The Research of Applying Interactive Design for a New Experience into Taiwan Traditional Matsu Culture

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Abstract. This research explores the use of electronic media in cultural related exhibition. It uses "Matsu Monopoly" interactive projection device as an example. Matsu Monopoly is an easy use device which allows people to understand the culture and the history of Matsu. Through the dynamics, images, and texts, visitors in the video, it will impressive the visitors for a strong visual feedback. We hope visitors will interact with the device, and profound experience a variety connotations of the Matsu culture in order to learn new knowledge from the game.

Keywords: Interactive device · Virtual experience · Interactive technology
Matsu culture

1 Introduction

The culture contains the relationship between peoples. In other words, it's the process of human evolution, many historical cultural products and ancient ceremonies are spread. The value of the culture will be changed by the interactive designing device. Human and environment should strengthen communication between each other. However, the essence of the design is not only the pursuit of beautiful shapes. Contributions should be made to the dissemination of the culture.

In a rapidly changing environment, people are used to be attracted to dynamic exhibitions. Computer networks and information technology continues to be developed and people began to have many activities in academic research and dynamic exhibitions. This new experience is to introduce Traditional Matsu culture into an interactive design. We hope to bring new creative idea and communication. It is also another new symbolic representation.

Many people in Taiwan are slowly moving into the coastal areas. Therefore, many Matsu temples are built in the coastal areas. The Matsu Patrol and Pilgrimage in Taiwan was selected as Intangible Cultural Heritage in UNESCO (United Nations Educational, Scientific and Cultural Organization), and also was listed as the world's three major religious events in Discovery Channel.

We developed an interactive device by using a large map and large dice of a "Matsu Monopoly" as the basis. When dice is out of points, participants can go forward on the map. This research combines digital media technology with traditional Matsu culture, and use the technological interaction to spread cultural values. The purpose is to achieve educational and entertainment. Research through the design of a virtual interactive system, and it is similar to the traditional Monopoly game combination. Feel fun of realistic scenes in the virtual environment.

In this study a large-scale multiplayer parent-child interaction device as cultural communication. The objectives of this study were as follows:

- To design a multi-person and large-scale interactive device for parent-child, and to uses a concept of edutainment as cultural exchange. Device was proposed to provide customers with a device that enables them to enjoy the fun of an interactive experience. In addition, there is a different experience from the traditional practice of the past.
- Through the device can solve the busy people and they can also experience Matsu culture on weekends and this can solve the problem of time limit. The interactive device is an exhibition-style experience. It is different from the activities of the traditional Matsu Patrol and Pilgrimage, and there will be no bad weather or rain and work can't participate in activities of question.

2   Literature Review

There are many interactive technology design products are being developed in today's society. They are even used in large quantities in daily necessities. These interactive technology products are slowly changing people's visual habits. This research will be introduced through interesting interaction, and it makes people more relaxed and joyful learning culture and history.

2.1   Interactive Device Design

Ye in "The Principles of Interaction Design in the Post-digital Age" put forward "Triple E" indicators. It includes effective, easy and enjoyable [1]. Interactive design is to convert information into a simple and clear guidance. It creates an interesting process which motivates the people to learn.

The interactive system combines interactive design and culture feature. The interactive exhibition is to use projector to cast screen to the wall. They use for large-scale interaction in the field. In my opinion, interactive technology is to use computer technology, cultural and artistic performance all three combine together. It becomes an interesting form to present.

Although, it is a game, however, in the process of using interactive design, it spreads history and culture. Interactive design takes people's needs and cultural experience as the central consideration. It combines technology and art design as a link between people and people or people and devices. People will enjoy exploring cultural history during playing the game.

2.2 Virtual Experience

The virtual experience is to integrate and improve the existing technologies of sound, video, drawing, and text. It allows users to feel "live experience" without having to onsite visit. Ho (2005) once published that exhibition space is to create a situational experience space conducive to learning [2].

