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Retraction

Retracted: Application of Virtual Reality Technology and 3D Technology in Game Animation Production

International Transactions on Electrical Energy Systems

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] Z. Wang, Y. Deng, and W. Chen, "Application of Virtual Reality Technology and 3D Technology in Game Animation Production," *International Transactions on Electrical Energy Systems*, vol. 2022, Article ID 8156535, 10 pages, 2022.

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Research Article

Application of Virtual Reality Technology and 3D Technology in Game Animation Production

Zehao Wang,[1] **Ye Deng** ,[2] **and Wenlong Chen**[3]

[1]*School of Film and Television, Hebei University of Science and Technology, Shijiazhuang 050018, Hebei, China*
[2]*Satellite TV Channel, Hebei Radio and TV Station, Shijiazhuang 050000, Hebei, China*
[3]*Chief Engineer's Office, Hebei North Information Technology Co., Ltd., Handan 056000, Hebei, China*

Correspondence should be addressed to Ye Deng; dengye@hebtv.com

With the increasing pressure of modern young people, they begin to look for various ways to relax. Among them, game animation makes them immersive and has a low experience cost, which is one of the best ways to relax. Therefore, animation games have been welcomed by more and more young people. However, virtual reality technology and 3D technology have played a huge role in the production of game animation. Therefore, this paper aimed to study how virtual reality technology and 3D technology were applied in game animation production and put forward their advantages. This paper also proposed a method based on virtual reality technology and 3D technology and analyzed the production of game animation. The experimental results of this paper showed that in the survey results of the popularity of the *A* game, only 56 experiencers thought its effect was good, accounting for 18%. There were 145 experiencers who disliked the *A* game because they thought the A game was very boring and the game scene was very simple. In the survey results of the popularity of the *B* game, 222 experiencers liked this game, accounting for 71.6%, and 43 experiencers did not like the *B* game because they thought the 3D effect of the *B* game would make them dizzy and uncomfortable. It can be seen that the integration of virtual reality technology and 3D technology into game animation production is more popular, so the research in this paper is meaningful.

1. Introduction

As a new force in the cultural industry, the animation and game industry has been well received by various countries. All countries use animation game displays to promote the popularity of the city and establish the connotation image of cultural innovation city. Anime game exhibitions are an important part of the exhibition industry. In a comprehensive sense, the animation game exhibition is an economic product of the development of the animation game industry, providing resource exchange and information for animation development, and promoting a platform like other industry exhibitions. With the rise of the animation and game industry, large-scale animation and game exhibitions in China have developed rapidly. As an important offline activity in the animation game industry, it has achieved explosive growth in recent years. After a period of development, the

salary of employees in the animation and game industry has gradually increased, while the supply of high-end professionals is still in short supply. The audience is the lifeline of the exhibition, and the development of the exhibition is inseparable from the audience. With the surge in the number of animation game exhibitions, the competition between exhibitions is becoming more and more fierce. Innovative means to improve animation production has become an important issue in the marketing of animation game exhibitions.

The application in animation games was the driving force behind the development of early Virtual Reality (VR) technology and 3D technology. The animation game industry has so far been a solid market for VR technology, which created ideal game environments and game characters with its rich sensory interaction and three-dimensional immersion. For-profit animation games and themed scenes

are the fastest growing fields, for example, Disney and Microsoft have injected money and creativity into the development of VR technology and 3D technology. VR can now cover everything from offline gaming to multiplayer online gaming experiences. The innovation of this paper was to study the application fields of VR technology and 3D technology in recent years and their advantages in the production of game animation. It also briefly analyzed the application of VR technology and 3D technology in the production of game animation and finally conducted an investigation and experiment.

2. Related Work

Anime games are characterized by the legendary life experiences of various characters that can be played and enjoyed. The creation of game avatars is the most important and hardest part of the game. A successful game character would become the soul of the entire game, and various actions of anime characters are inseparable from VR. Kodama [1] proposed that being able to accurately perform 3D-related internal determinations is an extremely important technology. Since methods commonly used in games and VR do not analyze object-related structures, 3D enables the high-speed rendering of objects [1]. Ruiperez–Valiente et al. [2] found that 3D technology has played an important role in people's daily life, and the game animation that combined VR and 3D technology is one of the most popular entertainment. Educational games can be combined with learning analysis to improve students' learning efficiency [2]. Woodlock [3] found that industries in transition are often very challenged. For example, with the promotion of VR and various technologies, the game animation industry is currently undergoing transformation [3]. Takano et al. [4] believed that 3D printing technology can improve the quality of the lattice structure of aluminum alloy additive manufacturing. He carried out compression tests, and micro-CT imaging, as well as finite element analysis. The reason for the large weight distribution of the product was investigated by micro-CT image analysis and finite element analysis [4]. Zhnag et al. [5] used 3D printing technology to combine drugs with tissue-engineered bone scaffolds so that the drugs on the scaffolds can have stable functions [5]. Scholars have found that animation games have been welcomed by more and more people, especially teenagers. But, traditional games can no longer meet people's needs. Therefore, innovation is required.

