

Application Environment of Ethnic Art Elements in Multi-type Film Making

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Abstract: As one of the unique national elements, national art elements are worthy of reference and application in film art creation. The film makers apply the characteristic national art elements to the film making process. It can not only improve the visual artistic effect of film works, sublimate the artistic value and aesthetic experience of films, but also make film works full of national charm and show the nationality of films. However, at present, the application degree and effect of characteristic national art elements in multi-type film production still can't reach the expectation, which has affected the spread of national art elements and the development of multi-type films. Faced with this situation, this paper studied the application environment of national art elements in various types of film production. The application of national art elements in character modeling design, film color and film composition has been explored, and relevant experimental research has been carried out. The research showed that there was still a lot of room for development in the application of national art elements in various types of film making. National art elements were applied to various types of film production, which could improve the composition quality of film images by 2.84% and the color saturation by 5.07%. The audience's evaluation of film images after incorporating the elements of national art is also higher.

1. Introduction

Film production is an art that uses pictures and sounds to express stories and convey emotions. The application of each picture sense, tone and composition in film production has a profound

impact on the quality, style and taste of film works. Therefore, the role of art guidance in film production appears. If aesthetic elements are not used in film works, it is difficult for film works to create artistic conception or express emotions, as is the case with the use of distinctive ethnic art elements. If the film works lack the application of national art elements, the film not only is difficult to express the feelings of the film makers and the social thoughts under the specific background, but also leads to the lack of local flavor and national flavor of the film works and lack of authenticity. Therefore, this paper actively explores the application of distinctive ethnic art elements in multi type film production.

As an audio-visual art, film has the functions of emotional nourishment, moral education, aesthetic education and so on. Many scholars have invested in the research work of film production. Willems G discussed the role of official film production policies in promoting national identity, and proposed some measures to integrate national elements into films [1]. Fan W J explored the relationship between animation film industry and national art elements, and explored the specific application strategies of national art elements from some aspects [2]. Peng Q I put forward suggestions on establishing the concept of national culture inheritance, following the principles of national art creation and the practice of story creation, and improving the style of animated films [3]. Chen L studied the film production mode, and analyzed the differences between different film production modes in different regions and the competitiveness of film enterprises [4]. Li Y discussed the role of AI technology in multi type film production [5]. To sum up, many scholars have studied film production.

The characteristic national art element is the embodiment of a national traditional culture, which has been studied by many scholars. Through studying the application of national art elements in film production, Liu X Y drew the conclusion that the application of national art elements in film production could not only sublimate the artistic value and aesthetic experience of films, but also help to inherit traditional national culture [6]. Alipour N discussed the popularity of fashion design based on ethnic art elements among Baluchistan people, and proved that Baluchistan people had high recognition of fashion using ethnic art elements through experiments [7]. Cheng N discussed the application and integration development of ethnic art elements in the new media era and animation creation. Based on a large number of illustrations, he discussed the method of integrating ethnic culture into animation from some aspects [8]. The application of distinctive ethnic art elements in film production helps enhance the aesthetic value and nationality of films.

This paper summed up the relevant concepts of characteristic ethnic art elements and film types. The application environment of characteristic ethnic art elements in film production has been explored. The application of image aesthetic quality evaluation algorithm in film production was discussed. An experimental study was conducted on the application of ethnic art elements in multi type film production.

2. Characteristic Ethnic Art Elements and Film Types

(1) Characteristic ethnic art elements

1) Concept of ethnic art elements

Ethnic art is an art gradually developed in people's daily life. It is the visual image and symbol carrier of national culture and has become a regional representative cultural symbol. Ethnic art elements have produced many forms in a long time, such as embroidery, shadow play and opera. Ethnic art can show people strong national feelings and ideas by virtue of its unique shape and rich expression methods [9].

2) Elements of ethnic art

Specific elements of ethnic art elements include New Year picture elements, shadow play

elements, paper-cut elements, facial makeup elements, etc., as shown in Figure 1. From the perspective of visual color art, New Year picture elements can create a sense of festive and auspicious atmosphere. Based on the analysis of artistic modeling design, New Year picture elements can leave a deep impression in people's minds with smooth lines, complex decoration and strong complementary color contrast. Shadow element is an aesthetic manifestation of the combination of light and shadow. Paper cutting element is a national art element with a unique style. Paper cutting is also known as window decoration. Paper cutting has the characteristics of realism, abstraction and decoration. Its specific content is usually an image with auspicious and detailed sounds. The appearance and development of facial makeup are closely related to opera. In order to make the audience at a distant place see their facial expressions clearly, drama actors have sketched facial makeup on their faces [10].

