PRESERVING AND EXHIBITING INTANGIBLE CULTURAL HERITAGE VIA VIRTUAL MUSEUM: A CASE STUDY OF THE HUNGRY GHOSTS FESTIVAL IN HONG KONG

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KEY WORDS: Intangible Cultural Heritage, Virtual Reality, Virtual Museum, Festival, 360-Degree Video, Photogrammetry

ABSTRACT:

This paper documents and reflects on the process of preserving and presenting the ICH in the form of a virtual museum by taking the case study of a China's national-grade intangible cultural heritage – the Hungry Ghosts Festival organized by the Chaozhou community in Hong Kong. The documentation, exhibition and interpretation in this virtual museum adopt a participatory bottom-up approach, in which the voices of the local organizers and participants are highlighted, and personal anecdotes are played up. The virtual museum intends to aggregate and exhibit all the elements of this ICH in one virtual space, including its origins and development, the tangible artefacts it entails, its dynamic and fluidic nature (e.g., ambiance, performance, communal spirits), and its multiple layers of meanings. As the Hungry Ghosts Festival celebration lasts merely a matter of days each year at a particular place for a local community, this virtual museum enables a wider public to access this festival at any time, in any place and from different dimensions. This paper shows how the virtual museum presents the aforementioned facets of the ICH through different display techniques and evaluates their usefulness, including (1) traditional text and image panels, (2) 3D reconstructed scene and models, and (3) 360-degree video. This is significantly different from the earlier work, which mainly focused on the accuracy of re-enacting the given form of intangible cultural heritage, such as performance and craftsmanship in a virtual environment, or a particular creative presentation by professional performers and elites with specific meanings.

1. INTRODUCTION

A major focus of research in Virtual Reality (VR) and cultural heritage is on the technological capacities for achieving a high-fidelity visualisation of tangible heritage objects and sites and creating an enhanced experience. Scant attention has been given to the use of VR in representing intangible cultural heritage and the evaluation of such experiences. Existing literature mainly focused on the accuracy of re-enacting the given form of intangible cultural heritage such as performance in the virtual environment (e.g., Kim *et al.*, 2019; Selmanović *et al.*, 2020). The use of the virtual environment in exhibiting ICH as living heritage, especially in displaying festive atmosphere and communal spirits, has largely not been attempted. These important aspects of ICH are hardly captured by traditional methods (e.g., photographs, videos and artefacts) in a museum. This paper explores how to preserve and exhibit intangible cultural heritage in the form of a virtual museum through the use of traditional means as well as VR technology. It documents and reflects on the process of constructing and curating the first virtual museum dedicated to a China's national-grade intangible cultural heritage – the Hungry Ghosts Festival by the Chaozhou community in Hong Kong.

2. BACKGROUND AND LITERATURE REVIEW

2.1 Hungry Ghosts festival in Hong Kong as China's National grade intangible cultural heritage

This section will first introduce the festival and how it has become an ICH. It then explains why a virtual museum with the use of VR technology is needed to document this ICH. The Hungry Ghosts festival originated from Buddhism in India and has been known as the Yulan festival in China. The origin of the festival highlights filial piety in which the central character, Mulian, saved her mother who was suffering in hell. It was said that Mulian's mother made misdeeds during her lifetime and therefore was punished in hell. Mulian rescued his mother from suffering in hell by following Buddha's instruction to offer ritual chanting and food offerings in the seventh month of the lunar calendar. It was believed that the festival was initially practiced by the emperor with Buddhist rituals in commemoration of ancestors since 538 AD (Huang, 2011). The festival has gradually gained popularity among the commoners through the opera performance of Mulian's story since the 7th century. Subsequently, Daoist rituals were added to the celebrations and new meanings of pacifying wandering spirits who have died of misfortune were added. Since then, the meaning of the festival has been expanded from commemorating ancestors to also including those who lost their lives to misfortune. Today, celebrations in different forms were found in various parts of Mainland China, Taiwan, Hong Kong, and overseas Chinese communities, such as those in Singapore and Malaysia.

