Research Article

Application of Digital Interactive Display Design Based on Computer Technology in VR Film

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In order to explore the sustainable development of VR films, the paper analyzes the current situation and problems of the film works and the important role of digital interactive display design in the film, and makes a comprehensive analysis and comparison between traditional display design and digital interactive display design by using statistical methods. Finally, it is concluded that the application of digital interactive display design in VR films not only meets the development needs of the digital industry in the intelligent era but can also improve the interactive experience of VR films. The application of computer technology to the digital integration of VR movies can enhance the visual effect of the movies and more easily resonate with the audience, and it has important strategic significance to promote the economic prosperity of later animation films.

1. Introduction

The development road of VR films contains people's imagination and good wishes for the digitization of computer technology. The characters, actions, behaviors, and reaction modes in VR films can better attract the audience. With the increase of the number of audiences, the immersive performance and interactivity of VR films can enable the audience to better participate in it. The surrealism can fully mobilize the audience's vision, hearing, smell and touch, and complete an interactive process of communication experience. The digital interactive display design application of computer technology provides the audience with a stronger immersive interactive experience in the film, and realizes the seamless connection between the real world and the virtual world. In the panoramic film, the digital display design can achieve the real-time rendering characteristics necessary for interaction, so that the audience can obtain the entertainment experience. This way, to a certain extent, enhances the audience's sense of substitution. It has changed from the previous fixed screen or screen play to a 360° surrounding environment. VR movies and TV are no longer based on the narrative means of traditional movies, but more show an immersive experience. Wang (2022) made an artistic exploration of VR films and an analysis of the possibility of the future, pointing out that people's awareness of the artistic expression of VR films is constantly improving, and VR films have made new artistic exploration and attempts in terms of space composition, time composition, and narrative composition [1]. Li (2021) analyzed the narrative characteristics and narrative structure of VR films under the background of 5 g computer technology. Due to the particularity and versatility of audiovisual, VR films, supported by the hardware of technology, have more released the narrative perspective and fluency [2]. Jiang and Wang (2021) and others studied the problems of weak immersion, poor interaction, and low simulation of the previous film experience, and used deep learning technology to enhance the VR film experience effect. From the perspective of visual center, the visual expression of VR film is emphasized, and the concept of VR film creation based on audience experience and visual guidance is emphasized to realize the interactivity of VR movies [3].

Zhang (2019) pointed out that computer technology has been fully integrated into people's daily life. The improvement of new media and human-computer interaction technology has also stimulated people's interest in digital interactive display design. Under the current big data background and the development status of digital interactive technology, it can bring diversified development in various fields [4]. Yanliang (2022) analyzed the conditions for the generation of immersive experience in digital reading, and provided enlightenment for the development of interactive experience design in the future by creating more immersive experience in digital reading through interactive mode design [5]. This research is about the application of digital interactive display design in VR movies. This research can bring some reference value to this research. Xu and Xu (2022) in the perspective of interactive narrative, from the perspective of analyzing the elements and characteristics of interactive narrative in digital display, constructs the interactive narrative situation and truly conveys it to the audience, so that the audience can receive, understand, and identify with the theme of the display from the sensory organs. The digital interactive display design of interactive narrative can break through the boundaries of time and space and allow the audience to obtain a good experience [6]. In this study, the digital interactive display design of computer technology is applied in VR movies to bring good entertainment experience and physical and mental relaxation to the audience. Yuan and Liu (2022) and others discussed the creative imagination and extensional thinking of sci-fi films as the starting point to positively respond and reflect on the virtual world constructed by digital technology and the emotional experience separated from the body. Various virtual space-time and spectacular images created by digital technology have broadened the audience's vision [7]. Yaqin (2019) analyzed that the integration of virtual reality technology and film has become an important discovery in the development of film art, bringing a brand-new visual experience to the development of film art, and digital interactive display design has created innovations in the creation of plot scenes, line of sight, and characterization [8].