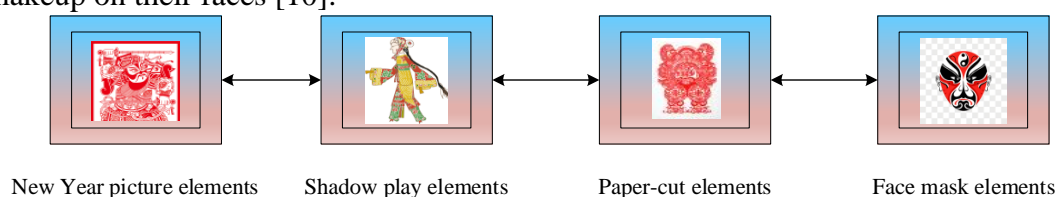


Figure 1. Components of ethnic art elements

3) Application of ethnic art elements in animation film production

The fifties and sixties of the 20th century belong to the golden age when ethnic art elements were used in animation film production. Many films with national art elements are emerging. These films contain rich ideology, artistry and aesthetics. At this time, the application level of ethnic art elements in film production in China is close to that western countries. The film works in this stage organically combine traditional national culture with folk art. It deduces and inherits the national art elements, forming a unique film art style. However, with the influx of western countries' art concepts, the creation of film works gradually lacks the national art elements. The development of the film industry is also in a dilemma. Therefore, in the process of film production, it is necessary to re-activate the elements of national art with characteristics to enrich the content of film works, so as to improve the artistic value of film works.

(2) Types of movies

Types of movies are divided according to movie scenes, story lines, character types, etc. The main types are action movies, comedy movies, romance movies, animated movies, etc., as shown in Figure 2. The main expression of motion is human or mechanical motion. According to this standard, action films can be divided into action films with human actions as the main performance content and action films with mechanical actions as the main performance form. Further subdivided, action films with human actions as their main content can be divided into martial arts films and swordsman films. What they both have in common is that they both attach importance to excavating the formal impact and aesthetic feeling of movements and sports. However, there are differences between the two. The story background of martial arts films is mostly modern and modern, focusing on the fighting skills in the real world. Wushu movements include elements such as Sanda and boxing. The story background of swordsman films mostly took place in ancient times, focusing on illusory martial arts secrets, magic weapons and treasures. Comedy film is a kind of film type characterized by the effect of laughter. However, comedy is not just a form of work to satisfy the audience's happy psychology. Excellent comedy works often contain a tragic core and an attitude beyond life. Comedy plays an important role in the movie market and has a stable audience base. Love film is a kind of film with the initiation, development, twists and turns, reunion or discrete ending of love as its narrative content, and discusses the eternal artistic theme of love. Some classic love movies can be loved by audiences all over the world [11]. As an art form that combines film

art with animation art, animation often introduces a large number of national art elements in the creation process. Due to the progress of science and technology, the government's emphasis on animated films and other factors, animated films are currently in a rising stage of development.

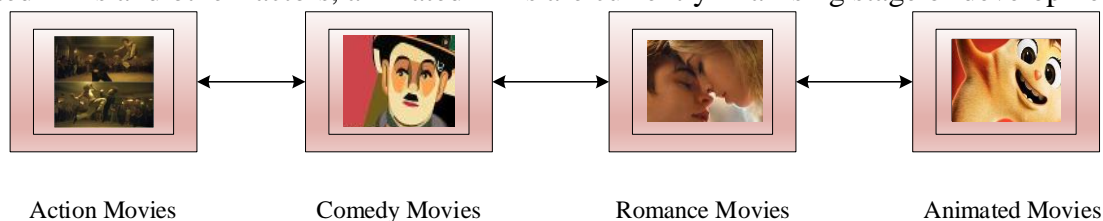


Figure 2. Related research on movie genres

3. Application Environment of Characteristic National Art Elements

(1) The application environment of characteristic national art elements in character modeling design

The application of national art elements in character modeling design is mainly reflected in the production of animated films. Character design is an important foundation for the success of animated films. There are many successful animated films that draw lessons from national art elements such as New Year pictures, shadow puppets and paper-cuts. Therefore, animated film makers should actively quote national art elements to create animated films according to the aesthetic trend of the current audience and their creative ability, so as to create animated characters with unique national characteristics [12].