In Hong Kong, there were at least 118 celebrations held in temporary structures at various public spaces by local communities of various ethnicities in 2014. The celebrations may range from 1 to 6 days, depending on manpower and funding available in each community. The cost of each celebration at a given site may rise to 140,000 US dollars. Ritual specialists are hired for their performance to pacify the spirits and purify the community. Opera performances are sometimes also conducted for the gods. Gigantic paper offerings are displayed. Incense, joss sticks, various kinds of paper offerings, as well as different foods are prepared for gods,

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The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, Volume XLVIII-M-2-2023
29th CIPA Symposium "Documenting, Understanding, Preserving Cultural Heritage:
Humanities and Digital Technologies for Shaping the Future", 25–30 June 2023, Florence, Italy

ghosts, and ancestors. The festive celebration is unique and also reflects the communal spirit. In 2009, the Hungry Ghosts Festival celebrations by the Chaozhou communities were recognized as Hong Kong's intangible cultural heritage (ICH). ICH includes "traditions or living expressions inherited from our ancestors and passed on to our descendants, such as oral traditions, performing arts, social practices, rituals, festive events, knowledge and practices concerning nature and the universe or the knowledge and skills to produce traditional crafts." (UNESCO What is Intangible Cultural Heritage? - intangible heritage - Culture Sector - UNESCO). In 2011, the Hungry Ghosts Festival organized by the Chaozhou community in Hong Kong was further inscribed as China's national intangible cultural heritage.

While this festival was extremely popular and was widely celebrated by the people in the past, the celebration has however been declining over time as a result of secularization, urbanization, and globalization (Chan, 2019, 2020). In view of the decline of this festival celebration, the virtual museum has therefore been constructed. It aims to document its celebrations, evoke collective memories of visitors, and attract the younger generation to gain interest in the ICH. Both tangible heritage relating to the festival celebration and intangible heritage are displayed in the virtual museum to show their interdependent relationship. This virtual museum uses multiple media to exhibit the Hungry Ghosts Festival in Hong Kong with reference to a celebration held by a local community during the Covid-19 pandemic in 2021. Traditional text, image panels, a 3D photogrammetry model, and 360-degree video display are used in the exhibition. With these items, the virtual museum contains immersive, experiential, and interactive features.

This virtual museum highlights the dynamic aspect of the ICH by showing how different local practices are performed and especially its adaptation during the Covid-19 pandemic in 2021. This is significantly different from the existing use of VR technology in documenting intangible cultural heritage which mostly focuses on documenting the best/perfect performance. Using digital technology, in particular photogrammetry and 360-degree video display, in documenting and exhibiting the festival which only lasts for a few days during a particular time of the year, also has the advantage of giving the locals the flexibility to view and appreciate the festival at any time and from anywhere. More importantly, the use of digital technology, such as 360 video clips, also captures the festival as a spectacle performed and participated by various people in the community. In sum, the immersive, experiential, and interactive features of the virtual museum also encourage visitors to perceive the emotions and communal spirits embedded in the celebration.

2.2 Existing applications of VR technology in the documentation and presentation of intangible cultural heritage

The applications of VR technology in cultural heritage sectors have been expanded from tangible objects, structures and sites towards intangible practices, expressions and skills. These applications yet concentrated on the material dimensions of intangible cultural heritages, such as costume, decoration and instruments (Tanaka *et al.*, 2010). However, association and interactions amongst peoples, objects, places or events were sparsely represented or restricted to static medium such as text and image. Recent efforts tended to acknowledge the human body as a "principal site of cultural repertoire" (Hou *et al.*, 2022, p. 3), attempting to capture the dynamics of intangible cultural heritage by encoding body moves and gestures into

choreographic patterns and mapping them on virtual bodies for users to watch and experience. Motion capture technology has therefore been extensively used to exhaustively document physical features, positions, rotations, joint angles and kinematic metrics involved in dance and martial arts performances, and craftsmanship (Kenderdine and Shaw, 2017; Aristidou *et al.*, 2021; Hou *et al.*, 2022). Digital archival and re-enactment of bodily performances may be unable to fully realise the living and fluid nature of intangible cultural heritage. Its liveliness and fluidity are also attributed to emotions, memories and communal spirit shared by those heritage communities. This issue is quite evident in intangible cultural heritage practices other than performing arts and traditional craftsmanship, such as ritual and festive events. Rituals and festivals have diverse and complex patterns which involve both individuals and collective, which have received less attention from the digital heritage research community. For example, in our case, the Hungry Ghosts Festival celebrations only last for a few days during a particular time of the year. They are participated by various types of people in local communities with different motivations in response to changing socio-economic contexts.

