Integration and innovative development of the relationship between stage environment and character design in the new era

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Keywords: new era; stage environment; character design; innovative development

Abstract: In the context of the new era, based on the innovation diffusion theory, the diffusion process of stage environment and character modeling was studied in depth. We need to use diffusion models, such as the Bass model, to predict expected diffusion by controlling for regular variables during the diffusion process. The model takes into account the impact of mass media and word-of-mouth communication on the diffusion of personas, distinguishing the different roles of innovators and imitators. And this paper elaborates on the assumptions of the Bass model. By constructing a diffusion model, it provides powerful decision-making support for market prospect prediction and marketing strategy formulation of stage environments and characters in the new era. The research results show that: the audience's attention to the stage characters reached 83.21%, and the audience's attention to the performance effect was the highest, reaching 41.45%. It shows that through the integration of stage environment and character design, the performance effect can be greatly improved and the innovative development of stage art can be effectively promoted.

1. Introduction

In various performing arts, there are also great differences in the shaping of character images, but their common feature is that they must be achieved through makeup and modeling [1]. The makeup and styling of stage characters can help the audience better understand the characteristics of the characters in the performance, create a visual art image for the audience, and conform to the audience's aesthetics [2]. According to different scenes, characters and stage performance methods, makeup artists and stylists need to analyze each character's identity, ethnicity, history and other factors, and use this as the basis for makeup and modeling design to ensure the coordination of the stage environment and character modeling. Sex[3-4].

Integration and innovation are of great significance to stage makeup design. To this end, this article proposes the integration and innovative development of the relationship between stage environment and character design in the new era. In the context of the new era, based on innovation diffusion theory, the diffusion process of stage environment and character modeling is analyzed. We also analyze the assumptions of the Bass model, fully combine multiple factors, and implement comprehensive considerations and innovative practices.

2. Related Words

Wang Y et al. mainly explored the development and visual representation of Wu Culture's creative products under the framework of virtual reality technology. Firstly, 3D modeling technology is the foundation for creating virtual scenes, modeling objects on the stage, including the stage and props. The motion effect of the synthesized video lens is synchronized with the lens parameters of the physical camera to prevent the target foreground from floating on the virtual background. In addition, some objects are equipped with interactive features, such as the ability to open curtains and lights, which can be triggered through user interaction. Secondly, they introduced relevant knowledge of Yu Opera through various texts, images, and other materials, aiming to deepen the audience's understanding and appreciation of the art form of Yu Opera. Finally, by connecting VRML virtual scenes to the database, users can effortlessly access and watch corresponding virtual martial arts performance clips [5]. In addition, Wu R et al. investigated the

  DOI: 10.25236/etmhs.2024.094

impact of human model scenarios on consumer responses and identified the potential mechanisms and boundary conditions for this impact. They found that in a solid background, consumers tend to notice and pay attention to the central figure faster. However, more specific or specific backgrounds often trigger a more favorable attitude towards the product. In addition, psychological imagery plays a moderating role in the influence of image context on consumer attitudes, regulating the relationship between image context and consumer attitudes [6]. Zufri T and others analyzed the development, basic design foundations and design principles of common character designs in today's games. This discussion concerns the viability of the pixel style, even as design styles in the current era of digital art are evolving with different ideas. Pixels are a fundamental element of design, capable of producing attractive design compositions. Looking at the current development of pixel style, in the surge of 3D visual works, we can find that pixel style still has an irreplaceable influence [7]. Zhang Y and others primarily investigate the utilization of three-dimensional modeling and mobile edge computing technology in the design of stage performing arts. They have researched and implemented a multi-Kinect joint data fusion method based on 3DMAX, successfully completing the modeling and virtual design of a three-dimensional virtual stage scene. Performance plans are created by leveraging computers to analyze musical characteristics, design lighting movements, and synchronize music with lighting movements. Additionally, they have demonstrated how the Dstributed Deep Learning Offload configuration impacts convergence performance, and explored how various model settings influence the offload scheme [8].

3. Method

The innovation diffusion theory serves as a framework to explain how new concepts, such as stage environment, character design, and new technologies, are disseminated in contemporary social systems. This theory is based on communication theory. Initially, innovation diffusion theory centered around communication channels and social systems. However, with the progress of research and the expansion of applications, this theory has been extended to fields such as technology prediction and marketing, deepening our understanding and shifting the focus to technological progress. The application of diffusion models in prediction and marketing aims to predict the market potential of new concepts, thereby helping to develop more accurate marketing strategies and decision support at various stages [10].