(2) The application environment of characteristic national art elements in film color.

The use of color is an important way to portray images and create atmosphere in movies. Based on the perspective of animated films and other types of films, this paper studies the application of characteristic national art elements in film color, as shown in Figure 3.

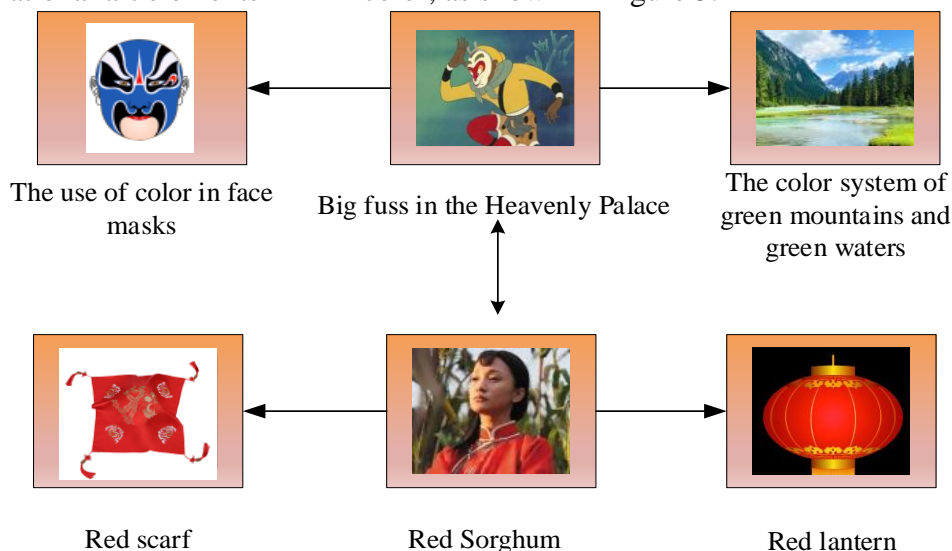


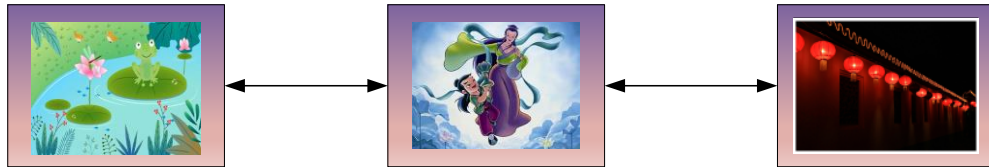
Figure 3. The application environment of characteristic ethnic art elements in film color

As shown in Figure 3, from the perspective of animated films, excellent animated films have unique and distinctive color styles. For example, the protagonist of "Make a Great Trouble in Heaven" refers to the color application of Facebook elements. Its facial image is exaggerated, which makes the characters highly recognizable. The scenery of "Make a Great Trouble in Heaven" also reflects the color system of green mountains and green waters, which increases the visual appeal and national characteristics of the work. Based on the perspective of other types of films, compared

with animated films, other types of films are not so closely related to the elements of national art. However, if the film works do not interpret the elements of national art, it is difficult to show the inner feelings contained in the works and the social thoughts in a specific background. Ethnic art elements are used in film production. It can improve the visual artistic effect of the film, and show the national character of the film. For example, the red scarf, red lantern and other elements in Red Sorghum has brought a visual feast to the audience, which shocks the audience greatly and reflected the national characteristics of the film works. Therefore, in film creation, national art colors can be used for color matching. Through the pursuit of strong visual contrast, the harmony and unity of the pictures are realized to increase the national style and appeal of the film [13].

(3) The application environment of characteristic national art elements in film composition.

Painting elements, as a kind of characteristic national art elements, have the characteristics of clear primary and secondary, integrity and fullness, and strong sense of decoration. It is widely used in film creation [14-15]. As shown in Figure 4, this paper takes three film works as examples to discuss the application of national art elements in film composition.



