

Towards a typology of virtual events

Author

Yung, Ryan, Le, Truc H, Moyle, Brent, Arcodia, Charles

Published

2022

Journal Title

Tourism Management

Version

Version of Record (VoR)

DOI

[10.1016/j.tourman.2022.104560](https://doi.org/10.1016/j.tourman.2022.104560)

Rights statement

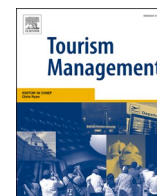
© 2022 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

Downloaded from

<http://hdl.handle.net/10072/414402>

Griffith Research Online

<https://research-repository.griffith.edu.au>



Towards a typology of virtual events[☆]

Ryan Yung^{a,*}, Truc H. Le^b, Brent Moyle^b, Charles Arcodia^b

^a Department of Marketing, Events and Tourism, University of Greenwich, Old Royal Naval College, Park Row, London SE10 9LS, United Kingdom

^b Department of Tourism, Sport and Hotel Management, Griffith University, 170 Kessels Rd, Nathan, QLD 4111, Australia

ARTICLE INFO

Keywords:

Virtual events
Virtual reality
Augmented reality
Social presence
Virtuality
Virtual location

ABSTRACT

Despite the mounting prominence of COVID-induced virtual substitutes to face-to-face events, the boundaries and terminology between different types of virtual events have not been clearly defined. Theoretical misconceptions exist surrounding the diffusion of virtual reality and existing virtual events into the tourism, hospitality and events sectors, with conceptual ambiguity generating contention. Consequently, this paper develops a typology of virtual events designed to clarify theoretical misconceptions and establish clear limits whereby all virtual events can be classified. Integrating the three dimensions of social presence, virtuality of environment, and location, the SPEL cube is presented as a conceptual model. This paper contributes to understanding the extant literature and practices of virtual events, providing implications for the management of events in the tourism, hospitality, and events sectors; and delivering a foundation for future research into optimal adaptations of immersive technologies.

1. Introduction

The COVID-19 pandemic has seen an unprecedented acceleration in the adoption, innovation, and acceptance of technology (McKinsey & Company, 2020). This phenomenon is especially prolific in the tourism, hospitality and events sectors, which were required to transform existing face-to-face events into virtual substitutes (Standaert et al., 2021). Almost overnight, various events pivoted to platforms such as Zoom, Google Meet, and Microsoft Teams, replacing face-to-face meetings. Advances in extended reality, an umbrella term used to describe immersive technologies that can merge the physical and virtual worlds, led to the proliferation of virtual and Virtual Reality (VR) events. Technological leaders, such as Meta and Epic Games have accelerated efforts to launch 'metaverses', where communities and economies span physical and virtual realities, converging in a shared online space (Kamin, 2021). In 2021, commercial platforms such as Mozilla Hubs, Facebook Horizon, AlterSpaceVR, and VRChat emerged, which enable up to 20 people to interact in virtual meeting rooms (Li et al., 2021). Microsoft founder Bill Gates (2021) predicted most office meetings would take place in 3D spaces within three years.

Despite these rapidly emerging technological capabilities, the boundaries between the different types of virtual events have not been clearly defined (Sox et al., 2017; Standaert et al., 2021). Compounding

definitional issues and conceptual ambiguity, there is limited consensus in the application of existing terms when developing and releasing new platforms (Flavián et al., 2019; Yung & Khoo-Lattimore, 2019). Common terminology for the categories and types of virtual events have appeared in past research, including face to face (F2F), hybrid, and virtual events (Huang et al., 2013; Sox et al., 2017). However, the lack of clarity between platforms means research on virtual events currently comprise studies on Zoom and Teams (see Park & Jones, 2021), to VR events in synthetic metaverses (see Fang et al., 2021); platforms which sit on different ends of the virtuality spectrum (Milgram et al., 1994). Critically, theoretical misconceptions exist surrounding the diffusion of VR and existing virtual events into the tourism, hospitality and events sectors. Consequently, to provide guidance, sound terminological grounding is required, involving the charting, understanding, and critical assessment of the independent and dependant variables which underpin emergent theoretical frameworks on virtual events.

Additionally, while research has found that virtual events increase attendee engagement, motivation, and enjoyment, few of these findings have been explored in the events sector (Bec et al., 2019; Wei, 2019; Yung & Khoo-Lattimore, 2019). Empirical research on virtual or even hybrid events (i.e., a combination of virtual and face-to-face components) in the tourism, hospitality and events literature appears to be extremely limited (Sox et al., 2017; Wei, 2019). The lack of research foci

[☆] This manuscript has not been published and is not under consideration for publication elsewhere. Declarations of interest: none.

* Corresponding author.

E-mail address: r.yung@greenwich.ac.uk (R. Yung).

is surprising, considering early conceptual discussions hypothesizing potential applications such as revolutionising business travel, long-distance meetings, and large-scale conventions by holding them in virtual locations (see Pearlman & Gates, 2010; Guttentag, 2010; Williams & Hobson, 1995). However, the exponential increase in demand, combined with a renewed interest in and acceptance of virtual events, due to the global lockdown, has further compounded the need for research.