This research analyzes VR movies through digital interactive display design, and promotes the innovation and integration of digital industry and the reconstruction of new business forms from the concept and principle of digital technology interactive display design, it enhances the artistic expression and attraction of the film, breaks through the traditional form of film art expression, and plays a long-term and sustainable role in promoting the innovation of VR film industry.

1.1. Current Situation and Problems of VR Film Works. The development of VR technology in the film is the development of technology and the production of the content of the film itself. The two complement each other. The strong immersive experience of VR films not only has the feeling of immersive but also can better receive the emotional expression conveyed by the films. In the exquisite pictures, the real and detailed actions and realistic three-dimensional effects conquer the audience's senses, so that the audience can get a more shocking experience. The appearance of VR makes the audience immersive in the virtual scene. The appearance of VR technology promotes the audience's audiovisual enjoyment to a new level, Strengthen the environmental perception of the senses. The continuous extension of this technology makes the sensory perception more immersive. The highly virtual feature of VR technology has greatly expanded the possibility of the film to express reality and psychology, and enriched the aesthetic characteristics of the film art. However, it is difficult to shape the space outside the picture in VR films, and the creation method is too limited. The space change in VR scenes is also impossible to complete the space conversion. The disadvantage of immersion is the closeness. In augmented reality, it will gradually fade with the freshness and lose the original charm of the film. The picture output of VR film works has the problem of low-image quality, so the value of VR film works is greatly reduced.

The viewing angle of VR movies is 360°. When watching movies, the audience will put on the VR head display and immediately enter the movie scene. They can enjoy the film and television works in all directions and from multiple angles. From the perspective of audience experience, VR movies improve the visual effect of movies and the immersive feeling of human-computer interaction, which is the top priority of the next film production innovation, it is equipped with virtual reality technology and has the general nature of the technology product, that is, super immersive feeling. No matter how an excellent VR movie is watched, the audience can feel the reality of the scene and the integrity of the plot. A good picture can guide the audience to actively experience, perceive and guess the plot, and guide the audience to appreciate the beauty of the movie picture and realize a comprehensive observation. VR films highlight a future direction of the development of film entertainment. In terms of production content, they create new ideas, explore three-dimensional interactive immersive scene building methods, and VR films do not explore the interactivity of the technology itself, which is a common challenge in the future.

2. Digital Interactive Display Design

2.1. Digital Interactive Display Design Concept. Digital interactive display design uses the computer and network information technology auxiliary tools in the information age to carry out various display activities and achieve the purpose of display. In the digital display design, human-computer interaction is the best form of interaction, language conversion, and information expression. The application of digital interactive display design injects fresh blood into VR movies. This design has the characteristics of simulation. It can not only see six ways in all directions and listen to all directions but also have the feeling of touch, force, and smell. Shan and Li (2020) and others pointed out that in the interactive experience, consciousness materialization is formed, and the integration of different degrees of freedom in the real world and the virtual world is presented,

and once the results are achieved in physical and mental relaxation [9]. In addition, the interactive function of the digital display design is reflected in the personalized behavior mode, which enables the audience to give full play to their own thinking and imagination space in the virtual environment, and at the same time, it can also achieve the purpose of driving the audience's emotions and more closely conform to the physiological needs, so as to bring the audience an unusual and rich real experience and promote them to achieve a good sense of pleasure and satisfaction.

2.2. Principles of Digital Interactive Display Design. The design of digital interactive display needs to be clear about the purpose of the design and cannot be based on personal preferences. The design of interactive display also needs continuous innovation in the form of expression in order to be attractive in the design, have strong expressiveness and appeal, effectively mobilize the audience's multiple senses, and improve the audience's interest. Compared with the traditional display design, the digital interactive display design has stronger design and avant-garde. It is more in line with the favorite way of the audience in the information age. At the same time, the interactive design also represents the development direction of the mode towards the direction of digitization, networking, and intelligence. Digital interactive display design specifically includes digital technology, new media technology, and art performance design. It is created in virtual reality by combining computer technology, so as to respond to a rich three-dimensional virtual world, bring more pleasant and vivid visual experience to the audience, effectively help the audience release pressure in VR movies and feel happy and relaxed when enjoying the movies. Interactive design is convenient for the audience to find their own position in the virtual world and achieve good entertainment effect.

