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Research Article

The Application of Multimedia Technology in the Presentation of "Visual Emotion" in Dance

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ABSTRACT

In a sense, the wide application of multimedia technology has opened up new ways of thinking of traditional dance, expanded the space for its creation, and promoted the development of its art form. In modern society, the combination of various art forms such as music, dance, and stage art has made the art form of dance more widely expanded. As a new means of expression, multimedia technology can not only improve the performance of dancers, but also build a bridge for them, and can give the dancers another way to connect with the audience, and will become an important direction for the development of dance art in the future.

1.Introduction

Background And Issue Presentation

With the continuous progress of multimedia technology, the use of all kind of multimedia technologies on the stage is also increasing, especially Holographic Projection, Surround Sound, LED Screen etc., have penetrated into every corner of the stage, and multimedia technology has greatly improved the visual, auditory and spatial aspects (Fu Yan, 2022, 124-126). In recent years, multimedia technology was applied to a batch of outstanding dance plays, such as *Small City Rain Lane*, *Beijing Imag*e, *Golden Mask Dynasty*, *Dream Island*, all of which are effective application of multimedia technology, and have greatly improved the performance effect and ornamental effect of the dance play. In addition, through the application of video technology, the fusion of dance and other art forms is becoming more and more common. For example, the real-life dance photography works like the *Rain Bell* and *Old Things in Luoyang* shot by Netease in cooperation with Tang Shiyi show that in modern society, with the development of modern science and technology, dance art will have a broader development prospect, and this situation can also make people more and more interested in dance.

Based on the current application of multimedia technology in dance performance, this study studies the improvement of artistic expression brought by the presentation of dance "visual emotion". During the study, various research methods, such as survey method, observation method and field visit, are applied in data collection and actual experience. The results of the questions are presented through the audience's actual perception feedback of dance performance using multimedia technology.

2. Research Objectives

Through the observation of the samples and the collection and statistics of the questionnaires of the audience, study the actual application of multimedia technology in dance performance at the present stage. According to the results of the survey and observations, analyze and discuss the improvement of the presentation effect of "visual emotion" in dance performance using the multimedia technology, and explore the future development trend and direction.

3. Research Methods

1) Research planning

Step 1, propose the preliminary research direction, propose the preliminary research direction around self-research - "visual emotion" of dance

Step 2, prepare the relevant literature according to the preliminary research direction, and classify, organize and study the literature.

Step 3, clarify the research content, sort out the background and propose questions according to the research content.

Step 4, clarify the research methods and samples and prepare relevant research tools.

Step 5, apply research tools to study the actual situation, and data collection and organization.

Step 6, conduct quality inspection of the survey process and analyze the collected data.

Step 7, draw the conclusions of the study.

Step 8, discuss the conclusions and put forward reasonable suggestions.

2) Population and sample data sources

Study population: the samples of this study are dance works using multimedia technology in recent years and presented with “visual emotion”. The survey population is the audience of some of the above works.

Sample data sources: the observation samples were sampled by the author on site, and the survey data were collected from the questionnaires distributed after the audience watched the dance works.

3) Data provider

Name	Professional Title	Work Unit
Xu Yuejun	Associate Professor	Hubei Normal University
Song Jiaying	Lecturer	Jianghan University
Dong Xin	Lecturer	Hubei Normal University

4) Research tools

The main research tools in this study are questionnaires, which are formulated in combination with the research question on the application of multimedia technology in the presentation of dance "visual emotions". The questionnaires raise ten questions based on the sampled works. These questions are raised around the aesthetic improvement of dance works brought by multimedia technology and the actual perception feedback of the audience.

5) Tools

Questionnaire design:

Feedback about the perceptual experience of dance works
In order to better understand the perceptual experience brought to you by the application of multimedia technology in the presentation of "visual emotion" in this dance work, we have specially made this questionnaire, hoping to take up a little valuable time of you to let you fill in, so that the presentation of dance "visual emotion" using multimedia technology can be better developed and bring you better works.
1. Did you clearly perceive the application of multimedia technology in this dance performance?

