THE VIRTUAL EXPRESSION MODE OF EXHIBITION
IN LUOYANG FOOD CULTURE DIGITAL EXHIBITION HALL

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This is a project based on user experience research on the display of digital pavilions, using the themes of Luoyang food culture and virtual exhibition design and the principles of digital media design. The composition, current situation and display effect of Luoyang food culture are analyzed, as well as the government's policy direction and the development status and influence of digital display technology with the development of science and technology.

Keywords: food culture; digital pavilion; virtual exhibition; visiting experience

Introduction

Food culture is a very complex collection of phenomena of human production, life and activities, which are related to almost all other areas of human culture to varying degrees. It is no exaggeration to say that the culture of any country and a nation is to some extent and in a sense subordinate to their respective food culture.

Dr. Sun Yat-sen, the forerunner of the modern revolution, once said in his book "The Strategy for the Founding of the People's Republic": "After the evolution of China's modern civilization, everything has fallen behind people, but the progress of food and drink is still
beyond the reach of all countries." In fact, China's food culture also refers to the food lifestyle of Chinese people. For Chinese, "eating" is not only a simple meal to quench thirst and hunger, but also often contains the thoughts and philosophies of Chinese people when they know and understand things. In China, this culture of "eating" has gone beyond the matter of "eating" itself, and it has been given a richer and deeper social meaning (Hu, 2014).

As an important part of social life, food culture varies with the social changes, lifestyles and customs of Luoyang City. In the long process of social life development, the current food culture with strong local characteristics in Luoyang has been formed. In recent years, Luoyang, as one of the first batch of national historical and cultural cities and a famous tourist city at home and abroad, with the vigorous development of tourism, tourism catering, one of the six elements of tourism has an increasing impact on the tourism development of the destination.

According to a report released by the World Tourism Organization, more than 1/3 of the travel expenses of global tourists are spent on food, and the food in tourist destinations is an important aspect that determines the quality of tourism experience. France, Mexico, Japan and other countries are playing the food economy card and attracting world attention by applying for food heritage. China's Chengdu, Yangzhou, Macao and other cities have been rated as Creative Cities of Gastronomy by UNESCO, which not only improves the city's popularity, but also enhances the city's attractiveness.

With the rapid development of the Internet era and the innovation of computer industry technology, more tourist countries or cities have launched food culture themed museums or digital exhibition halls to promote the food culture of tourist destinations and have received good responses from tourists. Such as: China Beijing Roast Duck Museum, Hangbang Cuisine Museum, Chengdu Food Culture Museum, Portuguese Bread Museum, Japanese Ramen Museum, etc. Compared with other tourist cities, the communication and development of food culture in Luoyang has been relatively weak due to various reasons.

The authors believe that this research can not only analyze and study the advantages of the development of Luoyang food culture, but also promote the rapid development of Luoyang food culture by adopting the virtual exhibition of the digital exhibition hall that tourists like.

**Research objectives**

1. Study the composition and development status of Luoyang's food culture.
2. Investigate and analyze the current application status of the digital exhibition hall and the audience's evaluation and tendency of the digital exhibition hall, and design a virtual representation method for the exhibition of the Luoyang food culture digital exhibition hall.

**Literature review**

"Luoyang Food Culture" comes from "Looking at Luoyang Food Culture in the Northern Wei Dynasty from "Luoyang Jialan Ji". Although there are some physical museums with the theme of food culture in Luoyang City, the food culture has not been fully excavated, packaged and publicized. With the improvement of people's consumption level, tourists increasingly hope to experience the distinctive food culture of the tourist destination.

However, during the development of Luoyang's catering industry, some catering enterprises have neglected the excavation and development of delicious local delicacies, and
lack of excavation and refinement of the connotation of food culture. It is inevitable that it is difficult to improve tourists' consumption experience of tourism and catering, and it is also difficult to have a deep understanding of Luoyang's food culture. In addition, Luoyang City's tourism promotion has not yet regarded tourism and catering products as the basic composition of the overall tourism products, and the promotion of Luoyang's food culture has been weak, which has affected the comprehensive economic benefits of Luoyang's tourism industry (Zhu, 2010).

"Virtual Exhibition" comes from "VR/AR Technology Empowers Natural History Museum: Research on the Application of Virtual Exhibition Design". Since its emergence in the 90s of the 20th century, the digital museum has been considered to be a museum that digitally expresses the functions of general museums, such as collection, display, research, education, and entertainment. The basic definition of digital museum is: an information service organization that processes, processes, reorganizes, and disseminates knowledge related to natural or cultural heritage to the public with digital technology, form and unified digital resource standards (Gong et al., 2015).

