Keynote

From Virtual Tourism 1.0 to 2.0

Applying New Media to Support Sustainable Research, Conservation, Communication, and Accessibility

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Abstract: The digital tools for 3D restoration, reconstruction, and archival that have emerged in the past forty years have shown growing potential in driving the documentation of a monument's condition, developing hypotheses of restoration, and recontextualizing these monuments in their original cityscape or landscape. Through the introduction of Yorescape™, a streaming app for virtual tourism developed by Flyover Zone, this article explores the implication and application of virtual tourism on the cultural heritage tourism sector. Examining current virtual tours in comparison to those offered by Yorescape, the features of Virtual Tourism 1.0 and Virtual Tourism 2.0 are compared across technologies, visual assets, guidance, communications, accessibility, and repeatability. The features are then examined from the theoretical lenses of presence, immersion, interactivity, social engagement, accessibility, and user empowerment. Differences in information reliability, creation, and transparency between the two are also explored before a model on open access and paid access third-party peer-reviewed virtual experiences is presented. Thus, Virtual Tourism 2.0 is intended to be a way that cultural heritage professionals can take control of important new mediums and apply their own longstanding standards of public communication. For institutions, it can help to sustain cultural heritage research through generating new income streams. For users, Virtual Tourism 2.0 highlights potential to improve multiple facets of the visitor experience journey to cultural heritage sites and monuments. Whether it is preparation pre-travel, using virtual tours as extended reality (XR) guides when in-situ, or keeping their memories alive as well as deepening their understanding post-travel.

Keywords: *Virtual Tourism—Yorescape—Peer Review—Metaverse—3D Reconstruction*

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Background

Much like the overarching theme of CHNT 2021, this article aims to explore the topics of using technological innovations to support sustainable research, conservation, and communication of cultural sites and monuments. Through the introduction and presentation of the Yorescape virtual tourism app, the topic of increasing accessibility of cultural heritage for people with disabilities is also introduced, a theme that has only grown in importance since the onset of the COVID-19 pandemic that has highlighted the negative impacts of reduced mobilities on society.

The 3D digital tools that have emerged in the past forty years have shown growing potential in assisting with the documenting of a monument's condition, developing hypotheses of restoration, and recontextualizing these monuments in their original cityscape or landscape. They can also serve as a platform for empirical, or *simpirical* experimentation (Frischer 2016–17, 71–73), and finally, for educating people about the past by showing them how sites and monuments probably looked before they were damaged or reduced to ruins.

The topic of 3D restoration and reconstruction as a resource for education is not new (see Frischer, 1988). In effect, recreating heritage sites and monuments in virtual environments through 3D allows users to go on virtual tours of the sites. Crucially, the nature of virtual tours features an experience that is not possible in the real world – time travel. As noted by Frischer (1988, p. 302), "If the user is viewed as an explorer – not as a 'student' – then at every moment both guided tours…and free exploration…should be options provided by the program. The explorer metaphor is, of course, especially appropriate for a project such as the one I am working on …where the student is, quite literally, an explorer sent back in time to a re-creation of ancient Rome."

Flyover Zone

In 2015, Flyover Zone was founded to commercialize scientific 3D models and virtual tours (www.flyoverzone.com). This happened as a direct consequence of the unexpected appearance and emergence of the Oculus DK1 in 2013. After years of only being able to show scientific 3D reconstructions to a small number of students and colleagues at a handful of universities fortunate enough to have multimillion-dollar Virtual Reality (VR) installations, the emergence of a Head Mounted Display (HMD) that would cost a few hundred dollars as opposed to (for example) $40,000 Sensics headsets pointed to the potential of mass distribution of these virtual experiences. Perhaps more importantly, it also pointed to the timely emergence of a large viable VR consumer market.