This paper develops a typology of virtual events in the tourism, hospitality and events sectors. Creating a pragmatic typology will clarify terminological misconceptions, establishing clear limits whereby all virtual events could be classified into one of the proposed categories. The contribution of this paper is the integration of the three dimensions of virtuality of environment, location, and social presence to propose a three-dimensional cube designed to classify all types of virtual events, termed the SPEL Cube. This presents an extension to foundational work conceptualised in the “Reality-Virtuality Continuum”, adapting to contemporary events in our rapidly transforming 21st century society (Milgram et al., 1994). This paper offers a valuable contribution to theory by developing a conceptual framework through the SPEL cube that helps avoid misconceptions around virtual reality and virtual events. It also contributes to understanding the extant literature and practices of virtual events by producing a conceptual map of virtual event typologies, which in turn offers insights for practitioners.

2. Development of the SPEL cube

2.1. Virtuality of environment

The “Reality-Virtuality Continuum”, ranging from the real environment to the virtual environment was initially proposed by Milgram and Kishino (1994), and is often applied as the starting point for researchers to classify the wide variety of computer-mediated realities (Flavián et al., 2019). As their classification suggests, in the real environment, users interact solely with the real world. Whereas in the virtual environment, users interact solely with synthetic elements of a computer-generated world in real-time. A common example is the Second Life virtual world, where users represented by avatars interact in real-time in a continuous 24/7 virtual environment (Huang et al., 2016; Tavakoli & Mura, 2015). Fully interactive VR, where users control and manipulate their digital surroundings, is also currently classified as a virtual environment (Yung et al., 2021). The range of technology-mediated realities, where digital and corporeal content integrate at different levels, sit between these extremes (Flavián et al., 2019). With augmented reality (AR) for example, digital content is superimposed on the real environment (Rauschnabel, 2021). While virtuality is important to understand the nature of the environment in which users communicate; in the events context, we propose that introducing the dimension of location is critical for building a typology of virtual events.

2.2. Location

Even prior to COVID-19, the notion of virtual co-location and remote work had been gaining increasing attention (Olson & Olson, 2009). Since the pandemic, innovation and adoption of distributed meetings and events has exposed an exponentially growing interest and need to understand the implications of wide-scale mediated organizational communication (Standaert et al., 2021); a trend slated to continue post-pandemic (Le & Yung, 2022). This paper proposes location as a dichotomy, embodied by physical location or virtual location. Physical location, as the classification suggests, is when all participants are physically in the same corporeal space at the same time. With virtual location, two or more participants are geographically distanced and rely on technology to communicate and collaborate synchronously (i.e., videoconferencing) (Morrison-Smith & Ruiz, 2020; Standaert et al.,

2021).

When examined alongside virtuality, the importance of location as a dimension becomes evident. Existing terminology for virtual events (i.e., F2F, Hybrid, Virtual Events) is often classified depending on the location of participants (Erickson et al., 2010; Huang et al., 2013; Sox et al., 2017). Since the pandemic, internet-based videoconferencing has undoubtedly become the norm, with Zoom alone growing from 10 million to 200 million users from December 2019 to Marks, 2020 (Marks, 2020). However, the deficiencies and difficulties of participating in events through videoconferencing have become increasingly evident, particularly when charting the future of virtual events post-pandemic. Research has shown that collaborations via virtual teams are less successful than co-located teams, in large part due to the lack of telepresence (Morrison-Smith & Ruiz, 2020). While non-task-related, social interaction is often initiated spontaneously in face-to-face interaction, it requires experiencing a sense of co-location in technology-enabled events (Standaert et al., 2021). Indeed, Standaert et al. (2021) found that in events that were longer in duration, more capabilities are required to keep participants focused. Subsequently, to understand the implications of and chart future avenues of research to address these shortcomings, we propose the inclusion of a third dimension, social presence.

2.3. Social presence

Social presence, which is the *subjective sense of being together* (Oh et al., 2018; Pimentel & Vinkers, 2021) is often studied from the perspective of comparing how successful a computer-mediated communication is at emulating face-to-face communication. Understanding social presence is important in the development of VR as it is associated with favourable outcomes such as enjoyment, as well as contributing to the perception of artificial entities as social beings (Pimentel & Vinkers, 2021). When viewed from the context of virtual events, the lack of perceived co-location highlights the difference between social presence and telepresence, which is defined as the *sense of being there in the virtual environment* (Schubert, 2009). With telepresence, empirical work demonstrates users feel like they are there in the virtual environment, even if they are alone (Yung et al., 2021); a scenario that makes little sense in the context of meetings and events. Concomitantly, studies on social presence and virtual collaboration should focus on a solution which enables a sense of connectedness in a virtual environment.