Feedback about the perceptual experience of dance works
Yes ( ) No ( )
2. In what aspect did you feel the application of multimedia technology in this dance performance? Screen ( ) Light ( ) Music ( ) Stage Props ( ) Other
3. Do you feel that the emotional presentation in this dance performance is more visual because of the application of multimedia technology? Yes ( ) No ( )
4. What do you think is the core of the emotional presentation in this dance performance? Actors Performance ( ) Lighting, Screen and Stage Visuals ( ) Music and Sound Effects ( )
5. Do you feel that the 3D effect in the dance has improved the emotional expression? Yes ( ) No ( )
6. Through watching this dance, can you clearly feel the emotion contained in the whole performance? Yes ( ) No ( )
7. Do you think whether the use of multimedia technology in dance will enhance your perceptual experience? Yes ( ) No ( )
8. Do you have any other suggestions for our approach to applying multimedia technology in the presentation of dance “visual emotions”?

6) Quality Test

This study sampled four dance works, i.e. *Small Town Rain Lane*, *Golden Mask Dynasty*, *Scattered* and *Thought of You*. According to age ratio of the total audience of each work, 50 people were selected as the survey population, among which 15% of the audience aged 10-20. 65% aged 21-45; 20% aged over 46.

A total of 200 questionnaires were distributed, 192 valid questionnaires were collected, and 8 questionnaires were invalid or not collected, with an effective rate of 96%, which met the survey and research standards, and made it possible to extract real feedback data from the collected valid questionnaires, so it was judged that the questionnaire quality test was passed.

7) Data Collection

The following data are summarized through the collection and organization of questionnaires:

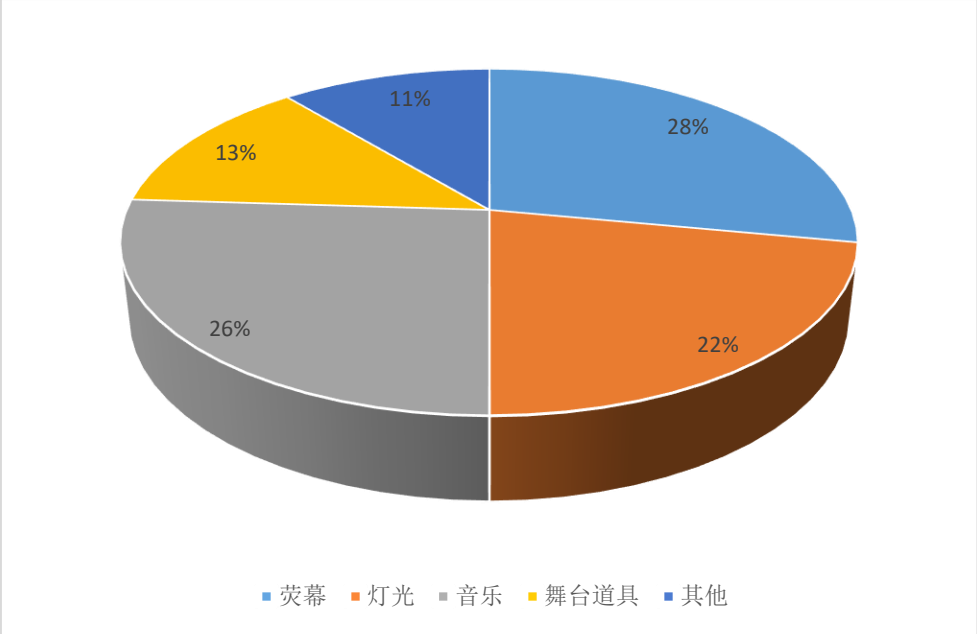

Figure 1 Audience perception of the application of multimedia technology in the dance performance