VR technology was first used in the military industry. However, with the continuous development of technology, VR technology has been widely used in different fields. First of all, in terms of cultural entertainment, VR technology was applied to the game e-sports industry, which made the game had a high sense of immersion and substitution and brought gamers an extraordinarily magical experience. It also brought game players an extraordinarily magical experience. Unprecedented interactive methods gave players new life. Deering [6] proposed a VR-based 3D geometry creation and manipulation tool aimed at providing an easy-to-use 3D environment for nonprogrammers. The accuracy of this

technique was very high and much faster than traditional mapping systems [6]. Elbamby et al. [7] believed that VR had an important place in the 5G network. But, many technical bottlenecks and challenges need to be overcome to facilitate its widespread adoption. In particular, VR's requirements for high throughput and low latency, as well as reliable communication require innovative solutions and fundamental research across multiple disciplines [7]. Du et al. [8] found that recent developments in VR encouraged the use of interactive architectural visualization in the design and construction, as well as facility management of architectural projects [8]. Thies et al. [9] proposed a novel image-based method for video teleconferencing in VR based on self-replay. State-of-the-art face tracking methods in VR environments focused on rigging 3d avatars for anime. eVR incorporated photorealistic real-time rerendering, allowing humans to modify the appearance of faces and eyes. For example, it is possible to change facial expressions or change gaze direction in prerecorded target videos [9]. Scholars believed that VR and 3D technology can be widely used in various fields, so it can also be used in game animation. Its application to game animation can improve the experience and popularity of game experiences. But, the scholars did not say how to incorporate it into the game anime.

3. Animation Character Production Based on Virtual Reality and 3D Technology

3.1. Importance of Virtual Reality and 3D Technology in Games. Virtual Reality (VR) is a very active technical research field in recent years. It relies on various fields such as computer science and mathematics, mechanics and acoustics, and optics and even aesthetics, as well as sociology [10]. With the continuous development of social productivity and science and technology, the demand for VR technology in all walks of life is growing. VR technology has also made great progress and has gradually become a new field of science and technology. It is a series of high-tech important technologies, including computer graphics intelligent interface technology, artificial intelligence, multisensor technology, highly parallelized real-time computing technology, human behavior research, and many other key technologies. At present, it is widely used in the military, education, medicine, film and television, art and entertainment, and many other fields, bringing huge economic benefits. The application areas of VR are shown in Figure 1.

As shown in Figure 1, there are many examples in the game industry of remembering games through the characters in the game, from the "Contra Series" that established the sense of action and attack to the current "Devil May Cry" series of Dante. Likewise, games in other countries have impressive characters and have successfully launched live-action films, such as Lara Croft in Tomb Raider. These characters can penetrate deeply into the minds of players, not only the fun of the game itself but also the distinctive character characters carefully shaped by the animation designers, giving it a vivid and full soul. This makes it easy to guess the character because of its specific actions, as shown in Figure 2.
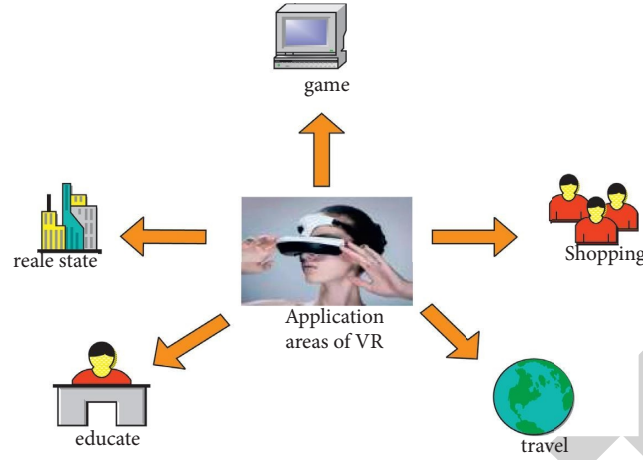
Figure 1: Application areas of VR.
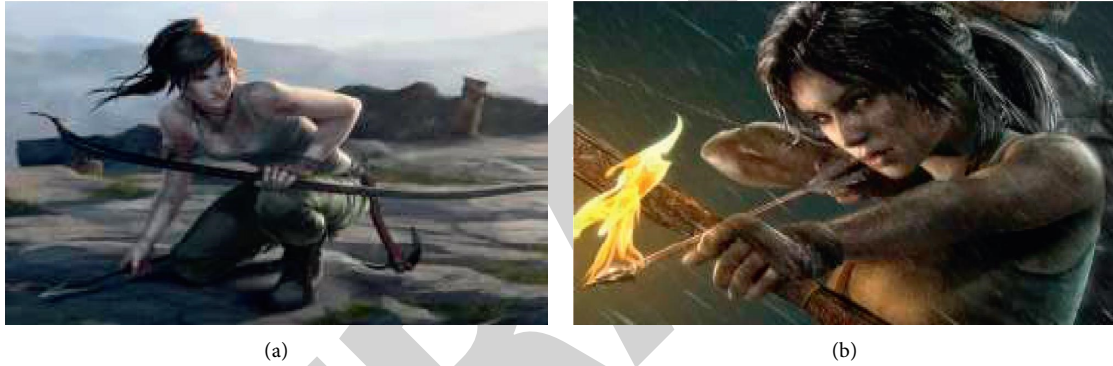