From the start, the primary mission of Flyover Zone has been to create and market virtual tours that students and the general public can take with the assurance that what they see and hear is as scientifically valid and as up-to-date as possible. At first, the company's virtual tours could be taken only on VR headsets. Starting in 2019, support for personal computers, laptops, and mobile devices was added. The company has published virtual tours of various sites in ancient Rome, Hadrian's Villa, and Baalbek. In the near future, it will be adding tours to new sites in a series of publications called Athens Reborn, Great Monuments of Egypt, and Mesoamerica Reborn. Discussions are underway to add tours in Asia and sub-Saharan Africa. In general, the mission of the company is to provide extensive digital archaeological coverage of cultures all over the world.

Yorescape

Until now, the company has sold its users perpetual licenses through the stores of Apple, Google Play, Microsoft, and Steam. The tours have generally gotten positive reviews and the company has developed a reputation for delivering quality products in this newly emergent sector of virtual tourism (https://www.flyoverzone.com/mediacoverage/). Starting in December 2021, the company started to implement a different approach to distribution, streaming its virtual tours to a freely downloadable application available on the same stores above. Flyover Zone calls the app "Yorescape™" (www.yorescape.com). The name is a neologism combining the roots "yore," meaning "time past,"

and “scape,” the suffix used in such English words as landscape and seascape. So, the Yorescape is the place to go to see the past brought back to life. Importantly, Flyover Zone develops its own virtual tours for Yorescape but also publishes virtual tours for third parties. In this capacity, Flyover Zone functions as a peer-reviewed publication outlet for distributing new media creations to a large, international audience. Thus far, there is no other publisher willing to handle virtual tours by archaeologists and art historians.

In this paper, the concept of Virtual Tourism 2.0, as developed by Flyover Zone, is explored as a useful tool to achieve the goals of sustainable research, conservation, and communication of cultural sites and monuments. The following sections define the relevant terms and concepts starting with tourism, virtual tourism 1.0, and virtual tourism 2.0.

Tourism

Tourism, or “the world’s biggest service industry,” accounted for $1.7 trillion of global economic activity in 2019 (UNWTO 2019, p. 2). The United Nations World Tourism Organization estimates that cultural tourism constitutes 40% ($680 billion) of all tourism (UNWTO 2018, p. 25). This form of travel has been defined (UNWTO no date) as “a type of tourism activity in which the visitor’s essential motivation is to learn, discover, experience and consume the tangible and intangible cultural attractions/products in a tourism destination. These attractions/products relate to a set of distinctive material, intellectual, spiritual and emotional features of a society that encompasses arts and architecture, historical and cultural heritage, culinary heritage, literature, music, creative industries and the living cultures with their lifestyles, value systems, beliefs and traditions.” Heritage tourism is primarily concerned with the exploration of tangible (material) and intangible (immaterial) remanence of the past (Gravari-Barbas et al., 2016). Based on UNWTO’s response and aims to prioritize innovation and digital transformation of the industry through new technologies and media for sustainability, resilience, and reaching new audiences (https://www.unwto.org/cultural-tourism-covid-19), it reasonable to expect that virtual tourism to cultural heritage sites could itself become a significant sector of the world economy, joining industries such as telemedicine, telecommuting, and telework as a new internet and digital enabled solutions to long-standing real world issues.

Virtual Tourism

Virtual tourism was defined in Robinson (2012) as:

Virtual tourism offers tourists an opportunity to visit and experience a destination using a computer or other technologies. Such technologies provide travelers with an opportunity to view a destination before they visit, and is best exemplified through the multi-layered datasets provided through Google Earth which offers street-level navigation and images, also referred to as 3DVT (or, three-dimensional virtual tourism), where viewers may interact with a destination without actually travelling to it.