Little tadpole looking for mother

Lotus lamp

Big red lantern hanging high

Figure 4. The application environment of characteristic ethnic art elements in film composition

In the process of creation, "Little Tadpole Looking for Mother" shows the images of lotus, aquatic plants and tadpoles according to the composition requirements of painting elements, which makes the whole picture have a strong sense of movement and beauty. In the process of creation, "Lotus Lantern" uses the composition method of green landscape painting, which makes it reveal a kind of artistic conception beauty with the characteristics of landscape painting. In the process of creation, "Red Lantern Hanging High" also applies the composition features of painting elements, which makes the courtyard full of national charm into a beautiful picture. The furniture placed and the red light hung are all elements of a beautiful picture. Therefore, in terms of film composition, film creators should deeply integrate the national art elements with characteristics. It is also necessary to combine scientific and technological means to make film works have both high aesthetic value and national aesthetic characteristics.

4. Application of Image Aesthetic Quality Evaluation Algorithm in Film Production

When film creators use the elements of characteristic ethnic art to create films, it is not objective to evaluate the visual beauty of films by personal experience. There is an unreasonable risk of using the characteristic ethnic art elements. Faced with this situation, this paper studies the application of image aesthetic quality evaluation algorithm in film production.

The method based on histogram contrast is used to define the significant value of each pixel in the movie image P which refers to the characteristic national art elements. There are:

$$T(P_c) = \sum_{\forall P_p} E(P_c, P_p) \quad (1)$$

Among them, E is the color distance between the pixel points C and P of the movie image in the color-opposition space.

By extending the pixel level of Formula (1), it can be obtained:

$$T(P_c) = E(P_c, P_1) + E(P_c, P_2) + \dots + E(P_c, P_n) \quad (2)$$

Considering the influence of spatial location factors on significant value, Formula (2) is integrated to obtain:

$$T(P_c) = T(K_p) = \sum_{q=1}^n g_q E(K_p, K_q) \quad (3)$$

The weighted average of similar color saliency values is taken as the saliency value of the current color, and there are:

$$T'(K) = \frac{1}{(m-1)S} \sum_{p=1}^m (S - E(k, k_p)) T(K_p) \quad (4)$$

Among them, $m = n/4$. s is the distance between color K and its m neighbors k_p . The formula of s in Formula (4) is:

$$S = \sum_{p=1}^m E(k, k_p) \quad (5)$$

The formula for calculating the normalization factor of s in Formula (4) is:

$$\sum_{p=1}^m (S - E(k, k_p)) = (m-1)S \quad (6)$$

The composition evaluation formula of "three-point method" is:

$$F_m = \lambda_{point} F_{point} + \lambda_{line} F_{line} \quad (7)$$

Among them, F_{point} is the proximity of the significant area to the trine. F_{line} is a measure of how close an important straight line in an image is to a three-point line. $\lambda_{point}, \lambda_{line}$ is the weight.

F_{point} is obtained by the following formula:

$$F_{point} = f \frac{E^2(T)}{2\epsilon_1} \quad (8)$$

Among them, $E^2(T)$ is the square of the minimum distance between the center point of the main area and the four trinkets.

The formula for calculating the minimum distance between the center point of the main area and the four trinkets is:

$$E(T) = \min_{q=1,2,3,4} e_m(D(T), H_q) \quad (9)$$

Among them, $D(T)$ is the center point of the main area, and H_q is the four thirds of the main area.

The calculation formula of F_{line} is:

$$F_{line} = f^{-\frac{E^2(\varepsilon)}{2\varepsilon_1}} \quad (10)$$

Among them, $E(\varepsilon)$ is the minimum distance between the important straight line and the trisection line.

