



The Impact of Emotional Interaction Design on Museum Displays

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Abstract

Museums are a key platform for the development of human civilisation and are historically important. The advent of information and interactivity has brought new media into people's lives and has led to a huge shift in the way people think. This approach breaks with the traditional way of presenting museums and allows cultural communication to be presented to visitors in new and interesting ways. The interactive development of innovative interactions has broadened the direction of museum exhibits, engaging visitors to actively explore information and enhancing the emotional connection between exhibits and visitors. Museum exhibitions are gradually changing from a traditional service model to a development model with a special emotional experience. How to enable visitors to truly experience the historical stories and cultural context behind the exhibits through display has become the focus of museum design today. This paper investigates the impact of emotional interaction design in museum exhibitions through case studies and other research.

Keywords

Emotional Interaction Design, Museum Displays, Museum exhibitions

1. Introduction

With rapid economic development and the innovation of technological products, the 21st century is the era of information interaction in pursuit of user experience, and interactivity is one of the main features of the information era. Verplank and Moggridge coined the term interface design in the 1980s, but the concept only became popular in this century. The practice of designing interactive environments, systems, digital products and services is interaction design (Cooper et al., 2007). A museum is a place that carries the development process of human civilization and contains many rich and important historical objects. A museum is a comprehensive institution that undertakes research, exhibition, education, entertainment and other social and cultural activities and functions. The exhibits contain a wealth of information, and they function as a type of social education (Greenhill, 1991). In order to enable the public to better receive cultural information, museums have begun to attach more importance to their communication and entertainment while developing their in-depth educational functions. In that way, viewers can use both their hands and their brains during visits. The development of applied information and communication technologies continues to broaden the way museums design their exhibits (Nechita & Rezeanu, 2019). The role of museum educators is also changing, with museum managers acknowledging the need to find new ways to enable visitors to connect with collections (Johnson et al., 2012). The emergence of interactive means such as digital media art, virtual reality technology and motion sensing technology has broken the static, single and closed characteristics of traditional exhibits, turning museums into places that encourage people to actively participate and experience the history of exhibits in a real environment. In recent years, museum design concept has been transformed from the original object-oriented to

the current people-oriented, and more and more interactive design exists in museum exhibitions.

In the current century, people go to museums not only to obtain information through exhibitions; now the focus of attention has shifted to the experience that museum displays give them. The way a museum transmits information to the audience no longer goes in a single direction; now people are guided to actively interact with the museum and experience the history of the exhibits (Packer, 2008). In interaction design, the user's emotional response is extremely important, and product attributes contribute to the communication of positive emotions (Demirbilek & Sener, 2003). For example, animation, sound or virtual reality technology can be used to bring the exhibits closer to people. The purpose of museum exhibition design is not only to display the collections, but to create an appealing display environment through design (Swain, 2007) and to give the audience a feeling of satisfaction through the displayed environment. The goal of this essay is to illustrate the impact of emotional interaction design in museum exhibitions through theoretical research, case studies and other methodologies. Since thousands of exhibits are displayed in museums, a question truly worth studying is: How can technology be used to effectively express and convey the emotional information of the exhibits, so that visitors can truly experience the historical stories and cultural values behind the exhibits?

2. Literature Review

2.1 Limitations of current museum exhibitions

Exhibits are an important aspect of a museum's mission to engage and interact with the public (Falk & Dierking, 2016). Diverse sorts of displays have been used to display different themes throughout the history of museums (Bouquet, 2001). However, in order to highlight the exhibits in the traditional display method, museums pay more attention to functionality. The display method focuses on the display method of the exhibits. The exhibits are arranged in a certain space. Visitors can view the exhibits in a single planned route, mainly highlighting the artistic and aesthetic value of the collection. While displays can promote visitor involvement, they have major ramifications for how history and culture are perceived (Moser, 2010). This one-sided approach to information output may simplify how viewers feel about different museums. In addition to the different cultures of the collections viewed, the psychological states of people in such museums are similar and have no characteristics, so they cannot attract audiences for a long time. Not only that, the audience's memory of the exhibits in this environment is not deep enough. Although the museum highlights the status of the exhibits, it cannot make the audience interested in the exhibits and truly remember them.

2.2 The benefits of emotional interaction design in museum exhibitions

Nathan Shedroff, an expert in information interaction design in the United States, believes (2001) that consumers participate in the design process, and that companies use the service as the stage, the product as the prop, and the surroundings as the set, so that customers may have a beautiful experience while conducting business. Pine and Gilmore (2011) claim that experience is when people spend time in an inherently human way and obtain from it a series of memorable times in the process. It is, in fact, the lovely sensation that occurs in a person's consciousness when he attains a certain level of emotional, intellectual, physical or even spiritual development. Museum collections document the long history of nature and human beings. They have the authority to let people see the real situation, to let people aware of the significance of equality of individuals as a person of society, and thus to keep their minds healthy and happy (Low, 2004). Museums play a central role as tourist attractions; however, their main focus is education and conservation (MacDonald & Alsford, 1995). Museum communication strategy and activities that encourage participation should focus on new technology, innovative activities, and entertainment to optimise visitor experience and attract new audiences (Nechita, 2014). Combining modern science and technology with display items in order to disseminate information, and applying interactive design to museum displays, is a great way for a museum to better play its role. Its function is of great significance. For example, the branding process benefits the function of a cultural organization as a sensible communication strategy will sustainably build the museum's brand (Sophocleous et al., 2019; Briciu, G & Briciu, V, 2013). The use of interactive design can enrich the exhibition space effect of the museum, making the museum not only a place for display, but also a place for emotional interaction.