Research has also demonstrated that in virtual environments, human emotional responses are significantly affected by virtual characters, and less so by virtual objects and spaces (Pimentel & Vinkers, 2021; Ravaja et al., 2018). Similarly, unlike geographical distance, perceived distance is the symbolic meaning of proximity rather than physical proximity, which can create a sense of closeness independent of physical distance (O’Leary et al., 2012). Critically, in the business events context, perceived distance known to influence decision making in virtual teams (Morrison-Smith & Ruiz, 2020). While telepresence and even self-presence (sense of virtual self as actual self) has received academic focus, the dimension of social presence predictably remains largely absent in tourism, hospitality, or events VR research. (Oh et al., 2018). tom Dieck et al. (2021)’s recent article on VR festival applications pointed to the ‘solitudinous nature’ of VR experiences as a key limitation, providing future directions for implementation of the technology. Consequently, it is imperative to integrate social presence, alongside virtuality and locality in a bid to establish a theoretical base to guide future research on virtual events.

Fig. 1 proposes the ‘SPEL Cube’ which integrates the dimensions of locality and social presence with the virtuality of the environment. The SPEL cube comprises eight vertices, charting virtual events across three critical dimensions. Table 1 is developed to further highlight the contribution of the SPEL cube, drawing on event examples and existing technologies that best reflects each designated category on the continuum. The examples selected are not exhaustive of existing technologies,

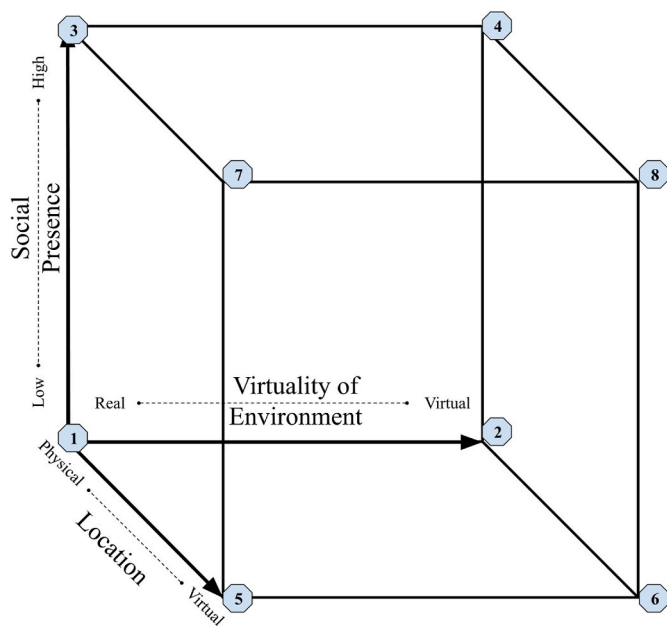


Fig. 1. The social presence-virtuality of environment-location (SPEL) cube.

instead, they were selected to showcase a typical example within each category.

The SPEL cube in Fig. 1 presents a unique opportunity to stimulate further research on the application and implications of virtual experiences on the tourism and events sectors. Research is required to understand the differing roles and experience of the various stakeholders on existing virtual platforms (Vertex 5/6). Adapting and extending the vast body of literature on F2F events and myriad of implications for attendees favouring virtual equivalents is important, particularly in light of the need of destinations to be resilient and potential future barriers to mobility. Understanding different roles and experiences of various stakeholders in Vertex 5/6 will allow for rigorous events preparation and training (Lui & Goel, 2022), as well as enhance crisis readiness and resilience for the host organisation and the events sector. Furthermore, research into the economic and social outcomes of VR events acceptance (Vertex 7/8) is warranted. Possible revenue models for digital experiences, new social norms for interaction in digital environments, and potential for rising inequality due to socioeconomic barriers to widespread VR adoption are all areas where further research is required (Pimentel et al., 2021). For instance, growing acceptance of VR events could potentially have paradoxical implications when considering the UNWTO Sustainable Development Goals (<https://www.unwto.org/tourism4sdgs>). Whilst innovation and acceptance in the area could contribute towards positive climate action and improving accessibility and inclusivity in theory; in practice, a potential outcome could be increasing inequalities instead as the privileged start literally building new (virtual) worlds inaccessible to those without the means to acquire and develop their own virtual infrastructures.

On the human-computer interaction (building towards Vertex 8), research and development on multi-user VR remains in its infancy and remains conceptually underdeveloped. Constructs and factors contributing toward social presence such as different approaches to immersive quality (e.g., visual representation, interactivity, etc.), contextual properties (e.g., physical proximity, social cues, etc.), psychological traits (e.g., user attitudes, demographic characteristics, etc.) (Oh et al., 2018), feasibility and impact of introducing artificial virtual characters, spatial audio, haptic feedback, or scent are avenues for future research. Such features not only have implications for elevating the ‘moment of truth’ in various service contexts thus enhancing customer delight (Ahrholdt et al., 2017), but also establish a clear competitive edge for

tourism, service and events organisations that seek to create long-lasting memorable experiences for consumers (Kim, 2018). Fitting into the broader contexts, progress made toward multi-user VR that evokes acceptable levels of social presence could signal paradigmatic shifts in terms of wide-scale implications to the future of (remote) work. Effectively this could shift society closer to dematerialisation and the new mobilities paradigm and as such the implications of closing temporal distance should also be explored (Sheller & Urry, 2006). Whilst technological advancements have allowed us to ‘revisit’ past events through video recordings, the potential ubiquity of VR events would allow participants to replay or revisit past virtually located events in their original format endlessly. Further, beyond entertainment and memorability purposes, closing psychological distance (spatial, temporal, social, and hypothetical) has been shown to improve tourists’ pro-environmental knowledge, attitude, and behaviour in environmental interpretation experiences (Frias-Jamilena et al., 2022).

