

Research note

Management of immersive heritage tourism experiences: A conceptual model

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ABSTRACT

There is potential for immersive technology, such as augmented and virtual reality, to create memorable tourism experiences, specifically for heritage tourism. However, there is a lack of conceptual clarity surrounding the management of heritage for memorable tourism experiences. Subsequently, this research note proposes a four-stage conceptual model of heritage preservation for managing heritage into digital tourism experiences. The four stages include the presentation of historical facts; contested heritage; integration of historical facts and contested heritage; and/or an alternate scenario. This research note demonstrates that integrating history with cutting-edge technology in immersive environments has the potential to not only preserve and manage heritage but to enrich the visitor experience and subsequent engagement with history.

1. Introduction

Digital technologies are blurring the lines between the real and the virtual world, offering the potential to increase the level of immersion within tourism experiences (Jung, tom Dieck, Lee, & Chung, 2016). The virtuality continuum or the mixed reality spectrum proposed by Milgram and Kishino (1994) demonstrates the co-existence of the real and virtual worlds using virtual environment (VE) technology (Fig. 1). Specifically, virtual reality (VR) and augmented reality (AR) have the capacity to enhance visitor experiences both at tourism destinations, prior to visiting tourism destinations, and importantly for recollecting tourism destinations (Little, Patterson, Moyle, & Bec, 2018; Neuhofer, Buhalis, & Ladkin, 2014).

AR is a technology with the capacity to overlay the existing environment into a digital context, with applications including, though not limited to, text, video, images and 3D objects (Azuma et al., 2001). Through AR, 3D virtual objects appear to coexist in the same space as the real world. Virtual reality (VR) is a technology that creates virtual three-dimensional environments that can be interacted with in a seemingly real or physical way (Jung et al., 2016). Unlike television, video or books, VR provides greater interactivity and opportunities for sensory immersion (Schuemie, Van Der Straaten, Krijn, & Van Der Mast, 2001). As such, AR and VR provide new mechanisms to inspire interaction between the physical and virtual worlds (Ishii & Ullmer, 1997).

Mainstream application and investment into immersive technologies expected to exponentially increase (Baciu, Opre, & Riley, 2016), providing future opportunities for expansion within the tourism industry. Digital technologies are also emerging within tourism destinations to preserve heritage in an engaging way for future generations to enjoy and experience (Guttentag, 2010). However, despite the growing prominence of AR and VR in the tourism industry, limited research has been conducted to provide conceptual clarity not only how heritage can be preserved, but how often contested heritage can be transferred to the digital world. This research note explores the applications of AR and VR for heritage management and preservation in the tourism industry, noting how this technology can potentially enhance the tourism experience. A four-stage conceptual model will be presented detailing how immersive technologies can be used for heritage preservation within the tourism experience and for future consideration and debate in conceptually related contexts.

2. AR and VR: blending heritage preservation with tourism experience

AR and VR technology has been successfully applied within various subsectors of the tourism industry, where a key benefit is increased visitor engagement (Chang, Hou, Pan, Sung, & Chang, 2015; Jung et al., 2016; Kounavis, Kasimati, & Zamani, 2012). Considerable research in

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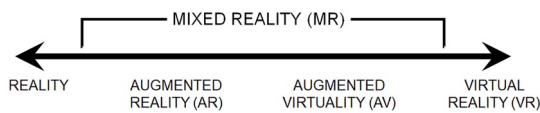


Fig. 1. Reality-Virtuality continuum (adapted from Milgram and Kishino (1994)).

this area has explored the opportunities for the technology to be further adopted by the tourism industry (Martins et al., 2017). To date, AR studies in tourism have primarily been undertaken for experience enhancement and interaction, where real scenes are enhanced by multimedia to provide personalized interactive information in a user-friendly interface (Jung et al., 2016; Kounavis et al., 2012). VR applications are emerging for marketing promotions, and to enhance and create memorable immersive tourism experiences in destinations, as well as off-site (Huang, Backman, Backman, & Chang, 2016; Neuhofer et al., 2014). Although increasingly expanding into multiple sectors of the tourism industry, there is limited conceptual grounding for which providers can leverage to create innovative immersive experiences.