The calculation formula of $E(\varepsilon)$ is:

$$E(\varepsilon) = \min_{q=1,2,3,4} e_{\varepsilon}(U_q) \quad (11)$$

The evaluation index of depth of field composition is defined as:

$$F_E = \log_2(|\beta_{\alpha} - \beta_T| + 1) + 0.5 \quad (12)$$

The visual balance evaluation formula is defined as:

$$F_{v\beta} = f^{-\frac{e^2 v \beta}{2\varepsilon_3}} \quad (13)$$

If the measurement of the size of the main area is increased, the visual balance evaluation formula is:

$$F_v = \kappa_{v\beta} F_{v\beta} + \kappa_v F_v \quad (14)$$

Based on the three-point composition evaluation, depth-of-field composition evaluation and visual balance evaluation, the comprehensive evaluation of composition quality is as follows:

$$F_1(P) = \kappa_m F_m + \kappa_e F_e + \kappa_v F_v \quad (15)$$

Among them, $\kappa_m, \kappa_e, \kappa_v$ is the weight.

The polynomial regression formula for image color saturation evaluation is:

$$T = \alpha P^3 + \beta P^2 + kP + \delta \quad (16)$$

Among them, t is the saturation of the image and p is the brightness of the image.

The evaluation formula of image saturation is:

$$F_T = 1 - |T - T_0| \quad (17)$$

Among them, T_0 is the average saturation of the image.

5. Application Environment of National Art Elements in Multi-type Film Production

According to the criteria of geographical distribution, age, gender, educational background, etc., this paper puts in 500 questionnaires in the form of online questionnaires. 483 valid questionnaires are obtained. The questionnaire mainly investigates the problems that people think exist in animated films, and people's evaluation of the application of national art elements in film production. At the same time, this paper attempts to integrate some national art elements into six movie images. From the quality of image composition, color saturation and people's subjective evaluation, the images before and after the integration of national art elements are evaluated.

(1) Respondents think that there are problems in animated films.

By investigating people's problems in animated films, the application environment of national art elements in animated films can be understood. The respondents think that the problems existing in animated films are counted and sorted out, and the relevant data obtained are shown in Figure 5.

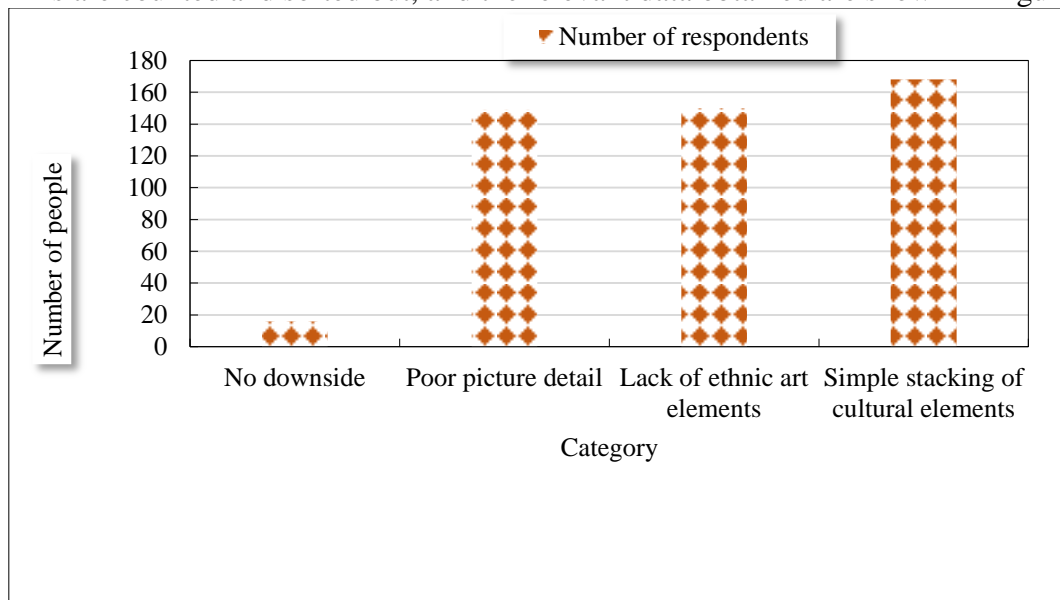


Figure 5. Respondents believe that there are problems with animated films

As shown in Figure 5, among the people who participated in the survey, 16 people thought that there were no shortcomings without animated films. They said they could accept the existing animated films. However, the proportion of this part was low. 149 respondents thought that the details of animated films were poor. They didn't think the animated film pictures were exquisite enough. This part of the respondents accounted for 30.85%, accounting for a relatively high proportion. It shows that the quality of animated films can't win people's high recognition. Film producers should actively improve the quality of their works. 150 respondents thought that animated films lacked elements of national art. The proportion of these people was 31.06%. It shows that some animated films lack national characteristics, so they can't arouse people's spiritual resonance and win people's recognition. It also shows that national art elements have a strong application foundation and market support in animated films. In addition, there are 168 investigators who believed that there was a simple accumulation of cultural elements in animated films. The proportion of this part of the respondents was 34.78%.