Several agendas designed to close the gap between different vertices presented in Fig. 1 in order to improve the quality of virtual and VR-embedded events. Future empirical work designed to close the gap between vertices will assist tourism, events and hospitality practitioners in enhancing resilient infrastructure and offerings in response to disruption and crises, while also allowing for further refinement and innovation of experience offerings. Attention to how Vertex 5 (virtual event hosted via video conferencing platforms) can be improved and transformed into Vertex 7 (ideal virtual event in a real environment) or Vertex 8 (ideal VR event in a virtual environment) if appropriate technologies are embedded. The rationale is that Vertex 5 will likely be converted back to Vertex 3 (F2F event) once international travels resume, such virtual events will be hosted due to convenience and of limited implications for tourism and hospitality sectors (except for the *hybrid model* which has been outlined in Table 1). Further developments should aim to convert Vertex 5 into Vertex 7/8 that place significant emphasis on creating a fully immersive event experience by integrating mainstream event attributes (serving as key motives for attending events) with VR technologies.

Since the key difference between Vertices 7 and 8 is the virtuality of environment, apart from business events, designs of Vertex 7 will be more appropriate for hosting festivals, sports, and entertainment events (Getz & Page, 2016) due to the crucial role of spatial elements (e.g. place attachment, sense of place), the appreciation of arts and culture (e.g. for festivals, art exhibits), and the prerequisite of special-purpose venues in some events (e.g. for theatres, concert halls). Directions for improving Vertex 7 include (1) using technological advancements to improve social presence, and (2) using unique features of the event (i.e., key motives for attending the event) to create a sense of connectivity. For Vertex 7, it is imperative to integrate traditional event management with user management techniques to create an immersive event experience since there are specific features of the event that cannot be augmented by technology alone. The post-evaluation of *Splendour XR, 2021* by mass media also suggests that overselling the event can be problematic (Newstead, 2021), which impacts event satisfaction, retention rate, and brand loyalty (Petrick et al., 2013). Designs of Vertex 8 (with virtual Environment) are more applicable for business events which are not sense-of-place focused and can be explained by the motivations for attending a business event, which are often career orientated rather than to experience a local culture or a destination (Getz & Page, 2016). In addition, if a low interactivity VR event (Vertex 6) focuses on enhancing user’s experience (instead of focusing on the event supply side as depicted in Table 1), ultimately it should be transformed into Vertex 8 (ideal VR event) using VR technological advancements.

The gap between Vertex 3 (F2F event) and Vertex 4 (augmented reality event) could also be narrowed by incorporating augmented reality components to transform the physical environment to a virtual environment (Vertex 4). Not only does this transformation create an immersive event experience that fosters memorability and a sense of novelty, but also acts as an alternative because of the over-utilisation of

Table 1
SPEL cube vertex characteristics, examples, and implications.

