Back in Time with Immersive Heritage Tourism Experience: A Study of Virtual Reality in Archaeological Sites

Mujde Bideci[1]([⊠]) [iD] and Caglar Bideci[2] [iD]

[1] Canterbury Christ Church University, Canterbury CT1 1QU, UK
mujde.bideci@canterbury.ac.uk
[2] University for Creative Arts, Epsom KT18 5BE, UK
caglar.bideci@uca.ac.uk

Abstract. This study focuses on how virtual reality applications might evoke nostalgic sensations in travellers during cultural heritage tourism. While extensive research on the tourism experience has revealed different extrinsic and intrinsic dynamics that affect the tourist experience, this research aims to explore what feeling of back in time VR users experience in an archaeological destination. The gap in visitor experience employing VR research still persists, despite the rising adoption rate of immersive technology, such as virtual reality. In this study, a qualitative method has been applied to analyse online reviews of VR users who visited the Olympia Archaeological Site in Greece and used the 'Back in Time Olympia' VR application. The findings drawn from the results show that nostalgia, presence, engagement by learning, and service experience are essential determinants of tourist VR experiences in such cultural heritage destinations.

Keywords: Heritage tourism · Tourist experience · Virtual reality

1 Introduction

Immersive technologies such as augmented (AR), virtual (VR), and mixed (MR) reality have recently provided enhanced immersion in tourist experiences by mixing physical and virtual settings and are primarily centred on cognition and emotions [6]. Tourists experience VR applications designed for multiple purposes such as providing entertainment, education, or enriched marketing strategies [10]. Existing research on VR applications in tourism has primarily concentrated on either positive [16] or negative [10] impacts of those applications on tourists' experiences, or conceptual/theoretical approaches [7] that have contributed to marketing and heritage preservation. Others have studied VR applications in understanding the behavioural intention of tourists [13], especially in museum settings. Based on previous research, our potential contribution to research and sector is two-fold: (1) due to the infancy of research on VR applications in heritage tourism, we focus on the usage of VR practises in tourism and explore the multidimensional structure of immersive heritage tourism experiences in an archaeological

site; (2) contrary to the popular myth of nostalgia, which can only be evoked with the link between the tourist's memory and the destination rather than the destination itself, we focus on the usage of VR practises in tourism and explore the multidimensional structure of immersive heritage tourism. This study's findings would guide marketers in understanding tourists' multi-dimensional VR experiences in heritage tourism. From a theoretical perspective, these research findings might encourage comprehension of VR experiences of presence, learning engagement, and service in such locations.

2 Literature Review

2.1 Tourism Experience and Immersive Technologies

Tourism experience is a socially constructed, gradually evolving term, influenced by various dynamics, stages, and meanings [14, 2]. Moreover, tourists tend to store those moments of experience in memory not only for satisfactory reasons but also to immerse the nostalgia along with the fantasies behind the stories [3]. Tourists visiting historical tourism destinations are either passive receivers who are motivated to recall their ancestral history or active searchers who have no link but want authenticity in their experiences [8]. Herein, the use of immersive technologies in destinations helps tourists experience feeling ai. Being back in time. In other words, when the tourism industry develops appealing storylines to engage with visitors [1] immersive technology can assist tourists in dreaming beyond and immersing themselves in a new cognitive experience.

AR and VR are different immersion technologies that bring users enjoyment, engagement, and interactivity [5] and are widely employed in service areas such as tourism. Although both immersive technologies give users richer experiences through cognitive immersion [6] AR mainly exposes synthetic archetypes such as avatars or objects over the real-world and helps users enhance their engagement [5], while VR provides a physical immersion with all senses and a realistic preview of what they would expect from a product/destination. Existing immersive technology research has focused on the consequences of AR/VR applications [9], the theoretical review of AR/VR technologies via meta-analysis [5], designing a conceptual model of heritage preservation for managing heritage into digital tourism experiences [1], and comparing AR and VR technologies to reveal their effect on tourist experiences [15].

2.2 Virtual Reality in Heritage Sites

Heritage sites are places where tourists experience nostalgic feelings by fantasizing about what happened in the past [4]. Due to a lack of first-hand experience in such places, nostalgia feeling can be gained through tangible and intangible historical facilities such as historical buildings, events, or cultural archetypes e.g., mythical stories [4, 3]. In this regard, heritage tourism offers to experience the past by engaging and immersing in the place [1]. Heritage tourism researchers have mainly focused on documenting its market share, contribution to the economy, and tourist visit patterns including motivations and behaviour. Some researchers have recently examined the latter aspect of AR, such as why and how it might improve place satisfaction in Beijing's nine heritage gates [13]

or whether mixed reality applications with culturally engaging activities affect visitors' immersion, like with HoloTour (3D virtual tourism application) when they visit a virtual heritage site - Temple of the Moon [11]. In destination-based applications, however, especially VR offers an alternate world in a simulated environment by blocking users' view of the real world with head-mounted displays. Therefore, VR applications embedded in cultural heritage sites add value to their nostalgic experiences. In this connection, this study focuses on exploring the feeling of the past and present through VR experience while visiting an archaeological site.