**Scope of research**

Based on the combination of computer technology and museum exhibits to build a digital pavilion, the research on the virtual display of the digital pavilion with the theme of Luoyang food culture is carried out.

**Population and sample group**

**Population**

Practitioners of the Luoyang catering industry, staff of Luoyang Museum, staff engaged in the research and development of virtual exhibition hall technology, domestic and foreign tourists.

**Sample group**

For the above four types of population selection methods, the form of main interviews and random electronic questionnaires are mainly used to collect and analyze sample information. Two to three representative figures were selected for each type of population interview, and the number of data collected and analyzed on the experience tendencies of digital exhibition halls in the form of random electronic questionnaires for domestic and foreign tourists was estimated to be more than 100.

**Research methodology**

**Research framework**

The main object of research in this paper is Luoyang food culture. The publicity method and effect of the traditional physical Luoyang Food Culture Museum, through this medium, we link the virtual digital exhibition hall with the development of social needs to study the expression of virtual exhibition. The research framework is shown at Fig.1..
Research results

Composition and development status of Luoyang food culture

Culture is the soul of a country, a region and a nation. The city is an important carrier space of culture, and the unique explicit image or IP image of a city and the spiritual outlook of the city are all derived from the urban culture, developed in the urban culture, and displayed in the urban culture.

The Heluo culture nurtured in the Heluo area is an important core and birthplace of the Yellow River civilization, and it is also the mainstream culture of the Chinese nation. As an important part of Luoyang's traditional culture, Luoyang food culture not only witnesses the changes of Luoyang City, but also serves as the life guidance and spiritual sustenance of Luoyang people. Through the analysis and research of the historical origin, development and formation factors of Luoyang food culture, it is found that Luoyang food culture can be traced back to the first dynasty of China, the Xia Dynasty or even earlier. Cooking utensils in the Luoyang region were also further improved during the Xia Dynasty to the Eastern Zhou Dynasty, when the government also began to pay attention to the culinary industry and institutions. Since then, Luoyang food culture has begun to develop rapidly, providing a good beginning for the formation of Luoyang food culture, which is now precipitated with the traditions and life characteristics of Luoyang people.

During the Eastern Han Dynasty, the Silk Road was opened, and cooking methods were further improved and enriched on the basis of introduction and integration. During the Wei and Jin Dynasties, China carried out a great integration of nationalities at that time, and the dishes, utensils, and seasonings brought by different nationalities enriched and innovated new foods and dishes. After Emperor Xiaowen of Wei moved the capital to Luoyang, with the Sinicization reform vigorously promoted by Emperor Xiaowen, Luoyang’s diet was gradually influenced by the food from the Western Regions. During the Sui and Tang Dynasties, through the opening of the Sui and Tang Grand Canal, cross-regional business exchanges laid the foundation for the prosperity of Luoyang’s catering industry.
**Factors influencing the formation of Luoyang food culture**

Through the analysis and research of Luoyang’s geographical location, climatic conditions, economic development and political tendencies of different dynasties, it is concluded that regional climatic conditions, economic development conditions and political inclination conditions are the key factors affecting the formation of food culture.

Regional culture is accumulated and formed in a long and long history. It has the material expression of carrying history and the spiritual connotation of its core value. The same is true of regional food culture. The material level of Luoyang’s food culture is mainly presented in water mats, soup, noodles, snacks, meat and so on.

Food culture is both production culture and consumption culture. In the era of commodity economy, catering enterprises, catering products and catering consumers constitute the operating body of food culture. Catering enterprises are the disseminators and pioneers of food culture, and food culture is the core of the catering industry.

The important support of the value system and the main driving force for sustainable development. With the rapid development of the catering industry, in addition to serving as a carrier for the inheritance and dissemination of traditional culture, the exhibition of catering culture should also play the role of cultural construction in the catering industry and build the cultural power and competitiveness of the catering industry.

**The propaganda status of Luoyang food culture**

The Several Opinions of the Henan Provincial Party Committee and the Provincial Government on Supporting Luoyang to Accelerate the Construction of a Sub-central City of the Central Plains Urban Agglomeration under the Guidance of Opening up clearly proposed to strengthen the protection and inheritance of Chinese history and culture and build an "Oriental Museum Capital".