According to "Peripherals" and "Showing Methods", we can categorize Virtual Experience into "Desktop Emulator" and "Projection Virtual Reality" [3]. This research uses a large projection screen, with the projector and stereo sound output device. Projecting the entire scene, surround the user to create some kind of interactive experiential learning.

The rapid progress of science and technology and the concept of interactive technology are also emphasized. Many products in life through interactive technology and bring more convenience to people. Through the interactive technology to applying users receive information from one-way for Become a two-way communication with the operator. The core of interactive technology is human-oriented and humanity [4].

2.3 Interactive Technology of Case Studies

Interactive Technology is an innovative application technology and the combination of aesthetics, culture, technology and science. A good interactive device will attract users' attention and participation. Dix, Finlay, Abowd, and Beale (2004) also mentioned that the device wants good interaction and it is necessary to design the system with the user as the center. Let users quickly obtain information and with the add to user interaction of computers, projectors, sensors, etc. [5].

An interactive system consists of four parts: perception, display, control and feedback [6]. Humans understand computer status through computer display and self-perception and change the state of the computer through control and feedback [7]. For now under the general to uses of computers and computer science is closely related to the daily life of modern people and the importance of being deeply studied and explored of Human-Computer Interaction [8].

So, interactive technology is an important learning for humans and computers and people will get more different experiences through interactive design. Research is the following classification of several cases to discuss:

2.3.1 Hello, Miss Lin International Goddess Digit Dajia Matsu Pilgrimage (The General Association of Chinese Culture No. 1, 2017)

This exhibition uses projector with interactive technologies instead of using the traditional way to demonstrate the culture of Matsu. Figure 1a, we use a 12 m long projector

wall to show and explain Dajia Matsu Pilgrimage. Interactive device through the touching system, you can have a dynamic interaction with the visitors. Figure 1b, there is an interactive experience area next to the palanquin. When visitor steps on the floor, it will produce the effect of smoke and firecrackers.

(a)   **(b)**

Fig. 1. Visitor interaction experience (Source: **The general association of Chinese culture, no. 1**)

2.3.2   Stamps of Landscape - NATIONAL PALACE MUSEUM 'Activities of the Twelve Lunar Months' (QIAN LONG GHAO 2015)

This device was made by using "Activities of the Twelve Lunar Months". The display we can see was composed from mountain, water, cloud, flower, tree, house, and people. It uses an "Augmented Reality" technology which allows visitors to manipulate the elements of mountain or water by themselves (For example, Fig. 2a and b).

(a)   **(b)**

Fig. 2. An interactive wall that gives visitors a sense of time and space (Source: **Qianlong C.H.A.O. New Media Art Exhibition**)

2.3.3   National Palace Museum Digital Art Exhibition (Bright Ideas Design - Tang Dynasty Painting of Ladies, 2011)

The interactive device has a round button that can be used to measure people's weight. When people step on top of the button, the device will measure the weight and send the info to the computer. There are three buttons respectively stand for Taipei, New York and Paris. Use the button; it will represent the three different regions. There is an infrared sensor located on the right side of the exhibition. Figure 3a and b, adding some modern society elements into this picture (Table 1).

Fig. 3. Adding some modern society elements into this picture (Source: **Bright Ideas Design**)

Table 1. Interactive device design and organized

Works/Exhibition	Era	User interface	Display	Virtual content/ Feedback
Hello, Miss Lin/Hello, Miss Lin International Goddess Digit Dajia Matsu Pilgrimage	2017	Hand, Foot Touch Button	Projector	Floor interactive projection, Analog fireworks surround
Stamps of Landscape - National Palace Museum 'Activities of the Twelve Lunar Months'	2015	Augmented Reality, Gianlong Emperor Seal Button	Projector	Experience Gianlong emperor use the seal fun
National Place Museum Digital Art Exhibition	2011	Round Button	Infrared Sensor	Experience different times of fun in the area

The examples above are all used to the projection virtual reality. To uses a large projector screen, and projector to give the exhibition a new atmosphere of interactive experience.

