Chapter 8
The Use of Virtual Reality and Augmented Reality in Cultural Heritage and Deep-Diving Destinations

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ABSTRACT

Underwater cultural heritage and deep diving are important attractions for tourism. Using cutting-edge technology tools for cultural heritage became more important for tourism destinations. The purpose of this chapter is to evaluate the use of virtual reality (VR) and augmented reality (AR) in tourism from the perspective of cultural heritage and deep diving. This chapter will contribute to the literature to show a new way of sustainable tourism. Commercial diving to an underwater heritage site a is popular touristic activity. Sometimes shipwreck recovery can be hazardous for cultural heritage. The review results indicate that these underwater cultural heritage sites need to be protected for sustainable tourism development. Virtual tours contribute to the sustainability of cultural heritage. On the other hand, treasure hunting trips and recreational diving may cause damage to the archaeological sites. Underwater cultural heritage sites should be protected for sustainable tourism. VR and AR applications can be used to promote a touristic destination by tourism marketers for experimental marketing.

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INTRODUCTION

Cultural heritages and deep diving as a tourist attraction are important components for tourism marketers and using technological tools for cultural heritage became more important for tourism destinations. Virtual experiences and augmented reality (AR) gives the visitors feel that as if they were at the historical places and historical times (Magnenat-Thalmann, et al. 2002). Virtual reality (VR) systems show visitors historical places that do not exist. Most of the historical places are under ongoing construction or away from population. Therefore, using VR makes it easier to reach them. Virtual means "being something in essence or effect, though not actually or in fact" (Etymology Dictionary, 2021). VR is a visional experience which is different than real world or similar the real one. VR is applicable mostly in education, video games, business, entertainment and cultural heritage. VR is a simulation of a historical place which is really exist and also not real. VR includes augmented reality and mixed reality (Goode, 2019). One of the uses of VR is simulation based. Such as driving a car or deep diving. This really feels like driving a car or diving deep. The other VR is avatar which is image based and 3D virtual environment in the form of video that user can join the system with an avatar.

Augmented reality is the type of VR technology that mixes the user vision in real surroundings with digital content. There are different approaches about virtual and augmented reality in tourism. According to Cheong (1995) VR could be a virtual threat for tourism and it may substitute to travel. Williams (2006) concluded that using VR & AR is the new way to experimental marketing. tom Dieck & Jung (2018) studied British female tourists' acceptance of AR mobile applications. Their acceptance depended on different dimensions such as information quality, costs, recommendations, innovations and condition risks. Boboc et al. (2019) showed in their work mobile AR applications have great potential in cultural heritage sites. However, user acceptance is low. Güzel & Sucaklı (2020) emphasized AR implications use at different levels for each museum. According to Graziano & Privitera (2020) on the occasion of AR and VR applications do not work, tourists show their disappointment. Jingen et al. (2020), Yin et al. (2021) emphasized, AR tourism research literature is mature and growing fast.

AR is in use in many sectors such as education, music, gaming, art, commerce and tourism (Mesároš, et al. 2016). Food and beverage sector also use VR and AR implications for food safety (Georgakopoulos, 2008). VR and AR based virtual educational tours are sustainable for nature and cause less greenhouse emissions (Mohanty, Hassan, & Ekis, 2020). VR provides more effective for advertising than brochures (Guttentag, 2010).

AR technology originated to 1960's and still are used with mobile devices, live feed cameras into a headset or smart glasses. AR is able to bring together physical world and digital information. On the other hand, gamification technology uses the game elements in non-gaming environments. Gamification is new trend for tourism which attract all ages of customers (Xu et al. 2013). Gamification and AR can act as interface among cultural heritage, tourism companies and tourist in sustainable tourism. Using AR and gamification techniques in tourism are more sustainable (Negruşa, Toader, Sofică, Tutunea, & Rus, 2015). AR has been increasingly used for cultural heritage tourism (Cranmer, Tom Dieck, & Fountoulaki, 2020). Digital technology and AR offers new ways to discover cultural heritages so that people can learn the heritage, have fun and socialize with others. Cultural heritage organizations are using innovative applications, gamification and AR. Today many organizations use AR for turning fiction to real experiences to attract tourists.

Since the recovery of artefacts and possibility of finding a sunken treasure from shipwrecks on the seabed, diving has become a commercial activity in waters. Underwater cultural heritages are always

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