(a)   (b)

Figure 2: Characters in tomb raider. (a) Tomb raider 1. (b) Tomb raider 2.

As shown in Figure 2, China's game industry has been on an upward trend at this stage, and other countries have also done well. But, there are few classics that can be recognized around the world. Game animation adapts to the needs of the socialist market economy for talent development and cultivates talents who develop morally, intellectually, physically, and aesthetically. Talents with project planning and operation management knowledge related to game open projects are fully understood. The sales of the game are more determined by the gameplay developed by the game planning. The overall evaluation of Chinese games is good, but only the quality of the art. For example, the Q version style is more easily accepted by the public, and the martial arts style can skillfully integrate elements of traditional Chinese martial arts. However, when it comes to characters with distinct personalities, nothing comes to mind. A large number of game development has accelerated the innovation of technological products and the innovation of game production itself, among which the ability to successfully create a classic character image is also one of the breakthroughs of the game.

3.2. VR-Based 3D Technology Algorithm. At present, VR games have good three-dimensional effects, which make players feel very immersive. It is because the game engine

that makes the game itself has VR effects, such as Unreal and Unity. [11]. Game engine refers to the core component of some prewritten editable computer game system or some interactive real-time graphics application. Its purpose is to allow game designers to make game programs easily and quickly without starting from scratch. Each component of the model built in this engine has three-dimensional coordinates, and players wearing helmets can get a good sense of immersion in the virtual world that has been built. Three-dimensional coordinates refer to points with a certain meaning formed by three independent variables. It represents a point in space and has different expressions in different three-dimensional coordinate systems. The geometric transformation matrix of 3D graphics is

$$\overline{T}_{3D} = \begin{bmatrix} a_{11} & a_{12} & a_{13} & a_{14} \\ a_{21} & a_{22} & a_{23} & a_{24} \\ a_{31} & a_{32} & a_{33} & a_{34} \\ a_{41} & a_{42} & a_{43} & a_{44} \end{bmatrix}. \tag{1}$$

Of course, in order to make the scene seen by the audience more realistic, and to make the people roaming in this scene have a better sense of immersion, the picture must be made three-dimensional. Therefore, this paper proposes a 3D technology on the basis of the existing, which converts

the panoramic video shot according to specific requirements into a stereoscopic effect [12]. The application of 3D technology includes 3D animation, 3D virtual, 3D mural, and 3D stereo.

Formula (2) can find the coordinates of the center of the circle (a_1, b_1) and the size of the radius R:

$$R = \frac{(a_3 - a_1) + (b4 - b_1)}{4}. \tag{2}$$

The angle of the tangent line where (a_1, b_1) is located is defined as 0, and the calculated radius of each tangent point pair is compared with the average radius using the threshold T, which is

$$A = \begin{bmatrix} a_1 & b_1 & 1 \\ a_2 & b_2 & 1 \\ a_n & b_n & 1 \end{bmatrix}. \tag{3}$$

a_n is the data for circle fitting, which is extended to construct a matrix as shown in the following formula:

$$B = \begin{bmatrix} a_1^2 + b_1^2 \\ a_2^2 + b_2^2 \\ a_n^2 + b_n^2 \end{bmatrix}. \tag{4}$$