Due to the global spread of the COVID-19 pandemic in 2020, government imposed lockdowns to limit the spread of the disease, limiting people's ability to engage with others by preventing them from leaving their houses. Many people had to start working from home. To restrict the spread of the COVID-19 epidemic, some states in the United States imposed stay-at-home policies. By mid-April, those state-wide measures were already severely impacting

people's mental health (Adams-Prassl et al., 2020). As a place for people to relieve stress and gain knowledge, museums have faced both challenges and opportunities. The use of emotional interaction design on museum apps can help alleviate the mental health problems that people face and can also promote the development of cultures in different countries. For example, in August 2020, the Victoria and Albert (V&A) Museum hosted a very successful Chinese livestreaming tour on China's most popular livestreaming platform, which resulted in some interesting interactions. The audience was invited to not only explore the museum's various collections, but also to talk about the traditions, history and culture of the United Kingdom and China (Grincheva, 2022).

3. Discussion

Communication is one of a museum's main functions. All museums want visitors to be a part of the story, whether it is through interpretation, visitor involvement or communication. If museum communication is to be both a concept and a process, its theoretical formulation must be linked to a practical method (Nielsen, 2017). The communication between museums and visitors is split into three areas by interaction design: human-machine interaction, human-environment interaction, and human-human contact.

3.1 Interaction between humans and machines

Museum visitors are increasingly expecting a wide range of experiences, including enjoyment and amusement (Moscardo, 1996; Prentice et al., 1998; MacDonald & Alsford, 1995). Under the background of the development of multimedia technology, a rich presentation of media makes the interactive behaviour of visitors more frequent. The text guide design next to the exhibits can now be viewed or scanned to explain the exhibits. Appropriate use of multimedia technology as an interactive medium can pique viewers' interest while also achieving the goal of information transmission. But interaction design is not simply replacing traditional media with multimedia technology devices, because it may be counterproductive in practical applications. For example, there is an electronic virtual robot in the Suzhou Museum in China, and visitors may at first be attracted by the novelty of interacting with a robot. But when it displays information that requires a lot of reading, the small electronic robot can cause a crowd to gather, which slows down the dissemination of information and annoys the more impatient visitors.

3.2 Interaction between people and the environment

Interactions between museums and tourists are digested as museum experiences (O'Dell, 2007; Stamboulis & Skayannis, 2003). In addition to the use of interactive machines, the interaction method in the museum display design also uses installations to create a visual environment that can be perceived by the audience and can enhance the exhibition's appeal. Different environments can lead to experiences of different cognitive or emotional qualities (Garner et al., 1991; Sansone, 2009; Schraw & Lehman, 2001). For example, the National Museum of China combined projection technology and three-dimensional production technology for the classic painting *Along the River During the Qingming Festival*, which not only made the characters in the painting move, but also added sound, as if to transport viewers into a prosperous urban market thousands of years ago. A similar example is the Florence Nightingale Museum, which presents the true tale of Nightingale, 'the Lady with the Light', from her Victorian youth to her adventures in the Crimea, then to her years as a passionate crusader for health reform. In the United Kingdom, Nightingale is credited as the pioneer of modern nursing. Museum visitors are provided with a stethoscope set, allowing them to simulate what it is like to examine a patient's body as a nurse. This interactive method not only satisfies the curiosity of tourists but also pays attention to the emotional needs of patients.

3.3 Human-human interaction

Understanding human interactions requires more than analysing each individual's behaviour in isolation. Instead, it is the coordination of people in space and time that reveals the true nature of their collective behaviour (Stergiou & Poppe, 2019). Interaction is often two-way, and the behaviour of viewers during their visit will also affect other viewers. Museums can cleverly use this to design for interactive behaviour. At the Eureka! National Children's Museum, there are six fun and interactive areas for kids to enjoy. Curious children can learn about themselves the world around them in a series of hands-on exhibits at the museum. The museum not only allows visitors to touch the exhibits but actually encourages it. Children have the pleasure of talking to their peers while gaining knowledge in the museum. A similar example can be found at an exhibition in London's Tate Gallery, where artists Bob and Roberta Smith interviewed people living in Thamesmead, southeast of the rotation, and turned the conversations into 24 handwritten drawings. Visitors are allowed to listen to the thoughts of those who were interviewed.