It is the deepening, upgrading and prospect of the construction of "Museum Capital" in Luoyang City, echoing the new expectations of the construction of international cultural tourism city for the integration of museum resources into urban tourism resources, as well as the shaping of urban cultural background, the new fashion of cultural and scholarly tourism, and the new positioning of the international cultural exchange center, with an international vision and open pattern.

Food Museum, Luoyang Museum, Luoyang Sui and Tang Grand Canal Culture Museum, Luoyang Folk Museum and other venues, the main traditional display methods and types of Luoyang food culture are obtained.

Through the new media background of films, TV series, variety shows, documentaries, urban IP open packaging promotion and other contents to obtain emerging display methods and types.

**Propaganda effect of Luoyang food culture**

In the 80s of last century, with the reform and opening up and the gradual development of the catering and tourism market, Bai Guangdi, then executive vice mayor, and Zhang Shijun, vice mayor, presided over government meetings successively, specializing in the excavation of Luoyang water seats and Luoyang local famous foods, and introduced relevant incentive policies. With the opening of the tourism market, the food culture of Luoyang, the thousand-year-old capital of Luoyang, is promoted.
THE VIRTUAL EXPRESSION MODE OF EXHIBITION

At present, online hot words such as "Luoyang cuisine", "Luoyang diet", "Luoyang beef soup" and "Luoyang water mat" frequently appear in online short videos. It attracts many tourists to come to Luoyang to taste Luoyang food. Through short video interactive platforms such as Douyin APP and Kuaishou APP, and online video interactive platforms such as Bilibili, videos on topics related to Luoyang food have been cited as many as 1 billion times. From this point of view, the current spread effect of Luoyang food culture is still very hot.

With the vigorous development of Luoyang tourism, Luoyang food culture and catering industry has also achieved good development. Through the introduction of Luoyang water banquet culture such as water banquets, a variety of flavored snacks and the tourism data released by Luoyang City in recent years, it is concluded that Luoyang food culture has a good development momentum and a broad source market. Through the analysis and summary of the scale, publicity, environment, practitioners and catering categories of Luoyang catering market, it is concluded that the small scale of Luoyang catering market, the food culture has not been fully explored, the publicity is not in place, the catering environment needs to be improved, the quality of catering employees is not high, and the main specialty diet is existing food and inconvenient to carry.

**Design strategy of virtual expression mode of Luoyang food culture digital exhibition hall**

Museums have always existed as institutions for collecting, protecting and exhibiting the cultural heritage of humanity. The digital museum is a museum that presents the functions of traditional museum collection, display, education, research and other functions in a digital form. Food culture digital exhibition hall is a museum or exhibition that uses digital technology to present food culture through virtual display. In the digital exhibition hall, visitors can immerse themselves in the virtual scene to understand the history and development of Chinese cuisine, the regional characteristics of food culture, traditional specialties of different regions, traditional cooking skills, food cultural heritage, etc. In addition, the digital exhibition hall can also allow the audience to have a deeper understanding of Chinese food culture through interactive experience and education promotion (Ouyang, 2022).

Based on these functions and features, digital museums are becoming more and more sought after by tourists and audiences. These advantages of the digital museum can solve the current dilemma of the spread of Luoyang food culture.

**Statistical survey results and demand analysis of digital exhibition hall audience**

To analyze the needs of the exhibition method of Luoyang food culture digital exhibition hall, on the one hand, it is necessary to consider the characteristics of Luoyang food culture from the perspective of the display party, and analyze the purpose of the exhibition; On the other hand, it is also necessary to fully consider their motivation and aesthetic characteristics from the perspective of the vast audience.

Helping the general public improve their cultural literacy through digital exhibition means and letting more people understand the history and connotation of Luoyang food culture is the fundamental purpose of the exhibition mode of Luoyang food culture digital exhibition hall.
However, at present, the popularity of Luoyang food culture in the whole country is still low. Under such circumstances, how to attract more audiences to visit through reasonable publicity and display methods has become the primary issue of Luoyang food culture digital exhibition design (Yinwen & Ren, 2021).

Luoyang's food culture has strong regional and ethnic characteristics, and there are some differences with the traditional agricultural culture of the Central Plains. In view of these differences, detailed explanations are needed to help the audience understand the culture; at the same time, Luoyang's food culture is also the Heluo area. Therefore, it is also an important display requirement to make use of the advantages of digital communication to contribute to the improvement of the image of local food culture. Through the analysis of the audience's experience tendency, it is found that the purpose of the audience's participation in the exhibition of the digital pavilion varies from person to person, and entertainment, knowledge acquisition, etc. may be the reasons for the audience to visit. Acquiring knowledge is a high-level demand for exhibitors, which reflects the audience's desire to enrich their spiritual life.