The VR system emphasizes immersive experience, that is to say, it needs a strong sense of reality and natural interaction mode and meets the real-time-based interaction requirements [13]. Immersive technologies, speech recognition, gesture and expression recognition, and natural interactions can combine to reshape the user experience, and change the relationship between electronic devices and people, and the way people perceive the world. In general, real-time performance and realism are the basic criteria for measuring most computer graphics algorithms. Real-time and realistic as the guidelines in the VR modeling process are important functions of VR directional modeling, and then the center coordinate (a_0, b_0) and radius R of the final fitting circle can be obtained from the following formula:

$$R = \sqrt{\frac{(p_1^2 + p_2^2)}{4} + p_3}. \tag{5}$$

Reverse mapping takes an existing business object mapping at a point in time and creates a new business object mapping with reversed inputs and outputs. Any changes made to existing business object mappings after this point in time are not automatically reflected in the reverse mapping. When using forward mapping for correction, the reverse mapping is used as follows:

$$(\lambda, \phi) = F(u, v). \tag{6}$$

This paper also borrows the practice of the game engine to generate two virtual cameras and put them into the generated ball model. The two cameras are symmetrical around the center of the circle, and the distance between them is set as d. Because the positions of the two virtual cameras are different, people define this 3D effect as fake 3D. The schematic diagram of the fake 3D is shown in Figure 3.

As shown in Figure 3, the panoramic video player converts static panoramic pictures into dynamic video images. Panoramic videos can be viewed at any angle of 360° from left to right, up and down, so that people have a truly immersive feeling. Many panoramic video players in the world use this method to construct the parallax effect of the left and right eyes, but the advantage is that it is common to all panoramic videos. Although the stereoscopic effect is not obvious, because the virtual camera can rotate with the audience's head movement, and the interpupillary distance can always remain unchanged, the visual effect at each viewing angle is stable [14, 15].

Because the scenes shot in reality are all 3D effects, and the human eye has a real parallax between the left eye and the right eye due to the existence of the interpupillary distance, a stereoscopic effect is formed [16]. Three-dimensional sense is the three-dimensional image of the real object seen. The paper surface is the same as what the naked eye sees, so it would look more comfortable. At this time, the value of 3D effect t_{max} is calculated according to the following formula:

$$t_{max} = \frac{d_{eye}}{v} \cdot fps. \tag{7}$$

Among them, d_{eye} is the interpupillary distance of the human eye, and the unit is meters. This value varies from person to person, and fps is the number of frames played per second of the panoramic video. People call the stereoscopic effect obtained by this method as lateral true 3D.

Let d represent the distance between the two virtual cameras placed in the sphere model, and the size of d is dynamically adjusted according to the head position of the viewer wearing the VR helmet [17]. The initial distance is d_{max}. With the change of the head position of the experiencer, the distance between the virtual cameras can be expressed by the following formula:

$$d = abs(\cos(yaw)) \cdot d_{max}, \tag{8}$$

yaw is the horizontal rotation angle of the human head. t is used to represent the frame difference between the videos played by the left and right eyes, and it is also dynamically adjusted according to the change of the viewer's head with the following formula. Among them, t is calculated according to the following formula:

$$t = int(\sin(yaw) \cdot t_{max}). \tag{9}$$

It can be seen from the above algorithm that when $yaw = 0$, d reaches the maximum value and t takes 0. This also means that the virtual camera sees the same number of frames currently playing, that is to say, there is only a fake 3D effect at this time. As the range becomes larger, the true 3D effect gradually increases, while the false 3D effect gradually weakens [18].

3.3. Application of VR and 3D Technology in Game Character Action Design.
Anime game design mainly forms a unique visual art creation mode through the combination of comics

and animation in the form of storylines, with two-dimensional, three-dimensional animation, animation special effects, and other related expressions. At the beginning of the game animation design, some basic characters of the characters are laid, and the game would also plans the inherent occupations for the characters. In this way, all the information prompts to increase the opportunity for people to design character actions, and also make the design of each character's action characteristics more distinct [19].

Sometimes there would be different male and female characters in the same occupation, especially the protagonist in the game, who would require the same and similar actions in terms of skills. At this time, it is necessary to reflect on the difference between men and women [20]. There are some general details of the basic features, such as male characters. The footsteps would appear more stable, and the hand movements would be more decisive. The legs of the female characters have always shown a state of closeness, even when the knees are drawn inward when taking a step. Of course, the setting of the female man can relax the legs a little. Female characters must maintain a soft and beautiful state in any action. Even when explosive force is required in the attack action, there must be a beautiful display. At this time, the softness and smoothness of the arms are emphasized to add details to the design. For example, a typical representative of male action characters is the "Devil May Cry" series as shown in Figure 4.