Vertex	Characteristics of 3 Dimensions					Examples of Events	Implications for Tourism, Hospitality and Events (THE) Sector	
	Location		Social Presence		Virtuality of Environment			
	Physical	Virtual	Low	High	Real			Virtual
1	Physical		Low		Real	N/A	<p>Implications for THE sectors: LOW</p> <ul style="list-style-type: none"> F2F event with a low level of social presence, which is technically unrealistic since by definition, social presence is used to assess how successful a mediated communication experience emulates the gold-standard of F2F communication (Biocca et al., 2001). 	
2	Physical		Low		Virtual	Trade events, expo booths, industry conferences, sales missions and roadshows such as • Single-user CAVE mixed reality experience (Mechdyne Corporation., 2020)	<p>Implications for THE sectors: HIGH</p> <ul style="list-style-type: none"> These can be used in marketing to trade shows (i.e., expos and fairs, personal selling the destination/product/experience), travel exchanges (e.g., appointments with intermediaries), and travel familiarisation visits (Hsu et al., 2008). This type of experience does not require a high level of social presence. However, if the user/stakeholder requires a higher level of social presence in their experience, Vertex 2 can be converted to Vertex 4 with appropriate technologies. 	
3	Physical			High	Real	F2F	<p>Implications for THE sectors: LOW</p> <p>Implications for THE sectors: HIGH</p> <ul style="list-style-type: none"> Virtual sessions focus on enhancing user experience by making it more emotional, immersive and memorable in a way that the tourist becomes fully involved with the existing surroundings. These sessions have significant potential to contribute to tourists' first-hand experiences which is fundamental for destination marketing through hosting augmented reality tours/experiences (Bec et al., 2021). By eliminating the physical distance, designing such packages allows service providers to adopt, innovate, and transform service offerings to be attractive to more customer segments in the post pandemic era. Technology-embedded service innovation therefore can be part of an effective crisis management strategy (Le et al., 2021). Multisensory virtual experience allows for the customization of the experience by allowing tourists to experience both the products and the surrounding environment at the same time in a virtual manner. This virtual wine tasting has the potential to become a valuable marketing tool for thematic tourism, thus increasing tourists' intentions to visit the regions and 're-live' the tourism experiences in the real environment (Martins et al., 2017). Hosting virtual events/sessions in a physical location allows for the optimal utilisation and enhanced usefulness of multi-purpose venues. This has implications for property managers, hospitality operators and urban planners in long-term vision of multi-purpose venues (Croll, 2018), and reducing pressure on the preservation of fragile tourism sites and event venues (Bec et al., 2021). Whilst multi-user room-scale mixed reality experiences have grown in availability, their capabilities could be enhanced through advances to social presence (usage of artificial virtual characters), stimulation of senses (audio, haptic, smell), and ease of use (accessibility, inclusivity). 	
4	Physical			High	Virtual	Events/sessions that use augmented reality or CAVE VR to enhance in-situ user experience such as • Multi-user room scale mixed reality such as Zero Latency (Zero Latency VR, 2021) and Virtual Golf (X-Golf, 2021) • Virtual wedding package (Hilton Santa Barbara, 2020) • Virtual wine tasting (Martins et al., 2017)		
5		Virtual	Low		Real	Any virtual events hosted in video conferencing platforms such as • Zooms, Microsoft Teams, GoToMeeting, Cisco Webex, ezTalks Meetings, Skype for Business, etc.	<p>Implications for THE sectors: MEDIUM</p> <ul style="list-style-type: none"> The widespread use of mainstream virtual events during the pandemic is temporary and will be diminished as soon as international travel is fully resumed and people are able to return to attending in-person events. However, there will be room for hybrid events considering its convenience, inclusivity, and resultant substantial changes in lifestyles 	

(continued on next page)

Table 1 (continued)

Vertex	Characteristics of 3 Dimensions						Examples of Events	Implications for Tourism, Hospitality and Events (THE) Sector
	Location		Social Presence		Virtuality of Environment			
	Physical	Virtual	Low	High	Real	Virtual		
6		Virtual	Low			Virtual	<p>Any low interactivity VR events such as</p> <ul style="list-style-type: none"> • 3D interactive plan (Blue Immersive Media, 2020) • Employee and volunteer training sessions with VR (PC Gamer, 2017) 	<p>after lockdown: “Hybrid formats will become prominent in the foreseeable future” (Le & Yung, 2022).</p> <ul style="list-style-type: none"> • Improvements to perceived social presence of video conferencing and hybrid events through advances to immersion (embedded slideshow and video presentation improvements), and engagement and communication (improvements to user interface like pointing, multi-user sharing and collaboration of interactive media). <p>Implications for THE sectors: HIGH</p> <ul style="list-style-type: none"> • Such sessions are preview- and supply-focused. The 3D interactive plan is highly applicable for simulating any type of events, especially in the event planning phase. This includes event outlay, scenario planning and simulation, risk and compliance management, and emergency preparedness training programs (Velev et al., 2019). • VR technologies offer more engaging experiential learning and training compared to traditional teaching and training approaches (Lui & Goel, 2022; Zlateva et al., 2020). Users are found to retain a third more information from their immersive experience (Sepasgozar, 2020). Such training sessions are highly applicable to any tourism and hospitality businesses, as well as serving as a useful platform for training event employees and volunteers. • Interactivity and ensuing engagement could be improved through advances to widespread adoption of 6DOF (degrees of freedom) VR, ensuring users are active participants instead of passive.
7		Virtual		High		Real	<p><i>Ideal virtual events</i> such as</p> <ul style="list-style-type: none"> • Splendour XR (Virtual Splendour in the Grass) hosted on 24–25 July 2021 (Splendour XR, 2021) 	<p>Implications for THE sectors: HIGH</p> <ul style="list-style-type: none"> • Billed as a ‘world-first immersive virtual music festival’, Splendour XR is considered to have a medium level of social presence due to the connection between attendees, music and artists, all of which create a sense of engagement, inclusivity, and novelty. However, it does not necessarily mean that the perception of social presence is entirely attributed to VR-embedded technologies. The sense of engagement is also subject to the artist performances and their interaction at the start/end/between songs (Newstead, 2021). This is one key aspect for virtual event organisers to pay attention to, that is, the integration of mainstream event attributes (which are the key motives for attending events) with technological advancements. • Mass media criticises Splendour XR for over-promising the effectiveness of VR-embedded features in enhancing user engagement their first virtual event. The critiques revolve around overselling the event can be problematic since the attendees’ pre-expectation is not aligned with the during and post-event experience (Newstead, 2021). This therefore has crucial implications for attendees’ event satisfaction, retention rate, and event brand loyalty (Petrick et al., 2013).
8		Virtual		High		High	<p><i>Ideal VR events</i> such as</p> <ul style="list-style-type: none"> • Facebook Horizon workrooms (Meta, 2020) • Urban planning events (Digital Frontier, 2018) 	<p>Implications for THE sectors: HIGH</p> <ul style="list-style-type: none"> • Workrooms designed to be VR meeting rooms for work, which have potential to replace the ‘traditional’ video conferencing platforms to create a more immersive meeting and communicating experience in the foreseeable future (The Verge, 2021). Horizon workrooms however is subject to a technical limitation of only 16 people per VR session. Nevertheless, these workrooms can address several issues related to accessibility (i.e., the inability to be in the event in person), inclusivity (i.e., reducing social stigma), environmental sustainability (i.e.,