Recent studies have been dedicated to address the importance of personal and communal aspects of ICH. Among the few, the 'Geelong Digital Outdoor Museum' ('GDOM') project has integrated collective and personal memories from the community into places of public significance in the city and used its immersive VR application to safeguard the transmissions of those place-based memories and invite the public access and interpretations (Kocaturk *et al.*, 2022). In the virtual tour of the Tampines Chinese Temple in Singapore, personal narratives and historical archives have been superimposed on the space of heritage site (Mah *et al.*, 2019). In these examples, however, the intangible cultural heritage has been largely regarded as a supplementary layer to signify or interpret the built heritage sites. In terms of recreating the atmosphere and mobilising the memories and sentiments of audiences, the ongoing 'Moments in Time in Immersive Virtual Environments' ('MoTIVE') project that creates a virtual reality version of a 1983 concert with both band performance and audience crowd can be inspiring for digitisation of ritual and festive events.

3. METHODOLOGIES FOR THE DEVELOPMENT OF VIRTUAL MUSEUM

This section explains the methodologies adopted and delineates the unique features of preserving and displaying ICH effectively by virtual means. An interdisciplinary approach has been adopted and evaluated in this study, including both anthropological investigation and technological application. The first part of this section will introduce the content of the virtual museum. The second part explains the efforts to reach stakeholders of intangible cultural heritage (i.e., organizers of the festivals and participating locals in our case) in the process of constructing the virtual museum. It then reflects on the ways of probing into shared memories and conducting data collections and documentations with their full consent, which helped identify what should be captured and constructed as contents of the virtual museum (i.e., narratives, visual records, ritual objects, etc.). Taking into account the dynamic and fluidic nature of intangible cultural heritage, this study takes full advantage of the media-rich affordance of virtual reality technology. The third part introduces the multiple media forms used in our virtual museum to preserve and exhibit the Hungry Ghosts Festival, which include traditional text and image

The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, Volume XLVIII-M-2-2023
29th CIPA Symposium "Documenting, Understanding, Preserving Cultural Heritage:
Humanities and Digital Technologies for Shaping the Future", 25–30 June 2023, Florence, Italy

panels, photogrammetric models, 3D reconstructed scenes and 360-degree video. The advantages and shortcomings of these different approaches in preserving and exhibiting intangible elements will be analysed and evaluated.

3.1 Introduction to the virtual museum

This section will provide a brief overview of the workflow for virtual environment development, the appearance and layout of the Virtual Museum, as well as the contents and experience contained within. This Virtual Museum is developed in *Unity* (version 2020.3.20f1), an integrated development environment. According to the collected information, it was determined that six exhibition sections and a floor plan for the Virtual Museum were to be generated. For the exhibits, we organised the collected textual and imagery materials on the canvas in *Photoshop* (version CS2022) to generate texture maps and mapped them on the surface of 'exhibition panel' objects set up in the virtual environment. Based on the photographic records of a temporary altar and artefacts used in the celebration (taken by Canon PowerShot SX70 HS), photogrammetry and modelling techniques were used to reproduce the 3D models of these items by using *Agisoft Metashape* (version 1.7.1) and *Blender* (version 3.0). The model of the altar is placed directly in the virtual museum. The display of the model of ritual artefacts mimics the way used in the festival, where each artefact is placed on a support platform but without a glass case. In addition, an ongoing ritual event was captured by a 360-degree spherical camera (Insta360 Pro II) and its built-in mics. A 5-second 360-degree video clip with 8K image resolution and ambisonic audio was subsequently generated for the virtual environment. Once the virtual scene was ready, AltspaceVR uploader package (version 2.2.19) was installed in our Unity project and was used to upload it to the 'world' created in AltspaceVR website (https://altvr.com/). The virtual museum was then published on AltspaceVR platform. As long as the user enters the designated code, they can access the Virtual Museum with different levels of immersion through multiple interfaces, which include PC (website), Oculus headset, and VR cave. Multiuser remote access and interaction among visitors (e.g., voice chat, emojis, selfies) are also supported.