As shown in Figure 4, taking Dante's action design in the "Devil May Cry" series as an example, the sense it presents to the public is that it is handsome and good-looking, and the movements are open and close. His different skills and key frames in different action designs are observed. Basically, every action figure is a handsome pose when taken out. The character animation composed of such key frames can emphasize the sensory impression and deepen people's memory of the character.

Film and television animations have more delicate requirements for character movements and have rich expressions. But, in the game, the requirements for the characters to walk are very high, and the characters in the game have obvious breathing movements. The careers of game animation and film and television animation are different, so there are industry restrictions in design. For example, when playing games, it is often possible to observe characters from different angles, while controlling fixed viewpoints in movies and TV anime. This determines that the game animation design must be complete and smooth from multiple angles and conform to the laws of motion. Since the game has the characteristics of player participation and operation, and the film and television are self-playing and guided, it is determined that the game animation must be connected from end to end. It can guarantee the switching of each short animation, and it is usually necessary to consider returning to the initial standby state when doing actions.

By playing the characters in the game, the multi-perspective representation of the characters presented to the player in the engine is truly felt. It is very important to fully analyze the rationality of its size and weight reflected in the whole frame.
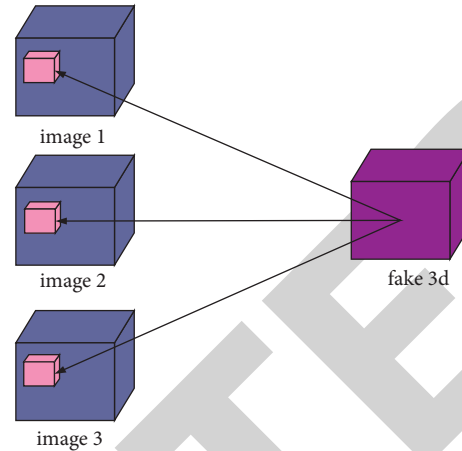

Figure 3: Fake 3D schematic.

(Devil May Cry)-
Character Dante

Figure 4: Virtual reality in the devil may cry series.

3.4. Application of VR and 3D Technology in Character Design. A successful game animation is inseparable from an excellent design process. A good design process entails paying attention to the problems that each stage may encounter in subsequent stages and simulating solutions in the preparation stage to minimize the repeated design process and shorten the required design time. Therefore, the application of 3D printing technology is a key element in the smoothness of the design process. 3D printing technology can directly generate parts of any shape from computer graphics data without the aid of mechanical processing or any molds, helping animation characters to quickly print three-dimensional models and realize a process from two-dimensional to three-dimensional.

How to shape the character of the character, the first thing is to consider its occupation. If an actor plays an archer, then the movements of the archer in daily film and television works can be used as a good reference. In this way, a series of skill action designs automatically come to mind. Therefore, it is also necessary to improve the ability of movement creation and strengthen the performance exercise. If this complete action is not deduced on how to do it, there is no way to know how to do the force transmission and detailed characterization in this action. From the action, the character's professional characteristics are portrayed to

make the character image more three-dimensional and intuitive, as shown in Figure 5.

As shown in Figure 5, in 3D games, game modeling is indispensable. With the more and more extensive application of computer technology in the field of games, a large number of emerging technologies are emerging. If the characters are endowed with the characteristics of cuteness, naivety, and heroic justice, these can be reflected in the details of the actions. Especially when designing movements, people can use these characters to be more creative. For example, if a cute little monster is created, similar elements would be added to the action design and even the single-frame action performance. The cute anime characters are shown in Figure 6.

As shown in Figure 6, the action characteristics of a character can be mined from the character's appearance, body type, occupational characteristics, and gender distinction, and even the character that wants to give it is added. People can better design character actions from the inspiration and imitation of movies, and each character in the game is presented in a more realistic and three-dimensional direction as much as possible. The acting character grasps the characteristics to perform the character actions that are designed only for it. A good animation designer must also be a good performer.

4. VR and 3D Technology Game Animation Evaluation

4.1. Investigation of the Development Trend of Animation Games. Animation works are a comprehensive art that combines literature, painting, sculpture, opera, architecture, music, and other artistic elements and is also a communication medium. Due to the high production cost of animation works, it is difficult to recover through the sales of the animation works themselves. Therefore, people have developed animation-related products and commercialized the characters, props, music, etc., of game animation works. The animation industry provides a powerful means to obtain huge profits. The economic growth of the game animation industry in recent years is shown in Table 1.