(2) Respondents' evaluation of the application of national art elements in various types of film production.

This paper studies people's subjective feelings and evaluation of the application degree and effect of national art elements in various types of film production. The relevant data are sorted and counted, and the relevant data obtained are shown in Figure 6.

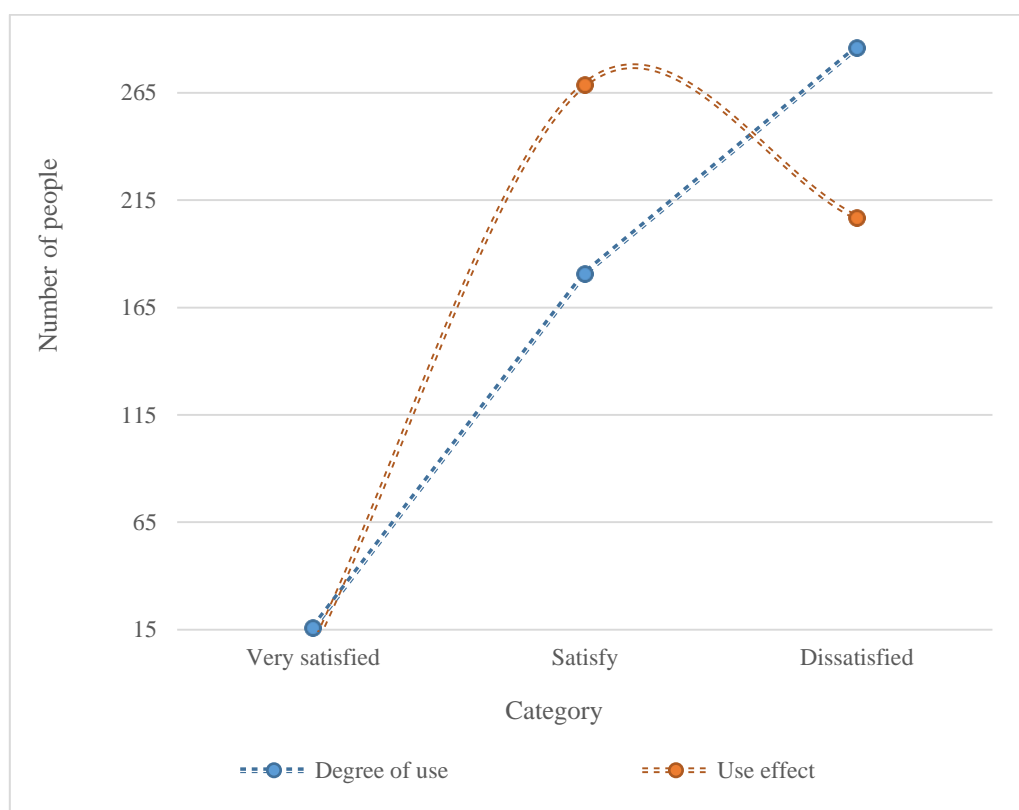


Figure 6. Respondents' evaluation of the use of ethnic art elements in multi-type film production

As shown in Figure 6, among the 483 respondents, 16 were very satisfied with the application of national art elements in various types of film making. The proportion of these people was 3.31%. 181 people were satisfied with the application of national art elements in various types of film production. The proportion of these people was 37.47%. There were 286 respondents who were dissatisfied with the application of national art elements in various types of film production. The proportion of these respondents was 59.21%, accounting for a relatively high proportion. Regarding the evaluation of application effect, seven respondents were very satisfied with the application effect of national art elements in various types of film production. 269 respondents were satisfied with the application effect of national art elements in various types of film production. There were 207 respondents who were not satisfied with the application effect of national art elements in various types of film production. To sum up, the application degree and effect of national art elements in various types of film production were still not high enough. Film makers should increase the application degree of national art elements to improve the application effect of national art elements.