Although in comparison, entertainment is still a relatively common purpose for audiences to participate in exhibitions, but unlike other forms of entertainment, what audiences hope to experience from museums is entertainment with a certain intrinsic value, and the entertainment provided by museums should not be separated from cultural communication.

Therefore, it is said that cultural and interesting exhibition content and methods can meet the needs of more visitors. Luoyang food culture has a wealth of intangible cultural heritage dishes, many of which are representative dishes such as Luoyang water mat, old Luoyang noodles, etc., which have a high degree of rarity and technical achievements.

The browsing of the origin stories and legends of the dishes, food ingredients, production process experience, and food recommendation lists will feast on the audience's eyes. At the same time, the dissemination of food culture knowledge can satisfy the entertainment and knowledge needs of the audience. In addition, it is not difficult to find during the tour of the museum and the survey that the most popular area of the museum is often the experience area of high-tech display equipment. It can be said that obtaining an unforgettable sensory experience and satisfying curiosity through advanced exhibition technology is also an important requirement for the audience to participate in the exhibition of the digital exhibition hall (Yu et al., 2021).

**Preliminary design scheme for the virtual representation of the digital exhibition hall**

According to the data analysis results of the questionnaire survey of the audience, the common virtual expression methods of digital exhibition halls, the preferences of tourists experience and the actual situation of Luoyang food culture, a total of three digital exhibition hall exhibition virtual display methods were screened out: naked-eye 3D projection exhibition mode, holographic projection stereoscopic imaging exhibition mode, panoramic virtual tour head-mounted stereoscopic display display mode, and four industry technicians and authoritative experts were invited to select.
THE VIRTUAL EXPRESSION MODE OF EXHIBITION

Table 1- Expert selection of the draft virtual expression of the exhibition of Luoyang Food Culture Digital Exhibition Hall
(made by co-authors)

<table>
<thead>
<tr>
<th>Exhibition plan Selection experts</th>
<th>Glasses-free 3D projection class</th>
<th>Holographic projection stereoscopic imaging</th>
<th>Panoramic virtual roaming head-mounted stereoscopic display class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jin Zhuo</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Zhang Yao</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Wang Xiangru</td>
<td>✓</td>
<td></td>
<td>✓</td>
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<tr>
<td>Wang Yanan</td>
<td>✓</td>
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</table>

Four experts voted with two votes per person based on the comprehensive evaluation of the characteristics of Luoyang’s food culture, the time of the construction period, the level of operating costs, the technical maturity and application of the three virtual display methods, and the results of the selection. The most voted for the naked-eye 3D projection display.

At the same time, four experts said that although the naked-eye 3D projection display method has the highest votes, the viewer's participation experience and interactive interaction are weak aspects of the virtual display method, and researchers need to improve the naked-eye 3D projection display method to integrate content that engages the audience in an interactive experience.

The organizational process and main content of the virtual exhibition design of Luoyang food culture digital exhibition hall

Five organizational processes for the design of Luoyang Food Culture Digital Exhibition Hall

Table 2 - Five organizational processes for the design of virtual representations in digital pavilions
(made by co-authors)

<table>
<thead>
<tr>
<th>Presentation layer</th>
<th>Functional exhibition Information-based exhibition</th>
<th>Functional exhibition Information-based exhibition</th>
<th>Specific</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Perceptual design</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frame layer</td>
<td>Interface design Navigation design</td>
<td>Interface design Navigation design</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Information design</td>
<td></td>
<td></td>
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<tr>
<td>Structural layer</td>
<td>Interaction Design Information architecture</td>
<td>Interaction Design Information architecture</td>
<td></td>
</tr>
<tr>
<td>Scope layer</td>
<td>Functional specifications Content requirements</td>
<td>Functional specifications Content requirements</td>
<td></td>
</tr>
<tr>
<td>Strategic layer</td>
<td>Audience experience needs</td>
<td>Showcase goals</td>
<td>abstract</td>
</tr>
</tbody>
</table>
The main content of the virtual exhibition design of Luoyang Food Culture Digital Exhibition Hall

![Diagram](image)

Figure 5 - Main content of virtual exhibition design of Luoyang Food Culture Digital Pavilion

(made by co-authors)

The structure and organization of the virtual exhibition design of Luoyang food culture digital exhibition hall

![Diagram](image)

Figure 6: Luoyang Food Culture digital pavilion virtual exhibition design information architecture

(made by co-authors)
Interaction design is more and more widely used in the exhibition design of digital exhibition halls, and visitors entering the digital exhibition hall of Luoyang food culture can use the handheld somatosensory control handle to view the display screen and information of the digital exhibition hall at any angle, and can complete personalized operations such as zooming in, zooming out, forward, and backward. It can also send barrage messages to interact with other visitors, and also play relevant background music to enhance the viewer's browsing experience.