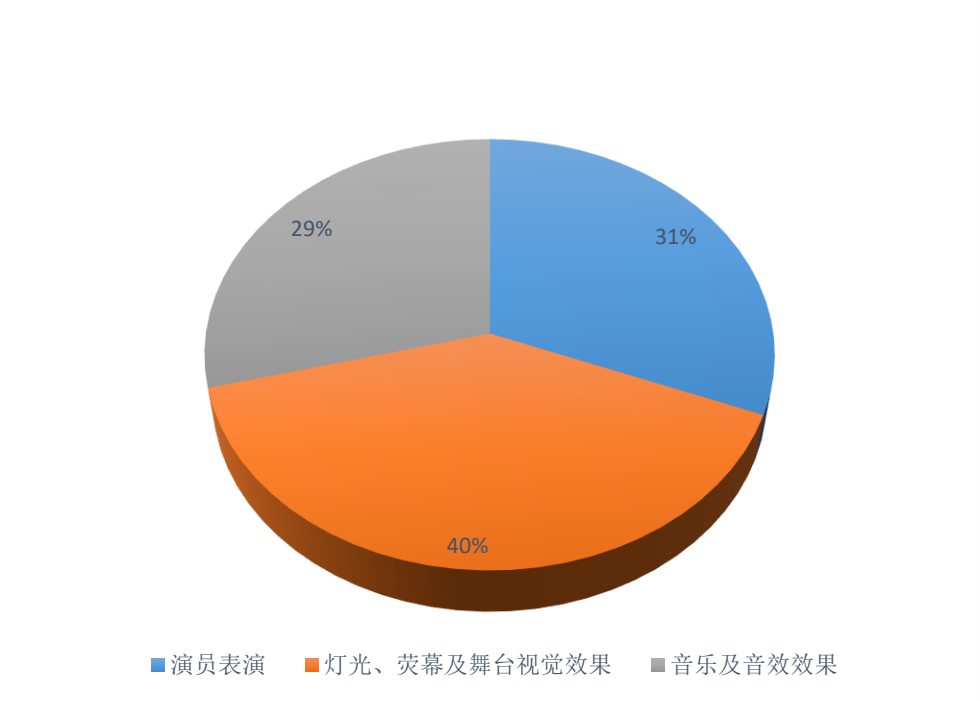

Figure 2 Audience emotional recognition of the dance performance using multimedia technology

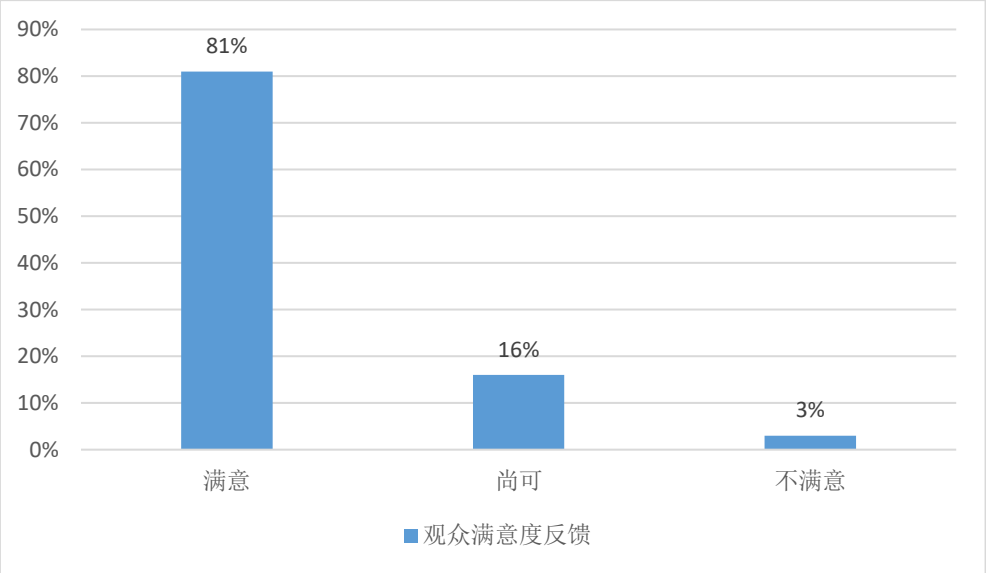

Figure 3 Audience acceptance of the dance performance using multimedia technology

8) Data analysis

Through data collection, organization and analysis, it can be seen that: In terms of audience perception of the application of multimedia technology in dance performance, 28% of the audience believes that the screen is the main performance mode of multimedia technology application in dance performance; 22% of the audience believes that they have experienced the presentation of multimedia technology from lighting; 26% of the audience has felt the application of multimedia technology from the performance of music; 13% and 11% of the audience respectively have experienced the application of multimedia technology in dance performance from stage props and other aspects. Data analysis shows that 76% of the audience has felt the application of multimedia technology in the dance performance through the screen, lighting and music, which accounting for a large proportion, therefore, more attention should be paid to screen, lighting and music in the application of multimedia technology in dance performance.

In terms of the emotional recognition of dance performance using multimedia technology, 31% of the audience believes that the performance of actors is the core of dance emotional expression; 40% of the audience believes that the comprehensive presentation of lights, screens and stage visual effects in the whole performance brings more emotional expression; 29% of the audience said that the performance of music and sound effects better represented the emotion of the work.