3. The Role of Digital Interactive Display Design in VR Film

Liang (2022) pointed out that under the influence of computer technology, the expression forms of films have also presented diversified styles, and the interactive experience and creativity of films have also undergone major changes. The traditional film plot has gradually changed into the interactive guidance dominated by the audience [10]. Digital display design can not only effectively spread the information that you want to express but also is an effective way to green display and environmental protection display. The use of virtual technology in digital display design can interact with the audience 360°. In VR movies, it can promote the communication of the audience beyond the real space, realize the artistic feeling that cannot be experienced in real life, realize interactive new display design in different time and space, and enhance the subjective initiative of the audience. This interactive characteristic gives the audience a viewing space. The audience explores the sense of extension of the story according to the film's interest points, and closely combines the audience's behavior and cognition in

the interaction design to form a common and interactive state. This interaction design is natural and friendly, and it is easy to mention the audience's desire to participate.

Zhang et al. (2020) and others' animation interactive experience and creative design under the background of the digital era have promoted the qualitative development and leap [11]. Xiong and Ming (2022) and others analyzed the design commonality of games and animation in interactive context to explore the characteristics that can be optimized and utilized between them, from surface experience to detailed modeling of animation design [12]. The application of digital interactive display design is a process in which the audience's senses or psychology produce a certain feeling. Psychological curiosity and the surrounding environment will cause different behaviors in the process of perception formation, which is the interaction of senses, behavior, thinking, and psychology. In the aspect of physical induction, the display design is applied to VR movies, and the stimulation content generated in the multimedia environment will be more abundant, with multidimensional experience, bringing new perception to the audience. The human-computer interaction effect has reached the humanized effect in the digital interactive display design, so that each audience has a unique experience.

VR films have not been able to obtain good experience, and they have lost their initial enthusiasm for the former VR films. They need innovation to satisfy the audience's appetite. Interactive display design can deduce the branch plots in the form of movies to meet the audience's inner desire to master the plot direction, and greatly enhance the audience's participation in the story in the interactive way.

4. Simulation Verification

4.1. Comprehensive Analysis of Two Kinds of Display Design. In recent years, the characteristic audiovisual entertainment consumption has been very popular with the broad audience. In order to shoot more works with strong appeal and interest, with the help of computer technology, interactive scenes are designed in the film to change the traditional passive viewing experience. Digital interactive display design and traditional display design can enhance the visual effect and immersive feeling of human-computer interaction in the film from the perspective of audience experience. Now, through comprehensive analysis of two different display designs, the following Table 1 is obtained:

In Table 1, it can be clearly seen from the data in the comprehensive analysis of the two different display designs in the table that the digital interactive display design has higher design effects in VR movies and can bring better visual feast to the audience.

Make the above data into a visual diagram as shown in Figure 1:

As shown in Figure 1, the digital interactive display design is far superior to the traditional interactive display design. It provides computer technology support in user experience design, film structure design, and visual communication design, bringing unique sensory experience to the audience.

TABLE 1: Comprehensive analysis of two display designs (%).