2.4   Matsu Culture

The main culture for Coastal area is Min Nan culture. There are many ancient stories talking about how Matsu rescue people from the sea. People believe, when their life in dangerous in the ocean, Matsu will save them if they pray to her. This culture is slowly becoming people's faith. She is people's god; people believe in her and follow her.

People rely on Matsu, through the faith of believing Matsu will be able to educate people's mind. Therefore, it became a regional of the cultural phenomenon. Han (2006) had proposed a culture wants to continue to exist and develop and it needs continuous innovation and breakthrough [9]. This research is based on the interactive device of Matsu culture. Through the game, people will know more about the culture of Matsu.

3   Method and Prototype

3.1   System Design Concept

This interactive device experience allows visitors to operate on their own. The operation is easy to understand and it gives user a deeper impression through the images, words or videos of the visual communication. In this game, we experience the culture of Matsu. This game uses two of the 3E concept, "Effective" and "Enjoyable". The production process is to collect the information of the temple culture and make a video. The video contents are the cultural elements and it is used in the game.

3.2   Interactive Interface and Interaction Device

The first zone is the screen projection area. The main purpose for this area is let user to watch the virtual scene of the temple. The second zone is the interactive device of the map and dice. First of all, the game begins at the start point on the map. The visitor will hold a large dice and roll it on the round, how many numbers they get, then how many steps they move forward. After visitor move forward, if they stay on top of the temple spot on the map then they can step on GamePad button to trigger the system to send the information to the computer (Fig. 4). At the moment, the big screen on the wall will begin playing the temple's feature films. The person whom first arrives the final spot will be the winner of the game. Competing each other will let people have better interactive experience and fun.
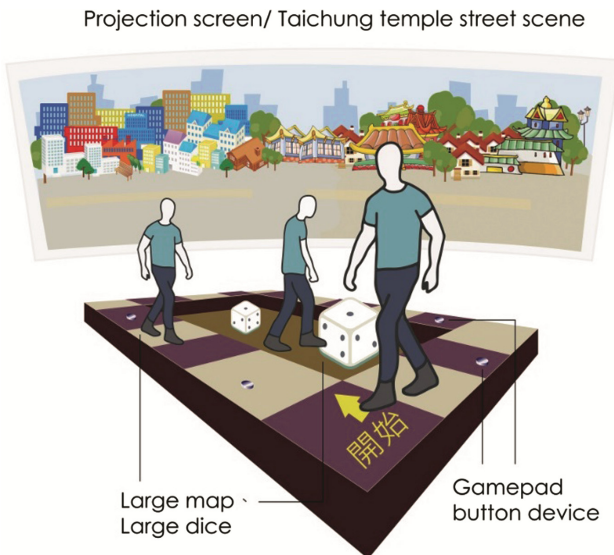

Fig. 4. System diagram

3.3   Interactive Vision

3.3.1   Large Projection
The research exhibition is open space and takes the big screen as a focal point. Visitors can learn more about the culture of Matsu by watching the temple video.

3.3.2   Large Map, Dice, Poetry
Visitors get a chance or a fortune card by rolling the dice, as shown in Fig. 5. They learned about the activities or allusions of the temple from the question in the card. The first player who arrive the final destination is the winner and also learn the new knowledge from the cheerful interactive game.

Fig. 5. Opportunity card

3.4   Interactive System and Interactive Operation Process

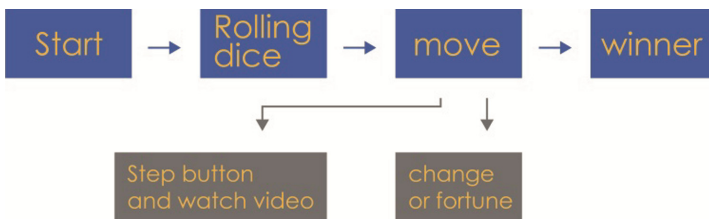The final winner will get a small gift (Fig. 6).