3   Methodology

To investigate travellers' VR-based experiences, data from two online review platforms were analysed. We purposefully confined our sampling to completely immersed VR experiences to capture users' immersive feedback. The study comprised tourists who visited the Olympia Archaeology Site in Greece from 2019 to 2022 and purchased a commercial VR service called 'Olympia Back in Time.' The VR service offers standalone headsets, an audio tour, and a GPS-based virtual map. The idea behind this service is to provide travellers with a unique experience that allows them to compare the current to the past. To achieve this, the VR application uses a 3D illusion of historical elements such as seeing athletes of the Ancient Olympic Games in the Stadium. With a qualitative approach, the reviews were anonymized from any personal information such as name or email address. A pseudonym list has been created for 402 reviews (e.g., user_1) and the thematic data coding has been conducted including finding similarities and removing repetitions. Because the research is exploratory in nature, we used MAXQDA-22 to analyse the contents and an inductive approach to the designs and categories developed from the reviews. The exploratory and confirmatory stages were employed to analyse the 10,864-word content. The experimental phase started with line-by-line coding, which entailed comparing and understanding the texts. A relationship between categories was sought at the next level, and tentative codes were created. Finally, a variety of code lists were employed to construct secondary codes.

4   Preliminary Results and Implications

The preliminary findings of the study show consistency with existing research and add on by presenting how a comparison of past and present with VR can shape tourists' experiences. After a qualitative insight into user experiences was gathered through online reviews, the initial themes were categorized into pre-defined themes and are (1) *presence* – feeling in the virtual environment [14], (2) *nostalgia* – including elaborative experiences [12], and (3) *service experience* – ease of use [17]. (4) *Engagement by learning* has been also revealed during the second coding process. Regarding the presence, 'feeling present at the site but at another time' was the common statement between reviews. Accordingly, as [17] advise, the mental imagery of spaces is an important element of presence that visitors feel when they are fully immersed in a VR-mediated environment. The mental imagination of ancient Olympia has been stressed by *User_ 71* as '*The VR glasses gave us a sense of ancient Olympia, complete with athletes exercising, people*

speaking or applauding full-sized temples, and a stunning statue of Zeus, which would have been difficult to picture otherwise'.

VR users interact with athletes in the simulation which evoke a 'sense of being with others' at the virtual Olympia. Like previous studies on **presence**, virtual reality allows users to interact with holograms and virtual images in an almost real-time manner as *User_ 6* explains '*We had been to Olympia the day before and thought it magnificent, but it was difficult (particularly for my kid) to truly comprehend and appreciate the magnitude of the area! The encounters with athletes were incredible, and you could practically reach out and touch ancient Greeks!'*.

Despite **nostalgia**'s concept as a recall and interaction with the ancestral past, nostalgic archetypes can actively stimulate imagination and fantasy by evoking emotional senses [8] in tourism destinations. History, reimagination, and transforming ideas are important elements of nostalgia. Accordingly, User_13 states an unknown history can be internalized by everyone instead of the ancestral past '*We all found it engaging and enjoyable, and it was a different experience from what we had done at other ancient sites. It invigorated the neighbourhood in a… Olympia has a fascinating past'. Reimagination* is delivered by fantasies as a part of historical nostalgia. In such an environment cognitive creation is active and helps to see beyond 'sole rocks' and *transform ideas* as *User_22* stated '*It not only brings the stones to life (which you need a lot of while merely staring at stones), but it also brings the entire place to life! It was quite nicely put up, with just enough information and entertaining elements such as seeing the virtual athletes compete'.*

Since VR **services** are an addition to the already-existing offerings at tourist locations, customers, particularly those who travel with kids, evaluate the personnel, payment, and simplicity of use such as '*Awesome experience. We contacted the owner via - and he replied within a couple of minutes. We gave him a time, and everything (including payment) was set up. He gave us a quick instruction on VR glasses, and we walked from there to the archaeological site (User_356)'.*

Although the imagination of the past links to nostalgia and presence, we have also found *that* visitors stress ***engagement with learning***. In line with [15] study, our study revealed that engagement is an important factor for visitors to the Olympia Heritage Site and is based on family, *learning, and comparing with previous experiences*. Accordingly, the desire of learning about how people lived back in the ancient Greek ages and how visitors engaged is given by *User_276* regarding family engagement '*…it was a wonderful trip, and our 8-year-old daughter never complained about "just stones", it is a fun way for kids to discover the history of Olympia (User_276, family engagement'.* Regarding learning from stories, User_105 states '*The audio and visual facility provided by VR was excellent with relevant information to each location within the site as options to hear further facts relating to every aspect of the history of Olympia'.*

Based on the findings from this study, we propose an immersive heritage tourism experience framework. Consequently, our research strengthens the understanding of the multidimensional structure of VR experiences and reveals the feeling of being 'back in time,' extending the literature on presence, engagement, and service. A key finding of our study is how nostalgia transforms into fantasies and imagination instead of traditional memories based on collective memory or ancestral history. While an increasing

number of research has been applied to VR (e.g., limitations [7]; effects as a marketing tool [14]), the relevant research goes beyond past work to explore its role in user experiences at heritage sites. Given that the findings will shed light on the undiscovered parts of VR and the tourist experience, we believe this study will provide practical implications for tourism marketers seeking innovative ways to enhance the tourist experience through immersive technologies. For future research, although there seems to be an upsurge demand in VR based tourism experiences, it should be noted that the multidimensional and complicated structure of the tourist experience should be explored through immersive technologies. Future studies can therefore examine the role of social presence including family engagement and negative impacts of such technologies (e.g., loneliness and addiction [8]) while exploring enhanced interactivity in different research areas.

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