted display will present a relatively macroscopic virtual image, and the audience will be watching the strange behavior of autistic patients from a distance, unable to empathize and resonate with them. When the audience chooses the "pull away" perspective, the head mounted display will present a relatively macroscopic virtual image, and the audience will be watching the strange behavior of autistic patients from a distance, unable to empathize and resonate with them. But in the later stages of the film, it will automatically switch to the "gaze" perspective mode, and when the audience enters the patient's subjective perspective, they will passively immerse themselves in the behavioral movement patterns of autistic patients. At this point, the audience will be surprised to find that even if they frantically rotate the controller in an attempt to control the physical movements of the virtual body, the virtual body will still unconsciously exhibit rigid, irritable, and other behaviors. When the audience realizes that all their efforts are in vain, they will instantly fall into a state of depression and frustration. After completing all the interactive elements in the film, the audience may empathize with the pain and helplessness of individuals with autism, and may develop a certain understanding and tolerance towards their strange behavior in public places.

5. The multidimensional impact of virtual image interaction on college drama and film education

The application of virtual image interaction in the creation of traditional theatrical performances requires a high reliance on advanced technological equipment, such as motion capture systems, virtual studios, and real-time rendering engines. The cost of a basic motion capture system ranges from 500,000 to 1 million yuan, with expensive equipment and the need for professional technicians to maintain and operate it. At present, only a few universities such as the Central Academy of Drama and the Shanghai Theatre Academy are equipped with relatively complete digital drama production equipment, and most local universities are still in the traditional stage of drama teaching. The uneven allocation of technological resources has exacerbated the regional differentiation of digital drama education and limited its popularization. The singularity of teacher structure is another prominent contradiction. Traditional drama education teachers are mostly concentrated in single fields such as performance, directing, or drama literature, lacking interdisciplinary backgrounds. This situation is highly similar to the teacher dilemma faced by media education in the era of intelligent media, reflecting the technological transformation pressure that art education generally faces.

6. Innovative Strategies and Paths for College Drama and Film Education

In the face of the widespread application of virtual image interaction, the first step is to establish an interdisciplinary curriculum system to empower humanities and arts with high-tech. Universities should reconstruct the curriculum system of drama and film majors, deeply integrate technology into art classrooms, and establish an interdisciplinary framework of "art technology humanities". On the one hand, while retaining the core content of traditional performance training, compulsory courses such as "Digital Performance Fundamentals," "Virtual Production Technology," and "Interactive Narrative Design" are added to ensure that students master basic technical literacy. The "Extended Reality Performance" course at Goldsmiths College, University of London adopts a "dual teacher system", where drama teachers and technical experts jointly teach. On the other hand, through cross-disciplinary collaborative projects such as virtual performance creation of "drama+computer science", students' teamwork ability and innovative thinking are cultivated. The "Digital Immersive Drama" project jointly launched by Shanghai Theatre Academy and Tongji University School of Design and Creativity has successfully created multiple award-winning digital drama works. Peking University held the "China Film Knowledge System Platform Driven by Big Data and Artificial Intelligence (CCKS)" 2025 Graduate Summer School, inviting important scholars in the fields of film studies, information management, and artificial intelligence to explore the current situation, challenges, and future prospects of academic research in film under the drive of big data and artificial intelligence, which is highly forward-looking. At the same time, international joint creation should also be carried out, using digital technology to break geographical limitations and carry out cross-border collaborative performances. The "Cloud Hamlet" project, a collaboration between the Central Academy of Drama and the Berlin Academy of Drama in 2022, achieved simultaneous performances of Chinese and German actors through real-time motion capture technology.

7. Conclusions

Virtual reality technology is a computer simulation system that can create and experience virtual worlds. Virtual reality technology and its virtual images are comprehensively constructed from three major systems: interactive system, perception system, and computing system. At present, virtual image interaction has been widely used in various fields and has also been involved in the field of drama, film and television. It has currently had a structural impact on the education of drama, film and television in universities: on the one hand, it breaks the temporal and spatial limitations of traditional drama education and expands the boundaries of the art of directing drama; On the other hand, it also exposes the practical difficulties in the current education system, such as insufficient technological equipment, single teacher structure, and lagging curriculum system. This article proposes innovative strategies and paths for higher education drama and film education, emphasizing the establishment of an interdisciplinary curriculum system to cultivate composite drama and film talents with dual abilities of "technological literacy and humanistic spirit". This study not only enriches the theoretical framework of digital representation in director art education, but also provides practical reference for the transformation of drama and film education in universities.

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