Fig. 6. Diagram of interactive process

4   Public Exhibition and System Evaluation

Kuan *et al.* (2007) put forward Scientific observations are based on researcher to finding phenomena of methods and systematically examine the course of events and people's reactions [10]. Li (2006) can also get results from observations and establish the theme of follow-up interviews [11].

When designers put the needs of users into their works properly and will increase the potential of the interactive system and it's easier for users to learn. Observing the

operation of participants during the public display of this research and ass ess user interface operations and user behavior.

It is a combination of projection wall and interactive maps, dice, poetry. It is a multiplayer interactive device game. To begin the game, from the "starting point", rolling the dice to determine who goes first. The game has many stages that player has to go through each of them in order to complete the game (Fig. 7a and b).

(a)   (b)

Fig. 7. Exhibition site interactive device

This research exposes exhibitions and is through observation methods to observe user actions and responses. We need an assistant to help people understand how to operate the interactive device. Interviewee said that if there is a clearer way to use the operation process, it will be more convenient to use the device.

5   Conclusion and Suggestions

Based on the above discussion and experimental study. Green and Jorden (2002) pointed out that design products can bring joy to users from aspects of physiology, society, psychology and thought [12]. Interactive design is focus on user's experience and feedback. Therefore, human-computer interaction experience is slowly being added to pleasure. It can be seen that interactive technology is a learning portal for enhancing communication between humans and computers and use new technologies to develop multiple human-computer interaction systems.

People in this exhibition must have assistant to help them operate the interaction device. People can play this game with their friends or family. Educate people to know the culture and let people have fun is the main propose for the Matsu monopoly. It can reach the concept of entertaining, but also highly praised by participants.

1. The research results are as follows: This research uses Gamepad and other simple electronic media, combined with interactive multimedia design for a new experience into Taiwan traditional Matsu culture.
2. Experiencer learns a lot of the culture knowledge through the device.
3. The interactive device allows the experiencer to be experienced without the limitation of time and space.

References

1. Ye, J.-R.: The Principles of Interaction Design in the Post-digital Age, p. 29. Artist Publishing, Taipei City (2010)
2. Ho, L.-H.: Shorten the distance of people and things - talk about interactive exhibition of museums. Palace Mus. Mon. **270**, 100–105 (2005)
3. Chao-Yun, L., En-Dong, L.: The development and types of virtual reality. Audiov. Educ. Bimon. **40**(3), 18–26 (1998)
4. Jung-Tai, L.: The essence and research of cultural and creative industries. J. Des. **16**(4), 1–5 (2011)
5. Dix, A., Finlay, J., Abowd, G., Beale, R.: Human-Computer Interaction, 3rd edn., p. 225. Prentice Hall, Haddington (2004)
6. Kantowitz, B.H., Sorkin, R.D.: Human Factors: Understanding People-System Relationships, p. 332. Wiley, New York (1983)
7. MacKenzie, I.S.: Human-Computer Interaction: An Empirical Research Perspective. Newnes, Amsterdam (2012)
8. Blythe, M., Bardzell, J., Bardzell, S., Blackwell, A.: Critical issues in interaction design. In: Proceedings of the 22nd British HCI Group Annual Conference on People and Computers: Culture, Creativity, Interaction, British Computer Society, vol. 2, pp. 183–184 (2008)
9. Pao-Te, H.: Han Talks About Culture, p. 84. Collection Art Family, Taipei City (2006)
10. Hsing-Sheng, K., Lu-Yin, J., Ming-Tang, W., Lan-Ting, W., Pei-Ling, L., Hsin-Fa, K., Li-Shu, L., et al.: Design Research Methods, p. 206. Quanhua, Taipei (2007)
11. Li, C.-H.: Qualitative Research: Design and Project Writing, p. 168. Wunanbooks, Taipei (2006)
12. Green, W.S., Jordan, P.W.: Pleasure with Products: Beyond Usability, p. 390. CRC Press, New York (2002). ISBN 9780415237048, CAT TF1185