Group	User experience design	Film structure design	Visual communication design
Digital interactive display design	82.47	83.21	82.57
Traditional display design	60.58	62.15	61.54

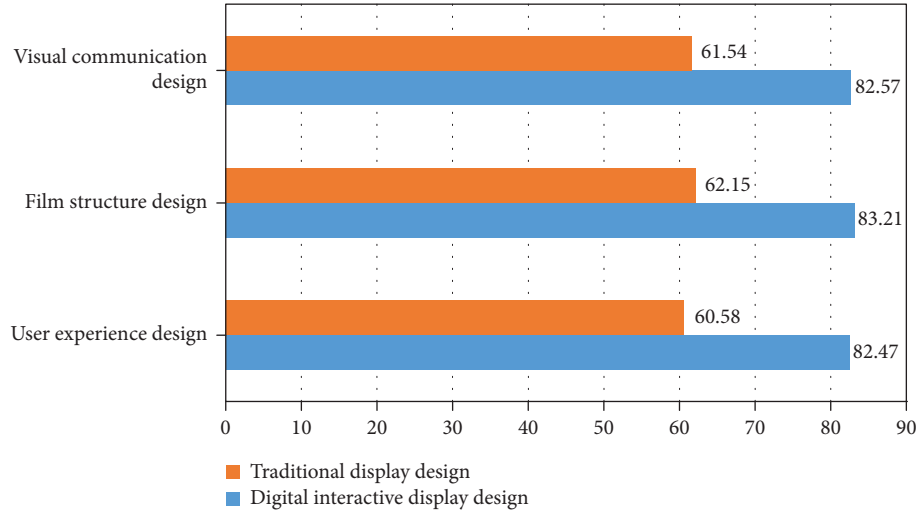is better integrated with the subsequent development of VR

FIGURE 1: Comprehensive visualization of two display designs (%).

4.2. Performance Effect Comparison of Two Display Designs in VR Movies. The digital display design in VR movies is mainly to convey the hidden details of the movie to the audience and deepen the audience's understanding of the movie, so as to bring a new movie viewing experience in terms of visual touch and hearing. With the help of computer technology, we can establish a good interactive experience between VR movies and audiences, effectively solve the problem of insufficient realism in interactive display design, and increase the interactivity of design and the conceptuality of display design. The performance effects of two different display designs are compared, and Table 2 is obtained:

In Table 2, the comparative analysis of the performance and effect of the two kinds of display design can be concluded that the display design breaks the original movie viewing experience. In consideration of the audience's preference and entertainment sense, it is necessary to strengthen the research and development of innovative interactive display design, and create unique interactive viewing experience with immersion as the core, so as to expand the influence of VR movies.

Make the above data into a visual diagram as shown in Figure 2.

As shown in Figure 2, the performance and effect analysis of the design shown in this study in the development of VR movies are significantly higher than that of the traditional design. From the comparison results, it can be indirectly explained that the digital interactive display design

TABLE 2: Performance effect comparison of two display designs (%).

Group	Immersive	Interactive	Imaginative
Digital interactive display design	90.25	91.11	92.14
Traditional display design	60.58	63.58	65.43

movies.

4.3. Comparison of Two Display Designs in VR Movies. VR films are changing the narrative mode and creative thinking of films while bringing people a brand-new film viewing experience. The immersive autonomy of the audience brought by VR films can change from spectators in traditional films to participants in VR films, and the experience is also transformed into interactive experience. In VR movies, the interaction mode highlights the theme of the role of the film, the style of the film and the interactive elements between the characters and the audience. Table 3 is obtained by comparing two different display designs in VR movies:

In Table 3, from the comparison and analysis of the data presented by the two kinds of display design in the film, it can be seen that the application of computer interactive design assistant technology in VR film can have more abundant interaction than under the traditional design, the new design of digital display with interactive function has changed the previous linear line of sight, it can more effectively shorten the distance between the characters and the
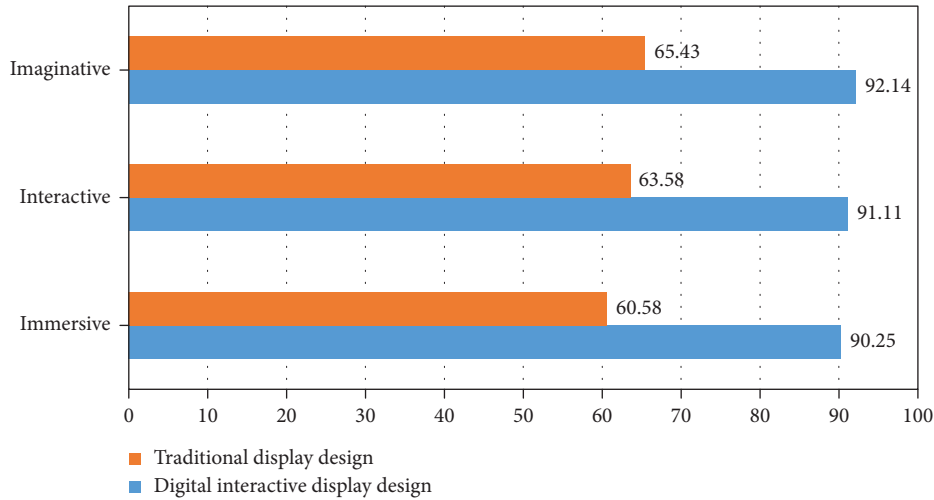
FIGURE 2: Visual analysis of performance effects of two display designs (%).

TABLE 3: Comparison of two display designs in the film (%).

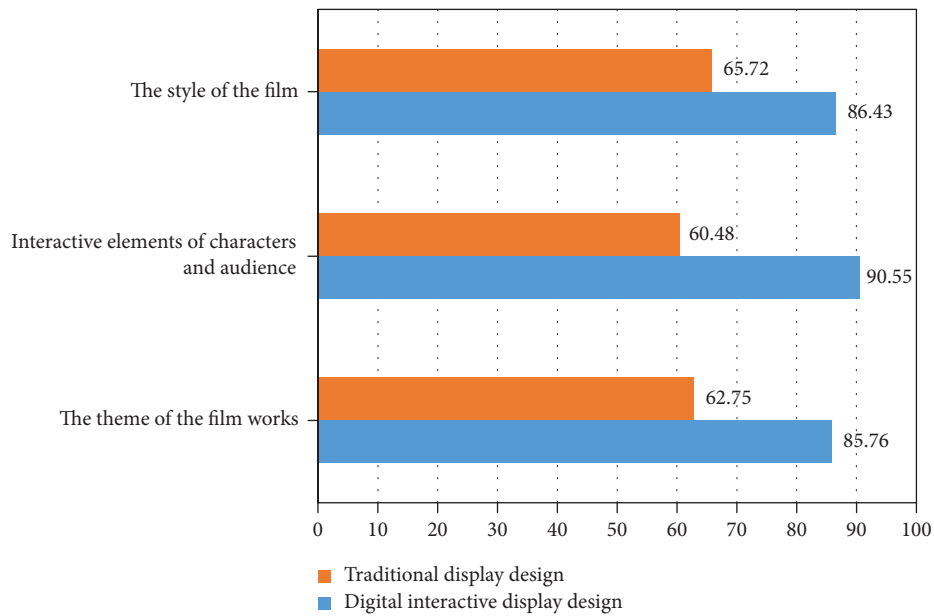| Group	The theme of the film works	Interactive elements of characters and audience	The style of the film
Digital interactive display design	85.76	90.55	86.43
Traditional display design	62.75	60.48	65.72

FIGURE 3: Visual analysis of two display designs in VR movies (%).

audience in interactive movies, making the audience have a more sense of substitution, higher immersion, and better experience.

Make the above data into a visual diagram as shown in Figure 3.

As shown in Figure 3, there is a statistical significance of $T < 10.000$ and $P < 0.05$ between the two kinds of display design data. It can be clearly seen that the comparison between the two groups of data is very different, which indirectly indicates that the digital interactive display design has a certain innovative effect on VR movies.

4.4. Experience Changes of Two Kinds of Display Design to the Audience in VR Movies. The progress of computer technology and the development of art are interrelated. Interactive design allows the audience to actively enter the film, and indirectly guides the audience to find their own sense of existence in the virtual film world, and then get satisfaction

TABLE 4: Changes in audience experience of two designs in VR movies (%).