(continued on next page)

Table 1 (continued)

Vertex	Characteristics of 3 Dimensions						Examples of Events	Implications for Tourism, Hospitality and Events (THE) Sector
	Location		Social Presence		Virtuality of Environment			
	Physical	Virtual	Low	High	Real	Virtual		
							<p>reducing unnecessary travel) and removing venue rental costs</p> <ul style="list-style-type: none"> Using VR-embedded technologies can be of use in urban planning events/workshops designed for mega venues and tourism superstructure. Avenues for future research evolve around unresolved issues such as economic viability (e.g., budgeting, funding) and environmental sustainability. Indeed, the debatable discussion that augmented and virtual reality technologies are seen to bring new value to the power industry (Global Data, 2019) but in fact are energy consuming (Tan et al., 2018). Growing acceptance and proliferation of metaverses and virtual worlds will uncover myriad avenues for future research such as the future of (remote) work, new economic models and payment vehicles (cryptocurrency, non-fungible tokens), and ensuing paradoxical socioeconomic implications. 	

fragile tourism sites and event venues, thus reducing the impacts of deterioration and construction on sites and venue. While initial efforts have been implemented to embed VR technologies to advance heritage preservation in tourist experiences (Bec et al., 2019; Moro et al., 2019), this paper argues that VR related technologies also have substantial implications for different forms of tourism experiences as well as for the tourism, hospitality and events sectors (see Table 1).

3. Conclusion

This paper introduces the SPEL Cube as a potential conceptualization to classify different forms of virtual events and provide implications for the tourism, hospitality and events sectors. The SPEL cube presents a novel contribution to existing discourse on virtual events by integrating the three dimensions of Location, Social Presence, and Environment to create a pragmatic typology by which all current and future computer-mediated events can be classified. This paper is designed to stimulate discourse on the capacity of virtual events to transform the tourism, hospitality and events sectors, articulated by the vertices conceptualised in the SPEL cube, operationalised through the dimension of social presence across location and virtuality. Applying the SPEL cube presents immense potential to increase the applicability and effectiveness of delivering a memorable event experience, against the impending threat of virtual events completely replacing corporeal equivalents. This paper explored the critical importance of advanced technologies in the delivery of events, with hybrid and different degrees of VR-embedded events possessing immense potential for practitioners to deliver unique event experiences to delegates. The SPEL Cube also serves as a foundation to develop a virtual-events management framework to aid the resilience of tourism, hospitality and events sectors in response to disruptions and uncertainties. Further research should draw on the SPEL cube to explore virtual events within each of the vertices proposed in the conceptual model.

CRedit author statement

Ryan Yung: Conceptualization, Writing – Original Draft, Review, Editing, Visualization, Project administration, Investigation. **Truc H. Le:** Conceptualization, Writing – Original Draft, Review, Editing, Investigation. **Brent Moyle:** Writing – Review & Editing, Supervision. **Charles Arcodia:** Writing – Review & Editing, Supervision.

Impact statement

Diminished mobilities from the COVID-19 pandemic necessitated pivots in the events sector from face-to-face events to virtual substitutes. Despite mounting prominence, boundaries between the different types of virtual events have not been clearly defined, with conceptual ambiguity generating contention among tourism, hospitality and event management practitioners. This paper develops a typology of virtual events designed to clarify terminological misconceptions and establish clear limits whereby all current and future virtual events can be classified. The Social Presence-Environment-Location (SPEL) Cube is presented as a conceptual model designed to increase the applicability and effectiveness of delivering memorable event experiences. The SPEL Cube provides guidelines for hosting events in circumstances deemed exceptionally difficult (e.g., COVID-19), generating significant tourism implications for the host destination. The SPEL Cube also serves as a foundation for practitioners to develop virtual-events management frameworks to aid the resilience of tourism, hospitality and events sectors in response to future disruptions.