It can be seen from the data analysis that in the dance performance using multimedia technology, the performance of actors, music and sound effects is almost equal to the emotional presentation results brought to the audience by lighting, screen and stage visual effects. This result is significantly different from the traditional dance feedback results without the application of multimedia technology. The most majority of the traditional dance audience believes that the emotional core lies in the performance of the actors, while other elements such as lighting and music are merely the foil tools for the performance of actors. It can be seen that the application of multimedia technology in dance performance can bring more diversified

emotional experience to the audience, and intuitively show the emotions of the work to the audience from more dimensions.

In terms of audience recognition of dance performance using multimedia technology, after viewing is completed, 81% of the audience thinks that the performance effect has reached or exceeded their expectations and gives satisfactory evaluation; 16% of the audience thinks that the performance effect is fair and within the acceptable range; only 3% of the audience is dissatisfied with the performance.

The above results, combined with the summary and analysis of the data in Figure 1 and Figure 2, show that the application of multimedia technology in dance performance can effectively enhance the perceptual experience of the audience, and multimedia technology with screen, lighting and music as the core can also make audience feel the emotions of the work more intuitively, and can greatly enhance the audience's satisfaction.

4. Conclusion

1) Application of video technology in dance performance

Nowadays, many technologies and equipment that do not belong to the stage are being used more and more widely in dance performance, first of all, more commonly used are technologies such as projection and LED electronic displays, their application has greatly promoted the in-depth development of dance art (Wu Yapeng, 2022, 156-158). To some extent, multimedia technology is a visual effect that can present virtual objects, people, and environments on the display from multiple angles and dimensions. The display of virtual technology uses light, electricity and other technical means, this technology is used in contemporary art performance, it emphasizes the sense of reality and stimulates the comprehensive feeling of audience's multiple sense organs, and with 3D display technology, it brings the more realistic image to the audience and give them the immersive feeling. The way to make it more realistic is to rely on 3D computer displays, on the processing of images, on the one hand, using software processing technology, on the other hand, using 3D modeling technology, so that the processed 3D video images can be displayed on the plane.

At the same time, there are projection and aerial imaging and other technologies, this diversified video projection can be changed from a flat effect to a multi-level display, but also with the help of other auxiliary equipment, such as 3D, 4D glasses, etc., which can improve the reality of human eyes to receive the image information (Huang Dejun, 2020, 53-54).

Aerial imaging is a technique that has been developed in recent years and can directly display images in the air. For example, CCTV once broadcast a dance play called *Small Town Rain Lane*, the opening was a projection, the picture brought everyone to Jiangnan, accompanied by wonderful music and architecture of Jiangnan style, such as the white wall and black tiles, oil-paper umbrellas and cheongsam, all of which brought a vivid feeling to the stage and made it look real. The picture was accompanied by soft music, and the hazy rain seemed to be scattered in the air, and brought everyone to Jiangnan Watertown. In *Small City Rain Lane*, lift up the skirt and cross the bridge, hold and wave the umbrella. These all show the delicate beauty of women in Jiangnan. It shown the scene of women in Jiangnan avoiding rain and playing, which gave people a dreamlike illusion, and accompanied by soft light, the strong

smell of Jiangnan came to everyone's face. In this performance, whether the dancer's single move or a multimedia image, has taken the local custom of Jiangnan as the theme and made people have the sense of traveling through time and space and crossing Jiangnan.

2) Application of audio technology in dance performance

Audio is a coding technology around stereo sound, and can bring a variety of sound sensations to the audience through different sound source directions, in which the generated playback sound field, in addition to the fixed source of the sound, will also have different presentation effects according to different environments, this technology is realized from the perspective of psychology with audio equipment. The first is to transmit the sound directly to the designated location, and then stretch it with reverberation, which will not damage the original sound and can cover up the mixing, and highlight its surrounding effect, in a certain environment, make it surround before and after, and that is the stereo (Li Haige, 2020, 124-126). Digital audio records the melody of the music through certain technical means, and then edits and stores it, which is called "listening to music and dancing". Dance is tangible and silent in people's sight, while music is sound and intangible and in people's hearing. Then, mix music with dance, and the stage effect is completed in a way that music cooperates with dance. In *Golden Mask Dynasty* performed in the Octopus City Theater, a high-level voice-activated technology was used to amplify the singing of each actor, and then played back multiple tracks, forming a good stereo field. From the content, you can feel farming, sacrifice, flood and other links. At last, a queen wearing a golden mask, who has built an extremely glorious dynasty with her wisdom. The atmosphere of stereo surround sound can help some scenes better reproduction, and at the same time, the surrounding effect of sound also can bring the dance performance to the climax, so that people can get an organic fusion in audio-visual when watching. The combination of the auditory artistic effect produced by multi-channel digital audio technology, the wonderful performance of live dancers and various art forms such as stage lighting can make the stage performance of dance become more novel (Pan Yang, 2020, 165-166).