The virtual museum is designed with six galleries, whose layout is illustrated in Figure 1. The first section introduces the project information and provides users with a pictorial instruction for all the actions allowed in the virtual journey. The next three galleries illustrate the historical development of the Hungry Ghosts Festival through visual archival materials (i.e. old newspapers, photographic records), animations, and videos. A comic explains the religious origin of the Hungry Ghosts Festival (see Figure 2). A cartoon-style animated video is displayed to explain how people celebrated the festival outside their houses on the streets in the old days (see Figure 3). It will automatically play when the users approach it. A series of exhibition panels with old photographs and newspaper displays show in turn the early celebrations of the Hungry Ghosts Festival at different local communities in Hong Kong. Next, old photographs are displayed to show the festival was celebrated in the 1960s to 1970s and 2012 in the Chiu Chow (ethnic) neighbourhood of Sam Kok Pier. Exhibition panels demonstrate that the Hungry Ghosts Festival celebrations conducted by the Chiu Chow community was listed as a Hong Kong's intangible cultural heritage in 2019, and national intangible cultural heritage in 2011. An adaptation of the Hungry Ghosts Festival at Sam Kok Pier under COVID-19 pandemic in 2021 subsequently displayed in Gallery No. 5 and 6. The Gallery No. 5 exhibits a virtual reconstruction of a temporary scaffolding

structure which encompasses an altar at a street corner where the festival ritual was performed during the Covid-19 pandemic. Next to the altar, an array of three-dimensional models of artefacts used in the festive celebrations are on display, with their names on the text panels (see Figure 4). The last gallery invites users to experience a 5-second 360-degree video in which Buddhist priests were performing ritual chanting at the altar at a busy street corner (see Figure 5). In front of the altar, people are gathered to make prayers and chat amongst themselves (see Figure 6). On one side of the temporary structure, pedestrians are walking through a narrow alley, which connects to a shophouse (see Figure 7). On the right side of the temporary structure is a busy road with cars passing by, and some who were praying and burning paper offerings across the other side of the road (see Figure 8). Event organisers were helping with the celebrations. While some participants were praying, others were chatting or watching the rituals or taking photographs.

Figure 1. The layout of the Virtual Museum

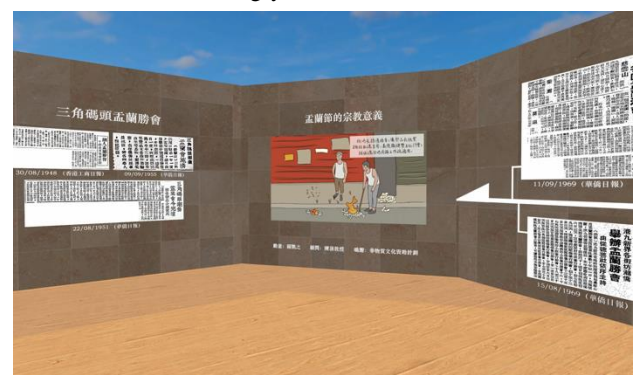**Figure 2**. The comic explaining the religious origin of the Hungry Ghosts Festival

Figure 3. The cartoon-style animated video that demonstrates how people celebrated the festival

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Figure 4. The reconstructed scene of a temporary bamboo scaffolding structure which encompasses the altar and ritual artefacts on exhibit

Figure 5. Entry view for the 360-degree video showing that Buddhist priests were performing ritual chanting at the altar at a busy street corner

3.2 A bottom-up approach and long-term anthropological fieldwork

The virtual museum is constructed by the first author through the use of data collected from her long-term fieldwork, in which she has conducted on-site observation and repeated field trips to more than 60 Yulan celebrations by different communities in Hong Kong since 2012. A long-term relationship with the organizers cum participants has also been established between her and the Yulan organizers. Information was collected from more than 350 in-depth interviews with various types of informants - organizers of the festival celebrations in different communities, men and women, young and old participants of the festival celebrations sites, as well as NGO representatives. In addition to the above information, the virtual museum also relies heavily on the information in a book and several journal articles on the festival published by her (Chan, 2015, 2018, 2019, 2020). A 30-minute documentary and two 5-minute short documentaries directed by her also contributed to the content of virtual museum. They are also part of the exhibit, which visitors can access and watch by scanning the QR code posters located near the exit of the museum.

More importantly, the Yulan organizers/ICH practitioners from local communities were also community partners during this project of constructing the virtual museum. As collaborating partners, these ICH practitioners provided detailed information of the celebrations, historical knowledge of the festival, old photographs, and personal memories of the celebrations. Memories of the festival celebrations recalled by them were

subsequently visualized in the form of comics and animations for display in the museum. Narrations of different ritual objects used in the celebrations were also sent to the organizers for confirmation and to ensure that the illustrations were accurate. Local organizers also helped to identify what should be captured and included in the virtual museum (i.e., narratives, visual records, ritual objects, etc). Not only was the permission from the organizers to take videos and photos during the celebration granted, but a detailed schedule was also provided by them to support the recording of rituals. In sum, the documentation, exhibition and interpretation in this virtual museum adopts a participatory bottom-up approach, in which the voices of the local organizers and participants are highlighted and personal stories are played up. Animations, comics and visual deliverables are products of co-creation by the anthropologist and the ICH practitioners. This has important ramifications for the questions of cultural heritage ownership and identities. This is significantly different from existing projects on digital documentation of ICH in which the teams in charge of the digital documentation usually had limited knowledge about the items.