References

- Ahrholdt, D. C., Gudergan, S. P., & Ringle, C. M. (2017). Enhancing service loyalty: The roles of delight, satisfaction, and service quality. *Journal of Travel Research*, 56, 436–450.
- Bec, A., Moyle, B., Schaffer, V., & Timms, K. (2021). Virtual reality and mixed reality for second chance tourism. *Tourism Management*, 83. <https://doi.org/10.1016/j.tourman.2020.104256>
- Bec, A., Moyle, B., Timms, K., Schaffer, V., Skavronskaya, L., & Little, C. (2019). Management of immersive heritage tourism experiences: A conceptual model. *Tourism Management*, 72, 117–120. <https://doi.org/10.1016/j.tourman.2018.10.033>
- Biocca, F., Harms, C., & Gregg, J. (2001). The networked minds measure of social presence: Pilot test of the factor structure and concurrent validity. In *Proceedings of the 4th annual international workshop on presence* (Philadelphia, PA).
- Blue Immersive Media (Producer). (2020, July 29). In *Large retail 3D scan – inventory, Google business, employee training, emergency response [video]*. Youtube. <https://www.youtube.com/watch?v=XPrlXvXlJn4>.
- Croll, J. (2018). *Creating a games legacy*. *Australasian Leisure Management*, 126, 16–20.
- Global Data. (2019). In *Virtual reality in power – thematic research*. <https://store.globaldata.com/report/gdpe-tr-s025%5fvirtual-reality-in-power-thematic-research/>.
- tom Dieck, M. C., tom Dieck, D., & Jung, T. (2021). Exploring usability and gratifications for virtual reality applications at festivals. *Event Management*, 25(6), 585–599. <https://doi.org/10.3727/152599521x16106577965152>
- Digital Frontier (Producer). (2018). In *Paris city outlets – digital frontier*. <https://www.youtube.com/watch?v=ghcJxUg2Brw&t=120s>.
- Erickson, T., Kellogg, W. A., Shami, N. S., & Levine, D. (2010). Telepresence in virtual conferences: An empirical comparison of distance collaboration technologies. In *Proceedings of CSCW 2010*.