3) Stage screens supported by multimedia technology are different from the traditional "background"

Compared with the conventional stage background, stage screen can enhance the performance effect on the stage more conveniently and quickly. This paper takes multimedia dance work *Scattered* as a case to study. *Scattered* is produced by the British Dynamic Multimedia Dance Company, and has its world premiere at the Warwick Arts Centre on October 2 in 2009, with its unique artistic creativity and difficult performance, win the praise of countless audience, and even is hailed as "the stunning program of the Sibiu International Theatre Festival" in Romania.

A successful multimedia dance work, of course, has its subtleties. First of all, the title of this work is *Scattered*, and its theme is "People and Water". In "Extreme Shock", people have also tried to move water on the stage, people want to achieve this process and complete the harmony between water, the relatively uncontrollable prop harmonizes with the dance, which is a waste of time and energy and very troublesome, therefore, in practice, in accordance with the requirements of the script, a small amount of water was moved to the stage, so that it is easy to clean up without affecting the later performance. However, in *Scattered*, although

"water" is not unreal, it is better than real. From its content, it uses changing scenarios and the interaction between people and water, and highlights the fusion of people and water. It combines stage projection and dance. At present, many modern dances use the element of projection. Therefore, Kevin Finan also applied it to his own work, and the "curved structure screen" design has made it different from other work and has unique creativity. The “waterfall” can be simulated by projecting the existing picture of water onto it. The curved stage, although increasing the difficulty of the dancers, but can create more novel stage arrangements, with the combination of the two factors, the audience is "immersed" in the presence of the water flow.

4) The combination and development of virtual animation and dance

The research sample of the combination of virtual animation and dance is an animated dance work *Thought of You*. The author is Ryan J Woodward, an associate professor in the Department of Visual Arts at Brigham Young University, who has worked as an animated screenwriter in two films, *Iron Man* and *Spider-Man*, and as an excellent animated screenwriter and director, his work is impeccable. For the original meaning of "animated dance", Ryan J Woodward wrote in his we-media: "1. Explore new ways to characterize the outer form of the character; 2. Simple 2D animation makes 2D animation more vitality; 3. The exploration of modern dance. Although he is not a dancer, he hopes to express a body language that can cross artistic barriers in an artistic way. 4. The Return of Art. A long career in artistic creation can cultivate a kind of artistic inspiration, and the best reward is to promote this art." This is both a return to oneself and a pursuit and love of art.

The theme of *Thought of You* is to “explore new development directions of modern dance”. “I'm not a dancer,” Ryan J Woodward says, “but I want to express body language in an artistic way that can cross the barriers between arts.” In this work, the design of the dance step is very professional, but it is a bit awkward for a layman like Ryan J Woodward. In the early stages of preparation, he completed the conceptual design with a choreographer. After the "animation" dance is finally completed, *Thought of You* will be restored to a pure "dance" by means of animation according to the actual arrangement of "animation".

What is the difference between "animated dance" and "physical dance" in terms of expression? “Animated dance" is a multimedia dance form that combines "dance" and "two-dimensional animation". The biggest difference between "animated dance" and "traditional dance" is the difference between "real" and "virtual", each of which has its own advantages (Li Xueyu, 2019, 59-61). From the perspective of action performance, "animated dance" restores the real human body with "lines", and carries out a secondary creation, and the action is unrestrained and ever-changing, which can break through the limitations of the human body and enrich the connotation of the work. This is the limitation of "physical dance". The active performance of "physical dance" can only be completed by the dancer's own physical quality. In the absence of any help, "leap" and "instantaneous disappearance" in "animation" are difficult to achieve. Even so, "physical dance" still has a unique beauty, that is, physical dance is more realistic, at this point, it is much better than the “animated dance”, although the lines also contain "emotion", but it is an illusory feeling (Zhang Can, 2018, 136).