As shown in Table 1, the output value of the game animation industry in 2013 was 83 billion yuan, an increase of 16.5 billion yuan over the previous year, and the growth rate was 30.5%; the output value in 2014 was 100.2 billion yuan, an increase of 17.2 billion yuan over the previous year, and the growth rate of 20.7%; the output value in 2015 was 123.6 billion yuan, an increase of 23.4 billion yuan over the previous year, and the growth rate was 23.3%; the output value in 2015 was 168.9 billion yuan, an increase of 45.3 billion yuan compared with the previous year, and the growth rate was 36.6%; the output value in 2015 was 205.5 billion yuan, an increase of 36.6 billion yuan compared with the previous year, and the growth rate was 21.7%. It can be seen that the economic output value of game animation is on the rise every year, so it is necessary to vigorously develop the game animation industry.

With the rapid development of the animation game industry, exhibitions with the theme of animation games

graphic design   3D design

Figure 5: 3D technology in game character design.

3D design-
Character Moe

Figure 6: 3D cute anime characters.

have also developed rapidly. In recent years, the exhibitions with the theme of animation games are shown in Table 2.

As shown in Table 2, in terms of quantity, various animation and game exhibitions in China have exploded since 2013, with an annual growth rate of more than 30%. In 2013, a total of 65 animation and game exhibitions were held, with an exhibition area of 3,000 square meters; in 2014, the number of animation and game exhibitions reached 89, with an exhibition area of 3,543 square meters; in 2015, the number of animation and game exhibitions reached 142, with an exhibition area of 4,162 square meters; the number of animation and game exhibitions carried out reached 190, with an exhibition area of 4,347 square meters; in 2017, the number of animation and game exhibitions reached 276, with an exhibition area of 4,568 meters. All of these showed that anime games have been welcomed by more and more people.

VR technology has also been widely developed in recent years. The development trend of VR technology from 2015 to 2018 is shown in Figure 7.

As shown in Figure 7, normalization is a way of simplifying calculations, that is, a dimensional expression is transformed into a dimensionless expression and becomes a

TABLE 1: Economic growth of the game animation industry from 2013 to 2017.

Years	Amount (100 million yuan)	Year-on-year increase	Growth rate (%)
2013	830	165	30.5
2014	1002	172	20.7
2015	1236	234	23.3
2016	1689	453	36.6
2017	2055	366	21.7

TABLE 2: 2013–2017 exhibitions with the theme of animation games.

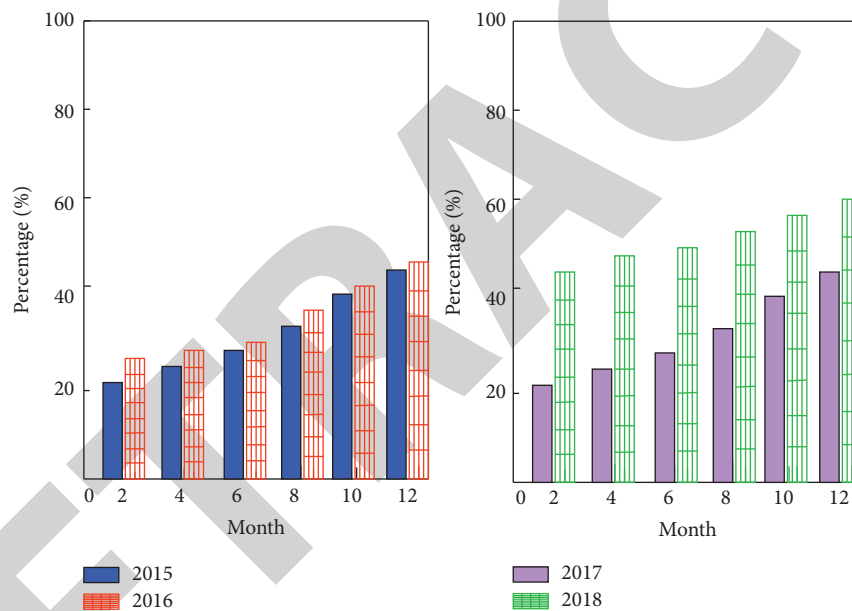| Years	Quantity	Exhibition area	Growth rate (%)
2013	65	3000	30
2014	89	3543	46
2015	142	4162	55
2016	190	4347	60
2017	276	4568	65

FIGURE 7: Development trend of VR technology from 2015 to 2018.

scalar. This method is often used in various calculations. With the maturity of VR technology, people are no longer satisfied with general visual information such as scenery and buildings, and it has become an urgent task to build a virtual environment to add characters to the virtual environment of the game. Therefore, the modeling and behavior research of characters in a virtual environment has attracted more and more attention and has gradually become a new research hotspot.