(3) Comparative experiment of film image composition quality.

Through the image aesthetic quality evaluation algorithm, the composition quality of the images before and after the integration of national art elements is calculated. The value range of composition quality index is 1-100. The specific results are shown in Figure 7.

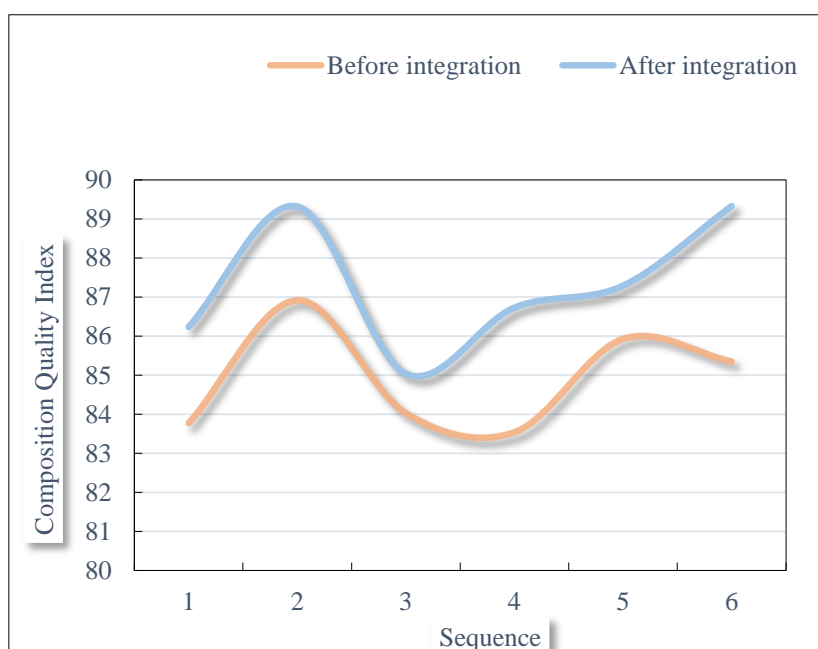


Figure 7. Composition quality comparison experiment of movie images

As shown in Figure 7, the composition quality index of the first image before incorporating the national art elements was 83.77. The composition quality index of the first image with national art elements was 86.24. In the following images, the composition quality index of the film image after incorporating the national art elements was higher than that before incorporating the national art elements. The average composition quality index of six film images before incorporating the elements of national art was 84.92. The average composition quality index of the six movie images with national art elements was 87.33. With the integration of national art elements, the composition quality index of film images has increased by 2.41, with an increase rate of 2.84%.

(4) Comparative experiment of color saturation of movie images.

The image aesthetic quality evaluation algorithm is used to obtain the color saturation of the images before and after the integration of national art elements. The value range of color saturation index is 1-100. The results are shown in Table 1.

Table 1. Color saturation contrast experiments for movie images

	Before integration	After integration
1	81.01	86.26
2	83.24	85.52
3	82.33	89.37
4	85.79	86.74
5	87.33	92.8
6	84.68	89.21

As shown in Table 1, among the six movie images that did not incorporate national art elements, the movie image with the highest color saturation index is the fifth image, and its color saturation index was 87.33. The color saturation index of the new image was 92.8 by integrating the national art elements into the fifth image. It can be clearly seen that the integration of national art elements into movie images can increase the color saturation of movie images. Among the six movie images that were not integrated with national art elements, the movie image with the lowest color saturation index was the first image. However, the color saturation of the first movie image also increased

obviously after the national art elements were incorporated into the first image. The average color saturation index of six movie images before incorporating the elements of national art was 84.06. The average color saturation index of six movie images with national art elements was 88.32. After incorporating the elements of national art, the color saturation index of movie images has increased by 4.26, and the increased ratio was 5.07%.

(5) Comparative experiment of subjective visual evaluation of film images.

Different display screens affect the subjective visual evaluation effect of movie images. Therefore, this paper does not choose the way of online survey to evaluate the subjective visual effects of movie images, but randomly selects 300 audiences from online and offline cinemas to evaluate the subjective visual effects of movie images. The subjective evaluation results are shown in Figure 8.