Heritage tourism offers experiences that involve visiting or engaging with places, artefacts and activities which, although often contested, authentically represent the past. Heritage tourism can include cultural and indigenous history, natural resources stories and historic infrastructure and events (Gravari-Barbas, Bourdeau, & Robinson, 2016). Heritage interpretation for tourism experiences can be presented in many forms such as physical, digital and documented forms, and be located in-situ (on-site) or ex-situ (off-site). Social, economic and environmental benefits can be generated from digital heritage tourism if implemented and managed correctly (Laing, Wheeler, Reeves, & Frost, 2014). VR is also identified as an effective instrument for heritage management and preservation by generating substitute experiences, thereby minimising disturbance on the heritage site (Guttentag, 2010).

Preservation is a concept that is commonly discussed in terms of heritage tourism activity and management. There are many types of tourism experiences and activities which contribute to local heritage preservation and management, as well as the protection of cultural sustainability at the destination, including community-based tourism and cultural tourism initiatives (Throsby, 2009; Ursache, 2015). Recent research has also documented the implication of the virtual and augmented technologies on local heritage preservation (Chang et al., 2015). Immersive visualization and 3D reconstructions of heritage sites can offer a form of protection to the remains of the past by providing alternative, complementary and engaging visitor experiences (Bruno et al., 2010). Therefore, as many tourism destinations are centred on local heritage, there is an opportunity for technology-based applications to contribute to heritage preservation, tourism experience management, as well as further enhancing the suite of tourism experiences.

Heritage preservation and conservation in recent years has had a tendency to focus on the incorporation of digital technologies to expand traditional methods. Heritage that is visually represented using computer-based interactive VR is referred to as Virtual Heritage (Noh, Sunar, & Pan, 2009). Methods such as 3D scanning, digital archive repositories and photogrammetry have been adopted as ways to preserve heritage, particularly for physical artefacts and sites (Yastikli, 2007). In addition, both AR and VR have been applied for heritage preservation, with greater focus on user engagement. Compared with other technologies, AR and VR are more commonly applied in a museum context, with applications to the broader suite of tourism experiences at destinations rapidly emerging (Jung et al., 2016; Martins et al., 2017).

Research in this area has detailed the development and implementation of the technologies for tourism consumption as stand-alone experiences, as well as how technology can be used to complement information at sites (Chang et al., 2015; Yung & Khoo-Lattimore,

2017). However, there are implications for heritage tourism experiences and preservation when using virtual worlds. One key issue with the creation of virtual worlds is the challenge of balancing the contested information with known accurate facts (Huang et al., 2016; Mura, Tavakoli, & Sharif, 2017). This conundrum can occur at multiple points of the virtuality continuum and has considerable implications as heritage preservation is largely focused on maintaining accuracy within the presentation of information. Additionally, tourism experiences based on facts are important to heritage education among visitors (Mura et al., 2017). Yet, heritage is often contested and subsequently some element of fiction or storytelling can be essential to articulate both sides of a story to generate a memorable experience.

Tourism is about creating engaging narratives to connect with the visitors, sometimes leading to exaggerated, unsubstantiated or overly dramatized depictions of reality. While authenticity should be maintained where possible, especially in the context of the preservation of intangible cultural heritage, contested history also exists, often playing a considerable role in local heritage and tourism experiences (Zhu, 2015). Contested heritage is often created when authenticity is not established, or conflicting perspectives exist where one or all perspectives lack scientific or documented evidence. For example, fictional recounts of history. Yet, these often-contested perspectives are also important parts of local and cultural heritage that can form the basis of a memorable tourism experience, which is especially pertinent with respect to heritage. In this context, the application of VR and AR in heritage tourism can serve to normalise dissonant memories via re-invention of contestation within historical traditions and myths (Naef & Ploner, 2016). Therefore, challenges exist when developing virtual experiences for heritage preservation and tourism experience.