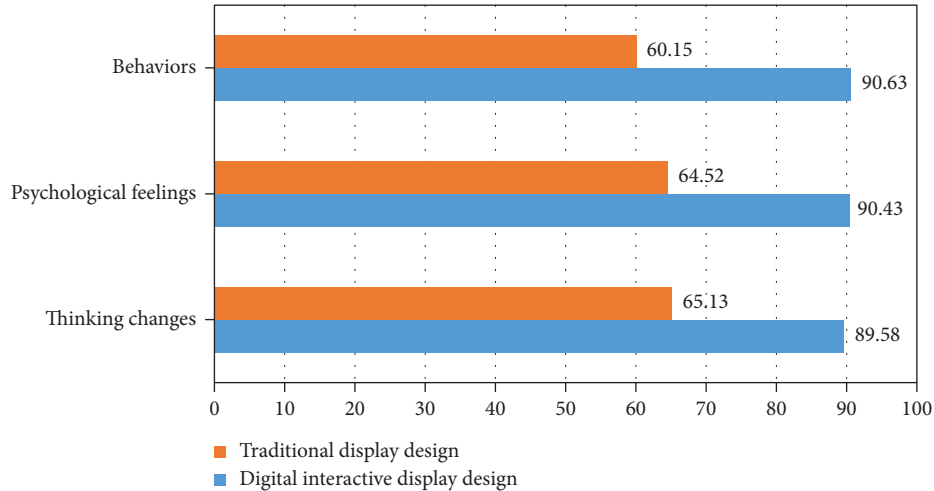| Group	Thinking changes	Psychological feelings	Behaviors
Digital interactive display design	89.58	90.43	90.63
Traditional display design	65.13	64.52	60.15

FIGURE 4: Visualization of audience experience changes by two designs in VR movies (%).

of their own value in the virtual world. Along with the development of the plot, the audience will be guided to produce psychological thinking changes, and different psychological feelings will appear. They will interact with each other in terms of vision, hearing, and touch, and have a strong interaction function in terms of experience. Now, the experience of the audience in the VR film of two different display designs is changed, and the following Table 4 is obtained:

In Table 4, the application of traditional display design in VR movies has no obvious difference in the change range of the audience's experience. The application of interactive design in this study has certain guidance on the psychological changes and thinking changes of the audience during the movie viewing, so that the audience can truly enter the world of movies.

Make the above data into a visual diagram as shown in Figure 4.

As shown in Figure 4, the digital interactive design is obviously superior to the traditional design, which can indirectly show that the design of this study can effectively improve the audience's interest in VR movies, and this interactive design has good interaction with the audience's film viewing experience.

5. Summary

Under the background of the rapid development of digital technology, VR films and TV are rapidly upgraded and updated in the direction of making viewers have a better sense of experience. However, its sense of experience is still at the relatively primary immersive stage, and it is quite lacking in deeper user experience and audience attention

guidance. This research is based on the computer technology to explore the application of digital interactive display design in VR movies. Through the comprehensive analysis and performance effect comparison of two different display design applications in VR movies, this paper studies the changes in the audience's thinking, psychological changes, and the changes in the audience's viewing experience, and integrating computer digital interaction technology into VR movies can better increase the immersion of VR movies and make them more realistic with 3D visual and auditory effects. In the digital age, the interactive function display design using computer technology has a positive role and important influence in VR movies. Interactive VR movies and TV will become a new way to break the current deadlock in the upcoming 5G era, it is expected to provide new ideas for the creation and innovation of VR film art in the future.

Data Availability

The data underlying the results presented in the study are available within the manuscript.

Disclosure

The authors confirm that the content of the manuscript has not been published or submitted for publication elsewhere.

Conflicts of Interest

There are no potential conflicts of interest in our paper, and all the authors have seen the manuscript and approved to submit.

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