This study also takes full advantage of the media-rich affordance of virtual reality technology in capturing ICH as a festival item and preserving its dynamic and fluidic nature. It aims to portray ICH as a "living" heritage, emphasise its lively aspect, as well as display the emotion and ambience of the festival. It visualizes how the special festival celebration is embedded as part of the everyday, busy street life in Hong Kong. By showing how locals struggle to creatively conduct a small-scale festival celebration during the Covid-10 pandemic in 2021, the exhibition highlights the resilience of the festival as an ICH and demonstrates how various ingenious alternatives were solicited by the organizers according to resources and opportunities available. The communal spirit continues to be observed in the common quest for peace and blessing, especially during the pandemic. The 360 video-clips also reveals how people in the community came together to celebrate in the temporary religious structure built in this period.

3.3 Analysis of different approaches to presenting the Hungry Ghosts Festival in a virtual museum

This section reflects on the strengths and weaknesses of the different approaches used in our project to preserve and present intangible cultural heritage. First of all, our project used the virtual museum as an overall approach to present the Hungry Ghosts Festival. The concept of the virtual museum emerged in 1947, long before the rise of virtual reality technology (Malraux, 2006). It was conceived to overcome the constraints of physical museums by expanding accessibility and innovating forms of communication (Styliani *et al.*, 2009). Digital representations of museum collections in varied media forms enable far greater flexibility in engaging audiences, conveying knowledge, and facilitating connection. As noted previously, the Hungry Ghosts Festival celebration lasts merely a matter of days each year at a particular juncture in local communities, with participation from the public with various motivations (Chan, 2018). A virtual museum thus proves an efficacious means of aggregating and exhibiting all information regarding this festival in one virtual space accessible at any time and from any place. The use of virtual reality technology in constructing and publishing such a virtual museum further furnishes visitors with immersive and interactive experiences.

Second, the Virtual Museum adopts three display techniques together to convey the Hungry Ghosts Festival, including (1)

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traditional text and image panels, (2) 3D reconstructed scene and models, and (3) 360-degree video. As introduced in the section 3.1, galleries No. 2 through No. 4 depicted the development of the festival briefly through written and photographic sources in chronological order. The aim was to emphasise its evolving character across sociocultural contexts and avoiding static projections. In addition to texts and images, a reconstructed 3D altar model based on the 2021 celebration was available to provide visitors with visual reference to learn about the temporary structure, the altar, and the ritual arrangement. One may examine the bamboo scaffolding structure (related from another ICH item under the category of skill) from different angles in the virtual space. Visitors also hear the ritual chanting once they get close to the altar and understand the specific arrangements of different ritual objects. Simultaneously, the 3D models of each object found in the altar were isolated from their functional context and were displayed independently adjacent. These items include the various offerings (e.g., flower, food paper offerings) and the incense burners representing gods and ghosts (i.e. wandering spirits of those who died of misfortune). Such display enabled close-up observation and appreciation of these ritual objects. More importantly, it also allows the visitors to understand the importance of tangible heritage (i.e., ritual objects) in facilitating the intangible cultural heritage - festival celebration.

While the 3D models in gallery No. 5 serves to primarily provide visitors an understanding of ritual objects - tangible heritage, 360-degree video record of the actual festival event in gallery No. 6 conveyed the pervasive communal spirit, revealing successive moments of performances and participation of diverse actors coalescing to celebrate. A processual approach of doing ICH is highlighted. With organisers enabling, ritual experts chanting, devotees praying and passers-by walking, the 360-degree video places users amid this 'doing' of the festival – with different people playing multifarious roles concurrently. This is also significantly different from most existing depictions of ICH in which the masters/elites were the focus in transmitting knowledge or performing skills or arts in an authorized way (Kenderdine and Shaw, 2107; Aritidou *et al*., 2021; Hou *et al*., 2022). Instead of merely revealing how ICH was interpreted/performed by the organizers and focusing on the religious meaning of the festival, the 360-degree video also unveils how various people in the contemporary city of Hong Kong appropriate this traditional religious festival with different meanings. The video depicts manifold activities conducted by spectators and participants of various kinds. It also enables visitors to understand how multiple layers of meanings are embedded in the festival further by showing the spatial context. Viewers are led to understand how ICH has been embedded as a part of busy street scene where passers-by and local community accept this as part of the "normal" cosmopolitan city life (see Figure 6, 7, 8). In sum, the virtual museum shows how different people in the community appropriate ICH with various meanings, whether as religion or cultural curiosity. This is particularly important for documenting an ICH festival item in which varying individual agency should be noted.