**Technical Architecture of Virtual Exhibition System of Luoyang Food Culture Digital Exhibition Hall**

The technical architecture design of the virtual exhibition system of Luoyang Food Culture Digital Exhibition Hall mainly includes program modules to realize calibration, measurement, spatial matching, calculation, display and interaction. The system first measures the three-dimensional information of the wall of the room where the user is located, as well as the position information and angle information of the audience through the depth sensor, and then calculates the image content selected by the audience according to the command information of the audience on the handheld somatosensory handle, and projects it on the space wall through a panoramic 360-degree projector. In the operation process of the entire software system, the core part is the acquisition and calculation processing of depth data and audience instructions.

![Figure 7 - Technical architecture design of virtual exhibition system of Luoyang Food Culture Digital Exhibition Hall](made by co-authors)
Design conceptual scheme of virtual expression mode of Luoyang Food Culture Digital Exhibition Hall

According to the results of the audience survey and the characteristics of Luoyang food culture, combined with the advantages and disadvantages of various virtual exhibition methods, a combination of handheld somatosensory control handle + naked-eye 3D projection was finally proposed for food culture display. Through the combination of two devices, the solution of Luoyang food culture digital exhibition system for natural human-computer interaction.

On the one hand, such a solution realizes the display and interaction with a certain sense of immersion interaction and audience participation through a relatively simple combination of equipment, which meets the audience's demand for the novelty of display means and is also conducive to promotion and popularization.

It is suitable for small and medium-sized groups, educational institutions, exhibitions, experience halls and individual users, and is also suitable for remote joint exhibition between exhibition halls; On the other hand, this scheme has a large display area and makes full use of the exhibition space, which is very suitable for the exhibition of Luoyang food culture with many contents, wide categories and large volume.

The combination of handheld somatosensory control handle + naked-eye 3D projection can solve the contradiction between equipment cost, participation interaction and display effect to a certain extent, although it cannot be compared with the realistic three-dimensional sense of holographic projection stereoscopic imaging, nor can it be compared with the immersion of the panoramic virtual tour head-mounted stereoscopic display mode.

However, because the audience's viewing angle range is limited, only the area within the audience's field of view needs to be projected to obtain a better three-dimensional visual display effect. Similar to the real tour, the audience can move freely around the effective areas of the room for an exploratory, immersive tour. In addition, we use the glasses-free 3D projection screen and the handheld somatosensory handle to assist the audience in human-
computer interaction, so we only need to define some simple actions to complete a wide variety of command inputs. These two aspects will be introduced in detail in conjunction with the design concept map (Fig. 8).

**Imitation reality roaming tour method based on mapping projection**

In digital exhibitions, the size of the display space often has a great impact on the visual effect of the display. The virtual display method of this exhibition is to use a panoramic 360-degree borderless projection device. The walls of the entire space can be used as a projection surface, and the display range of the picture is no longer limited by the size of the screen or curtain. In this space, the audience can browse the display screens and information projected around in 360 degrees, and can play selected videos on the screen through the handheld handle, change the browsing order of exhibits, browse exhibit catalogs, view exhibits from multiple angles, and zoom in.

Minimize exhibits and interactive methods such as drifting bottles or barrage messages. At the same time, if it is in the free browsing mode, the audience holds the joystick to browse indoors. After measurement and calculation, the system can obtain the distance and angle relationship between the audience and the wall, and calculate the irradiation range of the projector on the wall. The corresponding picture within this range is generated in real time and projected on the wall. Users can move freely in the space, browse the pictures in different areas through the changes of the audience's position and angle, and perform exploratory and immersive "real scene" roaming.