To address issues surrounding the virtual presentation of heritage and the management of digital heritage tourism experiences, this paper proposes a four-stage conceptual model to guide applications of AR and VR for tourism experience and heritage preservation (Fig. 2). Heritage presentation can be categorised in four approaches: 'Historical Facts', 'Contested Heritage', 'Integrate Historical Facts and Contested Heritage', and 'Alternate Scenario'. The 'Known Facts' approach draws on heritage information that has been substantiated or validated and can be used in tourism experience to present near accurate accounts of history. Examples of how AR and VR can be used for this approach include virtual reconstructions of artefacts and cities that visitors can use to obtain information or virtually explore. The 'Contested Heritage' approach utilises the unverified stories of local heritage to present a subjective or imaginative interpretation. AR and VR can use this approach to communicate and present cultural stories, myths or legends that may lack scientific validation. The 'Combination of Known Facts and Contested Heritage' approach draws on both substantiated and unsubstantiated information to present actual and personalised interpretations or versions of history. For example, virtual recreations of significant events can be developed according to the known facts while incorporating personalised stories or anecdotes of the event. Similarly, the 'Alternate Scenario' approach can draw on the known facts and contested heritage to present alternate realities that may have occurred if certain events in history had of resulted in a different outcome, such as if the Allied Forces were not successful in WWII.

3. Conclusion

Rapid advancements in software and hardware, as well as significant investments in current technology, have made the application of AR and VR readily accessible. Applications have expanded across industries, with considerable investment and growing scholarly attention within the tourism industry. There is an opportunity to for AR and VR to also contribute to heritage preservation of destinations and sites. However, there are implications for heritage preservation and

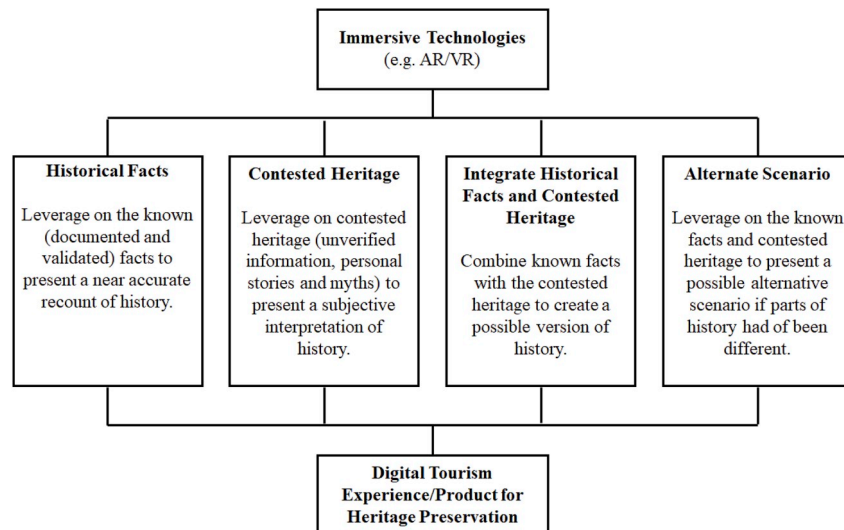


Fig. 2. Four-stage conceptual model of virtual heritage preservation for tourism experience.

management when creating virtual tourism experiences, whereby creators need to appropriately balance contested heritage with accurate information or known facts. To guide the presentation of heritage within immersive tourism experiences, the research has presented a four-stage conceptual model of heritage preservation. Future research should test the development of digital tourism experience prototypes across the four approaches. Further research should also explore digital preservation methods, such as 3D scanning techniques, to increase the accuracy of the virtual recreations of physical sites and artefacts. In addition, as the visitor experience is often central to the investment in and application of these tools, gaining a greater understanding of the responses visitors have to the four approaches will elucidate further development.

CRedit authorship contribution statement

Alexandra Bec: Project administration. **Brent Moyle:** Project administration. **Ken Timms:** Visualization. **Vikki Schaffer:** Writing. **Liubov Skavronskaya:** Writing. **Chris Little:** Visualization.

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