It can be seen from the mode of creation of"virtual" and "real" that both modes are well-founded. "Animation" can complete the movement that "entity" cannot complete, and "entity" can express the real emotions that "animation" can hardly show. At the same time, the combination of the two modes can also promote each other. It is believed that, in the future, the integration of "animation" and "dance" will become more and more frequent. With the development of technology, the mutual promotion between the two will also promote the rapid development of "animated dance", a new development direction of dance, and achieve the perfect integration of "real" and "virtual".

5. Discussion

The combination of multimedia technology and dance art is multi-angle and multi-level artistic presentation that integrates various elements such as music, art, form and culture. What multimedia technology brings to the audience is a sensory stimulus, and it creates a huge stage for choreographers, dancers, and combines multimedia technology with dance, and has become a trend in the development of modern dance art (Li Yu, 2018, 125-126). Multimedia technology has three core expressions: first, present the core of the work and its situation in an “immersive” way and let the audience more directly experience the charm of dance; secondly, in the “emotional bond” of “actors” and “audience”, multimedia technology builds a bridge between actors and holographic images, actors and TV screens, actors and audience, making art creation more interactive; finally, use the combination of multimedia and stage mechanism to provide more alternative spaces for the presentation of the stage, the spatial scope of choreography, the scheduling change of choreography, etc. that although consists of the study of Xia, et al, (2019) in “Spatiotemporal recurrent convolutional networks for recognizing spontaneous Micro-expressions” was due to the subtle spatiotemporal changes of micro-expressions. Therefore, the narrative mode of dance also has a new development in the changes of time and space, nonlinear narrative and so on.

Art is the great product of human development, with the blessing of modern science and technology, as an important artistic expression, dance is developing rapidly in a more dimensional, more real and more interactive direction. For the "visual emotion" in dance performance, the application of multimedia technology, from the music, background, light effect and the overall presentation effect of the dance, has built an effective bridge between the work and the audience, so that the audience can more directly and truly experience the emotional core contained in the work, which is the essence of the "visual emotion" of the dance that consists of the study of Meletaki (2022) who studied investigating emotion perception using expertise and found the first time the heart-brain interactions on dancers and controls on the identical visual emotion recognition test and compared heartbeat, visual and somatosensory evoked potentials, and interoceptive capacities between groups. Heartbeat Evoked Potentials did not modulate mood or dancing expertise, but they were substantially associated with interceptive abilities and personality attributes for both groups. The third experiment was an online pilot research comparing dancers and controls on a visual emotion discrimination test based on visual object recognition literature. Dance skills correlated with empathy, interceptive awareness, and behavioral performance. The fourth experiment examined different embodiment signatures for different emotions and the potential influence of psychological traits on the embodiment. It found that angry and happy facial expressions were processed differently and that alexithymia levels affected the Somatosensory Evoked Potential of anger. With the continuous progress of technology, dance performance has also

evolved from the single stage performance to a comprehensive performance combining technology and art. This greatly improves the performance effect in all aspects of dance, and the future development in the field of dance performance also needs to combine the two organically, so as to move our dance career forward.

6. Recommendations

The application of multimedia technology in dance not only meets the needs of modern society's fast pace and high efficiency, but also brings new development opportunities and visual enjoyment to dancers and audience. From the perspective of the dance creator, the combination of multimedia technology and dance provides a new art form for the dance creator, which will greatly change the way the creator thinks and creates, because computer technology, design language and new influence presentation methods can make multimedia design more convenient and flexible. And as a new type of expression, multimedia technology can show every detail of the dance, so as to better show the audience the "visual emotion" of the dance, and that's why multimedia technology requires the creator to put forward higher requirements for the three-dimensional space sense, the accuracy of the picture, the color, the language, etc. At the same time, the quality of the dance creator in terms of lighting, expression and so on also needs to be greatly improved. With the help of multimedia technology, the audience can feel the infinite expansion and extension of dance creation, and use virtual display to enhance the creative effect of dance, and display the design concept and conception, design origin, cultural background, and design details in three-dimensional space, so that the audience can comprehensively understand the depth and breadth of the dance and put forward their own opinions. Multimedia technology can adjust the work according to the feedback from the audience in a shorter period of time, thus building a convenient bridge for the work to communicate and interact with the audience.

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