Figure 6. In front of the main altar inside the temporary structure

Figure 7. Left hand side of the temporary bamboo scaffolding structure which encompasses the altar

Figure 8. Right-hand side of the temporary structure

More than spectating isolated rituals or performances, being immersed in the 360-degree video is expected to bring a visceral sense of the festival and a palpability of collective dynamism. Rather than merely immersing users in a virtual simulation of a festival scene, we purposefully employed diverse techniques to facilitate accessing and perceiving the multi-faceted nature of the festival. Virtual reality technology has long been celebrated for achieving presence through Place Illusion (PI) and Plausibility Illusion (Psi), i.e. a sense of occupying the space depicted and events transpiring genuinely though recognizing nothing real occurs (Slater, 2009). This capacity can attract visitors and immerse them in the recreated event; yet exclusivity and misleading accuracy risks also emerge. Many academics (e.g., Reading *et al.*, 2021; Walden, 2022) have also expressed concerns about VR's persuasive power and highlighted the need to maintain the user's awareness of mediation and representation during the experience, for example, by using basic shapes and colours over mimicking full details to reconstruct past objects. Therefore, our Virtual Museum combined media to present multiple facets of the Hungry Ghosts Festival instead of simulating presence alone. It is not only intended to provide visitors with a virtual illusion of participation in the festival, but also to broaden the perspective available to them for viewing the festival. By employing

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various techniques, the Virtual Museum can reveal complex layers of meaning encapsulated in the intangible cultural heritage, from ritual objects and space to communal spirits and bonds, and the relationship between tangible cultural heritage to intangible cultural heritage.

The 360-degree immersive video encourages visitors to become active in choosing their own perspective to adventure into the scene while providing a realistic and experiential experience. It also allows the viewers to imagine their participation in the festival in the local community. Informal observation conducted as the project reached the public further provided practical insights on this. Users, especially the younger generation, were more inclined to enter the exhibition galleries featuring 3D models and 360-degree videos than to follow the historical accounts of the development of the Hungry Ghosts Festival. Regarding the display of 3D artefacts, audiences who reported positive experiences claimed to have been denied close viewing or to have found it creepy/unsafe in the actual physical site, yet the virtual engagement allowed for safer, more leisurely exploration. For the 360-degree video, young visitors tended to probe the bounds of the scene, attempting to transcend captured space. These preliminary findings suggest that the appeal of immersive technology has already preoccupied users' motivations, actions and perceptions upon entering the virtual world before the Virtual Museum's integrated display strategies come into effect. In addition to the critical reflection and sensory experience, the appeal of new technology itself also demands consideration.

4. CONCLUDING REMARKS

Based on a case study of the Hungry Ghosts Festival in Hong Kong, this paper has mapped out the insufficiency of using traditional methods in documenting and exhibiting intangible cultural heritage and the advantage of applying the novel technology of virtual reality in displaying a festival item of ICH. This article also contributes to the documentation of ICH by presenting a detailed methodological framework with an emphasis on the participatory bottom-up approach, in which local informants are heavily involved and consulted.

By using the 3D models to display the tangible objects related to the intangible heritage and the 360-degree video to reveal how people actually perform ICH, the interdependency between tangible and intangible cultural heritage is highlighted. Personal stories and emotions are also captured in animations, short video, and documentary in the museum. The 360-degree video also encapsulates the ICH as a living heritage - a celebration participated by different ordinary people with different motivations and multiple values. This is significantly different from most existing documentation and exhibition of ICH that record accurate movement acquisition or a particular creative presentation by professional performers and elites with specific meanings. Finally, the virtual museum also serves as a pedagogical tool for the transmission of knowledge to the younger generation and the public. The appeal of immersive technology to the younger generation also gives it the advantage in motivating them to understand in this ICH which lasts only for a few days annually.

ACKNOWLEDGEMENTS

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