Mass media mainly disseminates attributes that are easy to verify, while verbal communication facilitates the dissemination of features that are difficult to verify [11]. Innovators influenced by mass media are often early adopters of new concepts. In contrast, imitators were influenced by word-of-mouth and adopted later. The decision of innovators to accept novel characters is not influenced by other members of the social system, while the decision of imitators is increasingly influenced by more and more adopters [12].

This article adopts the innovator diffusion model, which assumes that the diffusion of innovation is driven by the innovative behavior of potential adopters. This model specifically considers the behavior of innovators who become adopters due to the influence of the stage environment. It is also known as the external influence model. The expression is:

$$n(t) = p\left[M - N(t)\right] \tag{1}$$

Taking full account of word-of-mouth communication among potential adopters, an imitator diffusion model is proposed:

$$n(t) = \frac{q}{M} N(t)\left[M - N(t)\right] \tag{2}$$

In the above formula, M represents the highest economic potential of the character. $n(t)$ represents the number of new customers in a period of time t $N(t)$ represents the customer accumulation in a period of time t, and p represents the innovation conversion rate, which is the

result of users becoming adopters due to the influence of mass media. q represents the imitation coefficient, which is the probability that a potential adopter will become an adopter due to the influence of verbal communication.

The Bass model defines diffusion roles consisting of innovators and imitators. The diffusion speed of innovators is affected by factors such as mass media, stage environment and character design, and only focuses on easily identifiable characteristics. The diffusion speed of imitators is mainly affected by word-of-mouth communication factors from the audience, as well as attributes that are difficult to identify such as the reliability and durability of the characters. The calculation formula is as follows.

$$n(t)=\left[p+\frac{q}{M}N(t)\right]\left[M-N(t)\right] \tag{3}$$

The main goal of the Bass model is that at time t, the proportion of non-adopters who adopt the new character image is linearly related to the proportion of adopters.

Among them, $F(t)$ represents the cumulative deployment rate of the character at time t, and $f(t)$ represents the density function of $F(t)$, which refers to the adoption rate at time, $F(t)=\int_0^t f(t)dt$. Therefore, it can be concluded that the cumulative number of adopters $N(t)=F(t)M$ at time t, the number of new adopters $n(t)=f(t)M$, and $qF(t)$ represent the higher the proportion of adopters, the stronger the influence of imitators' imitative behavior.

After derivation of the above formula, the formula is as follows:

$$F(t)=\frac{1-e^{-(p+q)t}}{1+\frac{q}{p}e^{-(p+q)t}} \tag{5}$$

$$f(t)=\frac{p(p+q)^2-e^{-(p+q)t}}{\left[p+qe^{-(p+q)t}\right]^2} \tag{6}$$

The assumptions of the Bass model are as follows:

(1) The market potential does not change during the life cycle;

(2) The diffusion process is not affected by the image of other competing actors, and the competitive environment is an oligopoly;

(3) Marketing strategies or character image operation strategies do not affect the character image communication process;

(4) The character shape remains unchanged during the life cycle, and the character shape is shaped according to the stage environment;

(5) The geographical boundaries of the social system remain unchanged during the distribution process;

(6) There are no supply constraints in the diffusion process;

(7) In the diffusion process, user decision-making is only divided into two stages: adoption and non-use;

(8) The innovation coefficient and imitation coefficient of potential adopters are the same, and there is no difference between users.

The Bass model is a foundational diffusion model. Taking into account that user decision-making is only divided into two stages: adoption and non-use, it guides the audience to make positive adoption decisions through precise market positioning and marketing strategies[13-14].

4. Results And Discussion

In recent years, China's stage market and scale have continued to expand, and its economic benefits have become increasingly prominent. In the context of the new era, commercial development has gradually become the main direction of stage development. While ensuring artistry and pioneering nature, commercial stage environment and character design are valued by many directors.

The audience's attention to stage performances has shifted from performance themes and performance methods to stage beauty and modeling. Therefore, as an important carrier and artistic content of stage art, stage costumes are deeply noticed and loved by the audience for their innovative and exploratory styles, colors, and fabrics. Regarding the investigation of audience concerns about stage performances, this article selected 300 audiences for investigation and analysis. The audience's attention to the stage characters is shown in Table 1.