<https://socks-studio.com/2015/02/08/along-the-river-during-the-qingming-festival-by-zhang-zeduan-12th-century-and-an-18th-century-remake/>

Figure 1. Along the River During Qingming Festival.



<https://www.katapult.co.uk/10-of-the-best-interactive-museum-exhibition-ideas-for-curators/>

Figure 2. Florence Nightingale Museum.



<https://www.dayoutwiththekids.co.uk/attractions/eureka-the-national-childrens-museum-1b0115ef>

Figure 3. Eureka! National Children's Museum.



Figure 4. Tate Gallery in London (by the author).

4. Methodology

These research questions are based on background research and literature review issues as a guide for the design of research data-gathering procedures.

- 1) How can the experience of visitors to museum exhibits be enriched?
- 2) What is the impact of emotional interaction design on the experience of museum visitors?
- 3) During a pandemic, how can museums enable people to deeply interact online through interactive design?
- 4) How can emotional interaction design help people enhance their museum visit experience?

There are two forms of research analysis: qualitative and quantitative. Qualitative research seeks to gain insight into social phenomena. It concentrates on the 'why' instead of the 'what' of social processes, and It is based on people's personal experiences in their daily lives as meaning-makers. In the field of social science, quantitative research is the most common method of investigation. It is a collection of assumptions, procedures and methods for studying economic phenomena, psychological and social. Quantitative research collects a large amount of numerical data (Ahmad et al., 2019). Jick (1979) claims that different research methods can be chosen to understand the underlying logic of things. For example, qualitative research can explore things in depth or be used where conceptual understanding or existing research is lacking. Simultaneously, the appearance of quantitative research suggests that the research topic should be tested conceptually or interpretively. The use of multiple research methods should complement each other rather than inversely, which is an efficient cross-validation tool (Richardson & St Pierre, 2003). Therefore, this paper chooses qualitative research and quantitative research to study the impact of emotional interaction design on museum displays.

Instead of focusing on the quantity of observed features, qualitative research concentrates on understanding the essence of the research issue (Strauss & Corbin, 1994). How much the emotional interaction design affects the tourists visiting the museum is the essence of the problem to be studied, so the qualitative analysis method can be used for question 2 above. Case studies allow researchers to get a comprehensive understanding of a research subject and may aid in the description, understanding, and explanation of a research question or circumstance (Baxter & Jack, 2008; Tellis, 1997a; Tellis, 1997b). The impact of interaction design on museum display design can be better studied from published case literature. Dahl et al. (2013) conducted two sets of studies in two high-north museums in Norway and concluded through the interest development model of Hidi and Renninger (2006) that interactivity in the design of exhibitions can have significant cognitive and affective effects. They further suggested that future research on museum exhibitions could design more interest-focused features to deepen people's experience of museum visits. In addition, ethnography is a type of qualitative analysis that can be used to analyse this issue. Ethnographic studies

are generally considered to be a more reliable source of data in research and analysis (Edgerton & Langness, 1974). Da Silva's (2010) observational analysis of the Horniman Museum shows that the descriptions of different ethnic groups and religions in museums can be a visible and powerful way of showing differences within societies. It may be utilised to foster a better understanding of the community's various cultural customs and religious traditions. However, the extent to which such a description achieves this will depend largely on the museum's exhibitions and, most importantly, on the means provided to support the exhibitions. But ethnographic research methods also have some problems. They require quite a bit of data, for example, and the studies are actually very short and narrow in scope (Shaffer, 2017).

Quantitative research is used to observe phenomena or events that affect an individual. Quantitative research includes questionnaires, observational methods, experiments, etc. The answers to the questionnaire obtained from open-ended questions can be used as objective numbers and trends in the research results to give a human voice (Ahmad et al., 2019). For questions 1 and 3, a questionnaire can be used. Question 1 is in the form of a questionnaire to find out people's travel experience when they use emotional interaction design in museums. Question 3 can be used to study how people prefer to use smart devices to interact with the museum online during a pandemic. In observational research methods, researchers observe a specific aspect of human behaviour as objectively as possible and record the data (Williams, 2007). For question 4, an observational analysis method can be used. By observing records of people's interactions with exhibits in museums, we can draw conclusions about which emotional interactions people prefer when viewing exhibits in museums. In the future development of museums, management can be improved according to people's interests and experiences.

5. Conclusion

In the information age, interactive technology has brought new possibilities to the exhibition methods of museums. The interactive display method brings a more realistic visual effect. The experience mode that pays attention to human needs causes interaction design to change the single display method of traditional art museums, and it increases the communication and interaction between the audience and the exhibits. In the future, museums will become display areas where science, technology, culture and art are integrated with interactive design. In museums, people learn about the history of human social development through scientific and technological means. Interaction design will be more widely used in museum displays. It not only brings new methods for creating displays, but also promotes new methods of communication, promotes the integration of technology and art, and brings more developmental experience and effects.

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