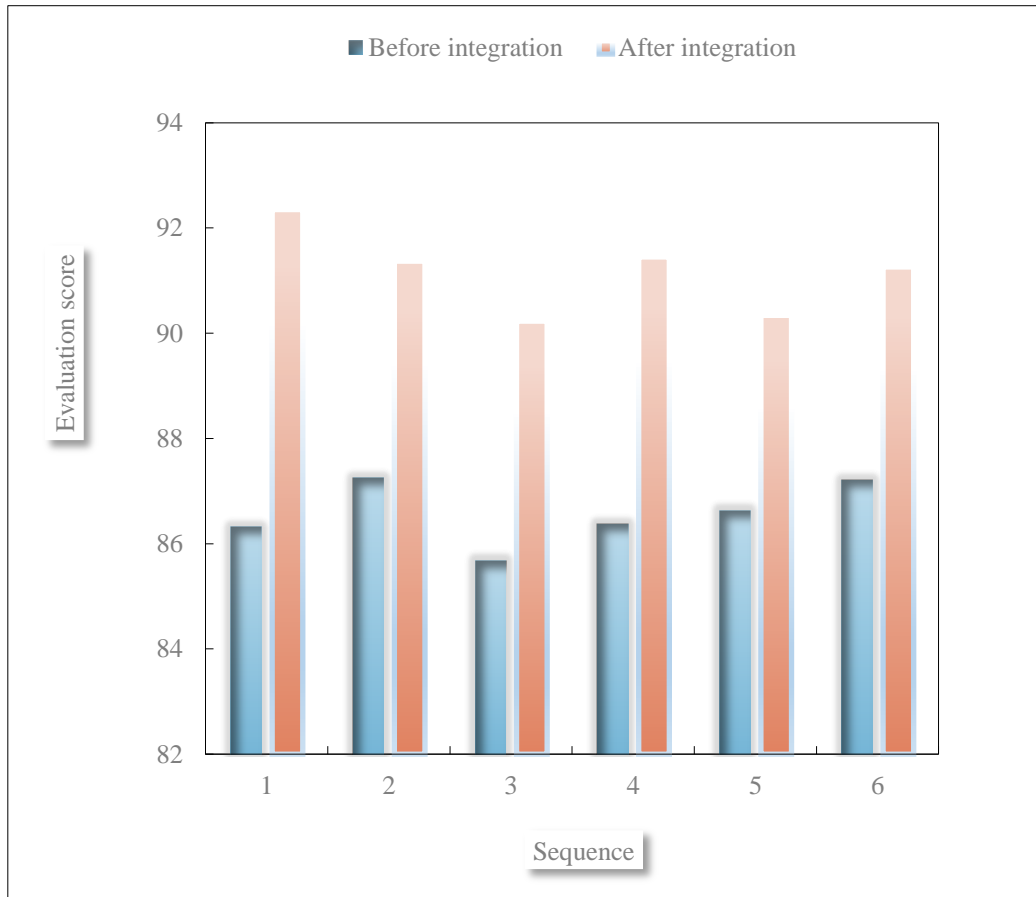


Figure 8. Comparative experiment of subjective visual evaluation of movie images

As shown in Figure 8, on the whole, the average score of the images after incorporating national art elements was higher than that of the images before incorporating national art elements. From the specific data, the audience scored 86.32 for the first image before incorporating the elements of national art. The score of the first image with elements of national art was 92.35. The audience's rating for the sixth image before incorporating the elements of national art was 87.21. The score of the sixth image integrated with national art elements was 91.26. For the audience, the average score of six movie images before incorporating the elements of national art was 86.58. For the audience, the average score of six movie images with national art elements was 91.17. After incorporating the elements of national fine arts, the visual effect of movie images has been improved by 4.59, with an increase rate of 5.3%.

6. Conclusion

This paper analyzed the application environment of characteristic national art elements in various types of film production. The network survey method and the image aesthetic quality evaluation algorithm were used to carry out relevant experimental research. Experiments have proved that the application degree and effect of national art elements in various types of film production have not reached the expected level. It is helpful to improve the composition quality of multi-type film images by integrating characteristic national art elements into multi-type film production. It is also beneficial to improve the color saturation of various movie images and the visual expression effect of various movie images.

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Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

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