Next to Google Earth, there is also Street View on Google Maps as well as Google Arts & Culture. More recently, amid potential tourists seeking alternatives to physical travel during the COVID-19 pandemic, the notion of virtual reality substitutes received a substantial boost in attention (Skandalis, 2020). In response, tourism boards across the globe including Germany, Ireland, Maldives, and Japan launched VR experiences in 2020; with Japan-based company First Air, which offers VR flight

experiences, reporting 50% increase in bookings since the pandemic (Debusmann Jr, 2020). Researchers and industry practitioners have skirted around the idea of virtual substitutes for corporeal travel through the years. With the sudden digital acceleration resulting from the pandemic (Twilio, 2020), the notion of virtual tourism has grown in importance (El-Said and Aziz, 2021).

Comparison of Virtual Tourism 1.0 and 2.0

Despite their growing importance, the boundaries between the different types of virtual tours and platforms have not been properly defined in the literature, and there seems to be no consensus in practitioners' use of these terms when developing and releasing new platforms or experiences (Flavián et al., 2019). The definition of a tour presumes a guide or a resource like a guidebook or audio guide that is a substitute for a real human guide (Manning, 2014). Yet, the American popular magazine *Good Housekeeping* recommended 30 virtual tours at the onset of the pandemic. Many of the tours functioned more as virtual museums than virtual tours in the sense that they allowed users to view 2D images of works of art or 360º panoramas of galleries in the collection, but not virtualized tours of the actual building with guides or at least texts explaining what the user is seeing. A case in point adduced by the magazine is the Guggenheim Online (www.guggenheim.org/collection-online), which describes itself as an online database, not a virtual tour. Another example is what the Vatican Museum labels its "virtual tours." These only allow users to click on panoramic photographs of rooms in the museum but provide no guide or any textual information about what is being seen (m.museivaticani.va/content/museivaticani-mobile/en/collezioni/musei/tour-virtuali-elenco.html). Evidently, what museums such as these are thus far offering are not really tours, whether virtual or not, in the usual sense of the term. Even with Google Arts and Culture, much like the Vatican Museums tour, there is an absence of commentary and sometimes seemingly random placement of the panoramas in the gallery.

To be sure, there are some virtual tours online that feature guides. These virtual tourism experiences both show the monuments and provide commentary to help users understand what they are seeing. A good example and resource is Eventbrite's Virtual Tours page (https://www.eventbrite.com/d/online/virtual-tour/). However, even with the leading purveyor of virtual tours on Eventbrite, World Virtual Tours, there remain shortcomings in the experience, especially guides that seem unqualified. For example, on April 3, 2021, the authors experienced the company's tour of the Colosseum and closely examined the information presented by the company's guide. Numerous errors were detected, ranging from minor (there was a year "0" and that is when Christ was born) to quite serious (the great fire under Nero occurred in 64 CE, not 68; the Golden House of Nero filled, not "40%" of the city of Rome, but an estimated 5.7%). In contrast, the scripts of Flyover Zone's tours are written by experts on the monuments. For example, Dr. Jenifer Neils, Director of the American School of Classical Studies at Athens and the author of two scholarly books on the Parthenon, was project director for "Athens Reborn: Acropolis." Moreover, information reliability and observance of the best practice guidelines as laid out in the London Charter and Seville Principles form the backbone of Yorescape virtual tour experiences. This also means that transparency of information is crucial. For example, in 3D restorations where there is no surviving evidence or alternative hypotheses exists, they are flagged and presented to the user.

Table 1. Feature comparison in Virtual Tourism 1.0 and Virtual Tourism 2.0.

Feature	Virtual Tourism 1.0	Virtual Tourism 2.0
Technology	Zoom, Google Meet, Facebook Live etc	Game Engines: Unity, Unreal etc.
Visual Assets	2D photos, Panoramas, Slide shows etc of site today	3D interactive environments, time travel feature of site today and in past
Guidance	Slide shows moving from pre-selected Point of Interest (POI) to POI	Multiple options: Free roaming virtual tourist teleporting from POI to POI, Pre-recorded guide commentary at POIs, Other virtual tourists assuming role as guide
Communications	Text chat function, Restricted to language of guide	Real time text, talk, or pointing toward guide and/or other virtual tourists, Multiple languages and translations supported
Accessibility	Suitable for mobility-challenged albeit linear experience	Suitable for mobility-challenged, potentially simulating and replacing corporeal experience where visitation to site is impossible
Repeatability	None	Yes, unlimited viewings pre and post travel or in-situ