Virtual anime as characters in computer games is always an interesting experience for people. As a new field, 3D virtual characters would include computer animation production physiology, psychology, robotics engineering, artificial intelligence, and other research fields. The implementation of virtual characters in the virtual environment not only improves the naturalness of the interaction between people and the virtual environment but also

improves the immersion of the virtual environment. The development trend of 3D technology from 2015 to 2018 is shown in Figure 8.

As shown in Figure 8, the application of 3D printing technology to the development of game animation can reduce the high cost of game animation and shorten the development time of game animation. It also breaks the creative limitations in traditional game animation development, and developers would open up huge design space. Compared with the industry with high energy consumption and low return, the animation industry is still an industry with low energy consumption and high return. Many enterprises begin to set foot in the animation industry and begin to regard the animation industry as an important orientation for industrial upgrading and industrial transformation, which is also because the Chinese animation industry contains huge possibilities.
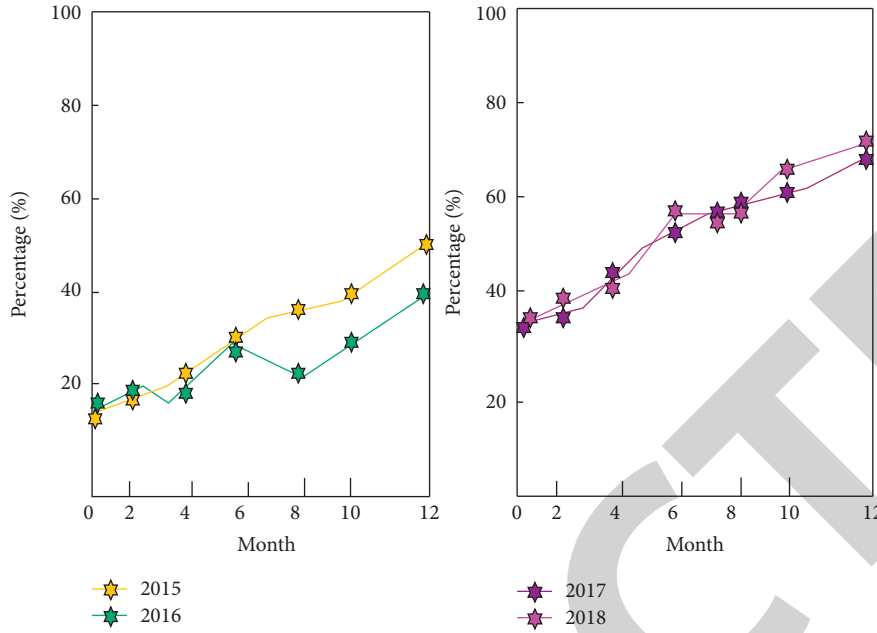
FIGURE 8: Development trend of 3D technology from 2015 to 2018.

4.2. Popularity Evaluation of VR and 3D Technology Game Animation. With a population of more than 1.3 billion, China is a country with a relatively large population and is also the largest consumer country in the world. The population of young people accounts for about 30% of China's total population, and the possibility of consumption is very high. Anime games are cultural commodities that meet the hobbies of young people and are deeply loved by young people. China's animation market has vast development space and high demand. This paper surveys 310 people who love games and animation, and their basic information is shown in Table 3.

As shown in Table 3, among these respondents, 180 people were aged 16–26, accounting for 58.2%, ranking first; 80 people were 26–36 years old, accounting for 25.8%, ranking second. The proportion of people over 46 years old was only 6.4%. It can be seen that among the people who love animation games, teenagers account for the largest proportion, and people over a certain age are not interested in game animation. From the perspective of gender, the proportion of males was 51.6%, and the proportion of females was 48.4%. The difference is not big, indicating that regardless of gender, anime games are popular.

The reasons why these 310 people love anime games are shown in Figure 9.

As shown in Figure 9, the reasons for loving anime games are as follows: being able to relax, role-playing, hobbies, funny characters, and attractive storylines. Among them, 78 people think they could relax, and 85 people think they could role-play. There are 70 people who think it is a hobby, and 77 people who think that anime characters are interesting and attractive storylines, indicating that the people attracted by animation games are people who are usually stressed and want to relax.