Table 1 Audience's attention to stage characters

Attention level	Value/%
Follow often	25.86
Follow occasionally	57.35
Never followed	16.79

It can be seen from Table 1 that 35.86% of the audience often pay attention to the stage characters. This shows that some audiences have a high interest and concern in the stage characters. They may be more devoted to appreciate the whole scene because of the outstanding characters. stage performance. The highest proportion of viewers who occasionally paid attention to stage characters was 57.35%. This part of the audience may have a certain interest in stage characters, but they will not pay special attention to them every time. Their attention may be affected by various factors such as the type of play, character setting, and overall performance quality. Audiences who have never paid attention to stage characters accounted for 16.79%. Although this proportion is relatively low, it also shows that some audiences do not pay much attention to characters when enjoying stage performances. The role of character modeling on stage performance is shown in Table 2.

Table 2 The role of character modeling in stage performance

Follow content	Attention percentage/%
Affects the overall tone and atmosphere of stage performances	28.96
Portraying character	25.65
Express character's emotions	2.97
Explain the time and space background	4.29
Bring visual appreciation to the audience	33.52
Other	4.61

According to Table 2, it can be seen that the two contents that the audience pays most attention to are bringing visual appreciation to the audience, accounting for 33.52%, and affecting the overall tone and atmosphere of the stage performance, accounting for 28.96%. This shows that when the audience appreciates the stage performance, they not only pay attention to the overall visual effect, but also pay attention to the atmosphere and tone created by the stage. Visual appreciation can directly attract the audience's attention, while the overall tone and atmosphere can affect the audience's emotional investment and viewing experience. Although the portrayal of the character's personality also received relatively high attention of 25.65%, the attention of expressing the character's emotions was relatively low, only 2.97%. This may mean that when the audience pays attention to characterization, they pay more attention to the portrayal of character rather than a single emotional expression. At the same time, it also shows that in stage performances, in-depth portrayal of characters is of great significance in increasing audience attention. The attention paid to the explanation of time and space background is as low as 4.29%, which may indicate that in stage

performances, the explanation of time and space background is not the content that the audience pays most attention to. The other attention levels are also lower at 4.61%, which may cover some more niche or secondary concerns. The indicators of audience evaluation of experimental dramas are shown in Figure 1.

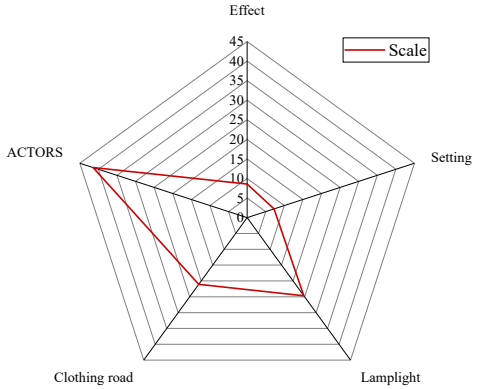

Figure 1 Indicators for audience evaluation of stage effects

From Figure 1, we can see that the audience pays the highest attention to the effect, reaching 41.45%. It shows that when the audience appreciates the stage performance, they pay most attention to the overall performance effect, which includes the attraction of the plot, the appeal of the performance and the overall artistic effect of the presentation. The attention paid to the scenery and lighting was 24.67% and 21.05% respectively. These two elements are very important visual elements in stage performances, which can create different atmospheres and scenes and enhance the audience's sense of immersion and viewing experience. In contrast, Fu Huadao and actors received lower attention, 7.24% and 5.59% respectively. This does not mean that Fu Huadao and actors are not important in stage performances, but it means that when the audience pays attention to stage performances, they pay more attention to the overall visual effects and atmosphere creation, rather than a single element or character.

5. Conclusion

In the context of the new era, this article uses diffusion models such as the Bass model to reasonably control conventional variables in the diffusion process, and can predict the future propagation direction of new things. The model considers the impact of mass media and word-of-mouth communication on the spread of personas, distinguishing the different roles of innovators and imitators. Through the assumptions of the Bass model, the approaches and strategies for its integrated development can be further explored. The research results show that the audience pays a lot of attention to the stage characters, of which 25.86% are regular followers and 57.35% are occasional followers. The audience is most concerned about visual appreciation and the creation of the overall tone and atmosphere, accounting for 33.52% and 28.96% respectively. The audience paid the highest attention to the performance effect, reaching 41.45%, which illustrates the importance of the integration of the stage environment and character design.

Acknowledgements

Ministry of Education Industry-University Collaborative Education Project: "Construction of Women's Dress Style Research Base Based on Dotted Line Reality Technology from the Perspective of Cultural Identity" (Project number: 231002807274654)

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