In terms of technology, virtual tours such as those offered by World Virtual Tours are essentially slide shows shared on Zoom, and, as such, they do not make the attendee feel a sense of presence. More importantly, in a World Virtual Tours experience, the user remains relatively passive with only the Zoom chat available as interaction. As researchers have shown, engagement and interactivity are vital to increasing sense of presence with VR experiences (Piccione et al. 2019; Yung et al., 2021), which in turn have been shown to increase enjoyment and efficacy of the experiences (Shafer et al. 2014; Tussyadiah et al., 2018).

Table 1 above aggregates the common features in currently available virtual tours in the left column. In the right column, these features are contrasted with those offered by Yorescape, which introduces “Virtual Tourism 2.0.” Starting with the underlying technology, in version 1.0, it is typically video conferencing platforms like Zoom, Google Meet, or Facebook Live. In 2.0, it is a game engine such as Unity or Unreal. This difference in platform has important consequences, for example, the game engines support freely roaming around the 3D model of the site visited. Obviously, this is a feature not possible on Zoom. In 2.0, users also use a clickable map with points of interest (POIs) indicated to which they can teleport. Again, this is not something that is possible on Meet, Facebook Live, or Zoom. In summary, Virtual Tourism 1.0 emphasizes the guide, not the monument visited. Virtual Tourism 2.0 introduces advances to immersion, fidelity, interactivity, and social engagement – all features that, as mentioned above, have been shown in past research to be vital in virtual tourism contexts.

In version 1.0, visual assets that the user sees are 2D photos or panoramas of the site as it appears today with the odd image of how it might have looked in antiquity. In version 2.0, the concept of perceived time travel through the Time Warp feature is introduced, where users are able to see the site as it appears today but also are able to experience the monument as it appeared when new hundreds or thousands of years ago.

Regarding the guide, in version 1.0 it is the guide who pre-selects the POIs, then arranges their slides in a certain order takes users from POI to POI. In version 2.0, it is the virtual tourist who has control, freely roaming around the site or using that clickable map to teleport from POI to POI as their

curiosity leads them onwards in any order that makes sense to them. With any POI, virtual tourists can click on the “start audio” icon and listen to an explanation of what they are seeing given by a Yorescape guide (with closed-caption translation available in Chinese, English, French, German, Italian, and Spanish). Crucially, these guides are the same leading experts, who helped create the 3D reconstruction of the sites. This feature of version 2.0 is important for two reasons. Firstly, empowering user agency and ability to manipulate and control the experience has been shown to be associated with higher levels of presence (Piccione et al., 2019). Secondly, the incorporation of leading experts into the experience reduces likelihood of factual errors as evidenced in the version 1.0 examples above, ensuring reliability of information. This is particularly important in education contexts when the virtual tour takes the specific form of a virtual field trip of a class of students.

Building on the theme of social engagement and interactivity is the support of multi-player experiences in version 2.0. In multi-player mode (called “Group Tour” in Yorescape), one of the participants can play the role of guide. Alternatively, the participant can play off against the recorded expert guide, agreeing and disagreeing as seems best to them; thus, introducing another layer of co-creation to the tour experience. In virtual tourism 1.0, technical barriers mean that this feature is impossible. The multi-player functionality also means the virtual tourists can easily communicate amongst themselves. Their communications are not filtered through the tour guide, as is the case in version 1.0. Finally, version 2.0 supports the simple but essential for tourism communication form of pointing. This removes any doubt in the minds of participants to what feature in a scene the guide is referring in the interpretation, and it facilitates the posing of specific questions by participants on a virtual tour.