**Human-computer interaction based on body sensing**

The virtual display method of this exhibition is to capture and feedback the position of the human body and the operation of the hand-held handle through the depth sensor, and project the corresponding picture on the wall, which can realize natural human-computer interaction based on body sensing. In many somatosensory interactions, the human body can move freely, but the eyes must always watch the fixed display to obtain real-time operation feedback. Different from these somatosensory interaction methods, since the content and position of the screen in this virtual display mode will change with the audience's moving position and the operation of the handle, the screen is in front of the audience's vision in most cases, so the audience does not need to stare at one position all the time, which does not hinder the audience's freedom of movement in the room. At the same time, since the walls of the entire room can be used as a medium for human-computer interaction, the system also has a larger operating space.

The audience's operating tools mainly rely on the hand-held somatosensory manipulator. When using it, the audience only needs to issue commands through the hand-held handle, and the system can automatically judge the user's browsing content, and then play the corresponding menu, screen, and voice explanation, background music, interactive messages or participate in interactive games to enhance the effect of the tour. It fully embodies the audience's sense of participation, immersion and interactive experience.

Prospects for the design of the virtual representation of the Luoyang food culture digital exhibition hall

The design of the virtual expression mode of the Luoyang Food Culture Digital Exhibition Hall has always been closely related to new technologies in the development process, and the virtual expression technology of the exhibition is no exception.
The use of virtual exhibition technology has played a huge role in promoting the development of Luoyang food culture, digital exhibition hall exhibition and even the digital exhibition hall industry, and the digital exhibition hall exhibition has always maintained an inclusive and accepting attitude towards the application of new technologies.

The development of technology is the result and characterization of the overall progress of human society and human civilization. In this context, the needs of the audience of Luoyang Food Culture Digital Exhibition Hall also present many new era characteristics, in response to such changes, the relevant design strategies must be updated in time. At the same time, the development practice of Luoyang food culture digital exhibition hall exhibition design also fully proves that the relevant technology and design can be integrated and developed, in the actual operation process, Luoyang food culture digital exhibition hall designers should be virtual exhibition and other related technologies and exhibition design as an ecosystem to look at, in the level of sustainable development of the whole system, promote the design of digital exhibition hall virtual expression and even the healthy development of the digital exhibition hall industry.

Results discussion

1. Throughout the research at home and abroad, many scholars and teams are studying Luoyang's food culture, and from the research dimension, most researchers are mainly biased towards the origin of Luoyang food techniques. There are few studies on the formation factors of food culture, the innovation of Luoyang's food culture, the impact of Luoyang's historical changes on Luoyang's food culture and traditional food meeting the needs of diners in emerging tourism markets, and the transmission mode of Luoyang food culture, and the research content of this part is also one of the characteristics of this paper.

2. Through the research on the development, dissemination mode, composition factors and exhibition mode of digital exhibition hall of food culture, and combined with the results of audience questionnaire survey, the combination of handheld somatosensory control handle + naked-eye 3D projection was designed and improved as the virtual expression of Luoyang food culture digital exhibition hall. Infiltrate food culture into various disciplines, and create cross-border cooperation in the fields of catering, art and science and technology. In order to further understand and analyze the innovation of Luoyang food culture, explore the characteristics of Luoyang food culture, and spread and develop under today's market economy and tourism economy. It helps researchers understand the influencing factors of the formation of Luoyang food culture, and provides more creative development ideas and forms for the innovation of Luoyang food to meet the needs of diners in emerging tourism markets and the dissemination of Luoyang food culture.

Conclusion

Based on the theme of Luoyang food culture and audience experience, this paper selects the virtual expression mode of the digital exhibition hall for research, and completes the relevant research work based on the system design principle.

Through interviews with the working staff of the digital exhibition hall industry and museums, the current exhibition development was investigated, and electronic questionnaires were randomly distributed to collect research information and data from the audience,
sufficient audience experience tendency information was obtained, and combined with the characteristics of Luoyang food culture, three appropriate groups of methods were selected, and industry experts were invited to comprehensively evaluate and select the three groups. Combined with the suggestions and actual situation, the selection method was optimized and improved, and the combination of handheld somatosensory control handle + naked-eye 3D projection was designed as the virtual expression of Luoyang food culture digital exhibition hall.

Through the research on the development, dissemination methods, constituent factors and exhibition methods of food culture, and the penetration of food culture into various disciplines, we will create cross-border cooperation in the fields of catering, art and science and technology. In the process of discussing the development of Luoyang food culture, let the rich Luoyang food culture achieve new innovation and inheritance.

Finally, through the four dimensions of participation, appropriateness, systematization and openness, the design of virtual expression of digital exhibition halls in the future is prospected. Inject fresh blood into Luoyang's regional cultural construction and play a beautiful Luoyang cultural business card.

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