TABLE 3: Basic information of survey respondents.

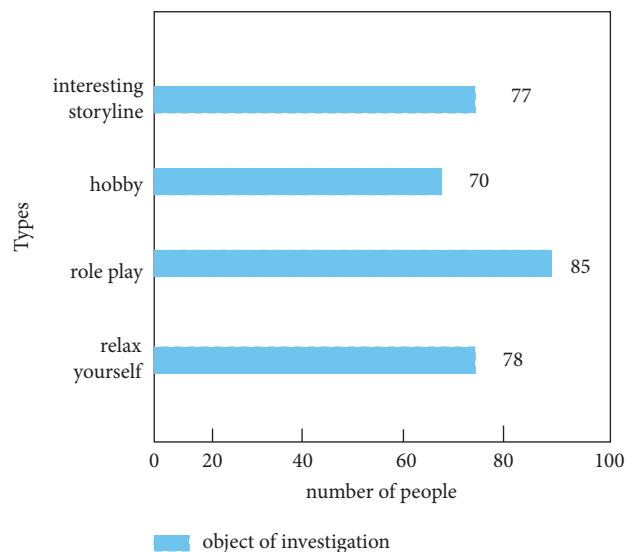| Category	Index	Number of people	Percentage% (%)
Age	16–26	180	58.2
	26–36	80	25.8
	36–46	30	9.6
	Over 46	20	6.4
Gender	Male	187	60.3
	Female	123	39.7
Income	Below 3000	150	51.6
	Over 3000	160	48.4

FIGURE 9: Reasons to love anime games.

TABLE 4: Popularity of game *A*.

Degree of liking	Number of people	Percentage% (%)	Effective percentage (%)
Like it very much	30	9.6	9.6
Generally like	26	8.4	8.4
Generally	109	35.1	35.1
Do not like	70	22.6	22.6
Dislike very much	75	24.3	24.3

TABLE 5: Popularity of game *B*.

Degree of liking	Number of people	Percentage% (%)	Effective percentage (%)
Like it very much	121	39.1	39.1
Generally like	101	32.5	32.5
Generally	45	14.5	14.5
Do not like	23	7.4	7.4
Dislike very much	20	6.5	6.5

In order to highlight the popularity of games and animations that incorporate VR technology and 3D technology, this paper investigates the popularity of 2 games by letting 310 respondents experience 2 animation games. Game *A* is an ordinary game and does not incorporate VR technology and 3D technology. Game *B* incorporates VR technology and 3D technology. The survey results are shown in Tables 4 and 5.

As shown in Tables 4 and 5, in the game experience effect of type *A*, 30 people like this game very much, accounting for 9.6%, and in the game experience effect of type *B*, 121 people like this game very much, accounting for 39.1%. There are 109 people who think game *A* is average, accounting for 35.1%, and 45 people think B game is average, accounting for 14.5%. 70 people dislike game *A* and 75 people dislike game *A* very much, accounting for 46.9%, almost half; 23 people dislike game *B* and 20 people dislike game *B* very much, accounting for 13.9% %, and only a small part is accounted for, indicating that the game *B* is more popular.

5. Conclusion

VR technology can simulate the environment, perception, and natural skills in game design, and on this basis form a three-dimensional dynamic scene, allowing players to communicate directly with the environment and characters in the game through the interactive interface and VR wearable devices. VR was proposed in the early 1980s. It refers to the technology that uses computer graphics systems to generate interactive 3D environments in computers and uses various external sensor devices to bring people immersion. VR and 3D technologies have been widely used in various fields. In recent years, the rapid development of animation games has forced the relevant personnel to innovate, so that the animation and game industry can maintain a good development. The most attractive thing in animation games is the game animation characters, which can make people have a strong sense of immersion and achieve the purpose of relaxing their body and mind. A lot of VR technology and 3D technology were used in modern animation games, which enhanced the game experience.

Therefore, this paper studied the application of VR technology and 3D technology in game animation production. In the method part, this paper expounded the VR technology and 3D technology in detail, and also briefly described the development of animation games. Character design and character design were presented. In the experiment, this paper analyzed the development of animation games in recent years and the economic value brought by them and found that the economic value brought by the animation game industry was increasing year by year. Through the investigation and analysis of the popularity of game animation with VR and 3D technology among game lovers, it was concluded that the game animation with VR and 3D technology was more popular. However, due to the lack of professional knowledge and practical experience, the design part is simply analyzed, and the practical experience is continuously accumulated, hoping to do better in the next work.

Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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