In terms of accessibility, both the Zoom slide shows of Virtual Tourism 1.0 and the more immersive and interactive experiences of Virtual Tourism 2.0 can be used by infirm people who are not able to travel. If there is a positive to be taken from the COVID-19 pandemic, it is the emergence and growing prominence of concepts such as virtual mobility (see Musselwhite, 2017) for the mobility-challenged. Yorescape strives to make virtual tours compliant with the Americans with Disabilities Act, including testing tours with the disabled. The empowerment of users to go where they want to go and see what they want to see, as well as the immersion and sense of presence of the medium – especially through a device such as a VR HMD – makes Virtual Tourism 2.0 tours one potentially important tool to mitigate disabilities as well as physical and social barriers to travel. Unsurprisingly, the potential of VR as an effective tool to improve well-being amongst those with disabilities have been posited and suggested in various studies (Montana et al. 2020; Musselwhite 2017; Singh et al., 2017).

Yorescape beyond the user experience

Beyond enhancing the experiences of virtual tourists, Yorescape is also innovative in serving the needs of the Virtual Heritage community. To date, no publisher has been willing to disseminate the virtual reconstructions created by members of this community. Flyover Zone hopes to fill this gap and invites submission of virtualized sites useful in the curricula of courses in the fields of Art History, Geography, History, and World Culture, especially those on the UNESCO World Heritage list. Third-party publications are first peer-reviewed by area and subject experts before they are accepted for inclusion on Yorescape. This means that a virtual tour distributed through Flyover Zone should count as a scientific publication. This fact already helps with sustainability: in the past, members of the CHNT community could get publication credit for scientific papers about their new media creations,

but rarely, if ever, for the creations themselves. With the appearance of Yorescape, this will potentially change.

In terms of economic sustainability in the newly emerging industry of virtual tourism, Flyover Zone also helps research and sustainability by helping to finance virtual tourism projects of qualified third parties. Even for those projects which are simply published on the Yorescape platform once they are ready to be disseminated, compensation is paid to creators or to their institutions.

Flyover Zone works with both Open Access and Paid Access models of publication. Regarding Open Access, Flyover Zone creates virtual tours on commission, then gives the tours away for free. A case in point is Baalbek Reborn. Since launching the tour on March 31, 2021, there have been over 35,000 free downloads. Creators with existing funding and interested in the greatest possible dissemination of their virtual tour will want to consider adopting the Open Access model. In contrast, the Paid Access model presumes that virtual tourists will pay for the tour through their subscriptions. Paid Access is thus suitable for projects which are in part designed to make the creators' research sustainable because Flyover Zone will pay compensation to creators or to their institutions.

Thus, Virtual Tourism 2.0 is intended to be a way that cultural heritage professionals can take control of this important new medium and apply their own longstanding standards of public communication. It can help to sustain cultural heritage research and institutions by generating an income stream through sales to a global audience. It can improve multiple facets of the visitor experience journey to cultural heritage sites and monuments. Whether it is preparation pre-travel, using virtual tours as extended reality (XR) guides when in-situ, or to keep their memories alive as well as deepen their understanding post-travel.

Conclusion

It is important to note that Flyover Zone does not consider Virtual Tourism 2.0 to be in any sense a substitute for real-world tourism – the company's mission is not to eliminate or reduce the need for people to take actual trips to see cultural heritage sites. Rather, Flyover Zone envisions Virtual Tourism as something that enhances and enriches real-world tourism. By raising awareness of places about which many people have never heard, Virtual Tourism 2.0 can arouse curiosity and motivate people to go visit them. However, especially for management of heritage sites where real-world tourism is no longer possible for myriad reasons, the insights and implications from the creation of alternative tourism through Virtual Tourism 2.0 will be vital for second chance tourism (Bec et al., 2021).

Conflict of Interests Disclosure

Bernard Frischer is the founder, president, and part owner of Flyover Zone.

Author Contributions

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