- Fang, J., Chang, V., Gao, G., & Wang, H.-C. (2021). Social interactions in virtual reality: What cues do people use most and how. In *Companion Publication of the 2021 Conference on Computer Supported Cooperative Work and Social Computing*.
- Flavián, C., Ibáñez-Sánchez, S., & Orús, C. (2019). The impact of virtual, augmented and mixed reality technologies on the customer experience. *Journal of Business Research*, 100, 547–560. <https://doi.org/10.1016/j.jbusres.2018.10.050>
- Frías-Jamilena, D. M., Fernández-Ruano, M. L., & Polo-Peña, A. I. (2022). Gamified environmental interpretation as a strategy for improving tourist behavior in support of sustainable tourism: The moderating role of psychological distance. *Tourism Management*, 91. <https://doi.org/10.1016/j.tourman.2022.104519>
- Gates, B. (2021). In *Reasons for optimism after a difficult year*. GatesNotes. <https://www.gatesnotes.com/About-Bill-Gates/Year-in-Review-2021>.
- Getz, D., & Page, S. J. (2016). Progress and prospects for event tourism research. *Tourism Management* (Vol. 52), 593–631. <https://doi.org/10.1016/j.tourman.2015.03.007>
- Guttentag, D. A. (2010). Virtual reality: Applications and implications for tourism. *Tourism Management*, 31(5), 637–651. <https://doi.org/10.1016/j.tourman.2009.07.003>
- Hilton Santa Barbara. (2020). In *Virtual wedding ceremony package*. <https://www.hiltonsantabarabeachfrontresort.com/assets/pdfs/Virtual%20Wedding%20Package%20B.pdf>.
- Hsu, et al. (2008). In *Tourism marketing: An asia-pacific perspective*. Milton: Wiley.
- Huang, Y.-C., Backman, K. F., Backman, S. J., & Chang, L. L. (2016). Exploring the implications of virtual reality technology in tourism marketing: An integrated research framework. *International Journal of Tourism Research*, 18(2), 116–128. <https://doi.org/10.1002/jtr.2038>
- Huang, Y.-C., Backman, S. J., McGuire, F. A., Backman, K. F., & Chang, L.-L. (2013). Second life: The potential of 3D virtual worlds in travel and tourism industry. *Tourism Analysis*, 18(4), 471–477. <https://doi.org/10.3727/108354213x13736372326154>.
- Kamin, D. (2021). In *Investors snap up metaverse real estate in a virtual land boom*. The New York Times. <https://www.nytimes.com/2021/11/30/business/metaverse-real-estate.html>.
- Kim, J. (2018). The impact of memorable tourism experiences on loyalty behaviors: The mediating effects of destination image and satisfaction. *Journal of Travel Research*, 57(7), 856–870. <https://doi.org/10.1177/0047287517721369>
- Le, J. D., Phi, G. T., & Le, T. H. (2021). Integrating chaotic perspective and behavioral learning theory into a global pandemic crisis management framework for hotel service providers. *Service Science*. <https://doi.org/10.1287/serv.2021.0282>
- Le, T. H., & Yung, R. (2022). Ones and zeros: An overview of virtual business events. In C. Arcodia (Ed.), *Routledge handbook of business events*.
- Li, J., Vinayagamorthy, V., Williamson, J., Shamma, D. A., & Cesar, P. (2021). Social VR: A new medium for remote communication and collaboration. In *Extended Abstracts of the 2021 CHI Conference on Human Factors in Computing Systems*.
- Lui, T.-W., & Goel, L. (2022). Learning effectiveness of 3D virtual reality in hospitality training: A situated cognitive perspective. *J. Hosp. Tour. Technol.* <https://doi.org/10.1108/jht-03-2021-0091>
- Marks, P. (2020). Virtual collaboration in the age of the coronavirus. *Communications of the ACM*, 63(9), 21–23. <https://doi.org/10.1145/3409803>
- Martins, J., Gonçalves, R., Branco, F., Barbosa, L., Melo, M., & Bessa, M. (2017). A multisensory virtual experience model for thematic tourism: A port wine tourism application proposal. *Journal of Destination Marketing & Management*, 6(2), 103–109. <https://doi.org/10.1016/j.jdmm.2017.02.002>
- McKinsey & Company. (2020). *How COVID-19 has pushed companies over the technology tipping point—and transformed business forever*. <https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/how-covid-19-has-pushed-companies-over-the-technology-tipping-point-and-transformed-business-forever>.
- Mechdyne Corporation.. (2020). In *CAVE virtual reality*. <https://www.mechdyne.com/av-vr-solutions/solutions/virtual-augmented-reality/cave/>.
- Meta. (2020, August 19). In *Introducing Horizon workrooms: Remote collaboration reimagined*. <https://about.fb.com/news/2021/08/introducing-horizon-workroom-s-remote-collaboration-reimagined/>.
- Milgram, P., & Kishino, F. (1994). A taxonomy of mixed reality visual displays. *IEEE TRANSACTIONS ON INFORMATION AND SYSTEMS*, 77(12), 1321–1329.
- Milgram, P., Takemura, H., Utsumi, A., & Kishino, F. (1994). Augmented reality: A class of displays on the reality-virtuality continuum. Telemanipulator and telepresence technologies. *Proceedings of SPIE*, 2351, 282–292.
- Moro, S., Rita, P., Ramos, P., & Esmerado, J. (2019). Analysing recent augmented and virtual reality developments in tourism. *J. Hosp. Tour. Technol.*, 10(4), 571–586.
- Morrison-Smith, S., & Ruiz, J. (2020). Challenges and barriers in virtual teams: A literature review. *SN Applied Sciences*, 2(6). <https://doi.org/10.1007/s42452-020-2801-5>
- Newstead, A. (2021). In *Splendour XR: A much-needed lockdown event but an uneven festival experience*. ABC News. <https://www.abc.net.au/triplej/news/musicnews/splendour-xr-review-virtual-festival-denzel-grimes-charli-tash/13470360>.
- O’Leary, M. B., Wilson, J. M., & Metiu, A. (2012). Beyond being there: The symbolic role of communication and identification in the emergence of perceived proximity in geographically dispersed work. *SSRN Electronic Journal*.
- Oh, C. S., Bailenson, J. N., & Welch, G. F. (2018). A systematic review of social presence: Definition, antecedents, and implications. *Front. Robot. AI*, 5(114). <https://doi.org/10.3389/frobt.2018.00114>
- Olson, G. M., & Olson, J. S. (2009). Distance matters. *Human-Computer Interaction*, 15(2–3), 139–178. https://doi.org/10.1207/s15327051hci1523_4
- Park, M., & Jones, T. (2021). Going virtual: The impact of COVID-19 on internships in tourism, events, and hospitality education. *Journal of Hospitality and Tourism Education*, 33(3), 176–193. <https://doi.org/10.1080/10963758.2021.1907198>
- PC Gamer (Producer). (2017, August 24). In *KFC 'the hard way' VR training game [video]*. Youtube. <https://www.youtube.com/watch?v=vb7GYATYArE&t=201s>.
- Pearlman, D. M., & Gates, N. A. (2010). Hosting business meetings and special events in virtual worlds: A fad or the future? *Journal of Convention & Event Tourism*, 11(4), 247–265. <https://doi.org/10.1080/15470148.2010.530535>.
- Petrick, J. F., Bennett, G., & Tsuji, Y. (2013). Development of a scale for measuring event attendees’ evaluations of a sporting event to determine loyalty. *Event Management*, 17(2), 97–110. <https://doi.org/10.3727/152599513X13668224082224>
- Pimentel, D., Foxman, M., Davis, D. Z., & Markowitz, D. M. (2021). Virtually real, but not quite there: Social and economic barriers to meeting virtual reality’s true potential for mental health. *Front. Virtual Real.*, 2. <https://doi.org/10.3389/frvir.2021.627059>
- Pimentel, D., & Vinkers, C. (2021). Copresence with virtual humans in mixed reality: The impact of contextual responsiveness on social perceptions. *Front. Robot. AI*, 8. <https://doi.org/10.3389/frobt.2021.634520>
- Rauschnabel, P. A. (2021). Augmented reality is eating the real-world! the substitution of physical products by holograms. *International Journal of Information Management*, 57. <https://doi.org/10.1016/j.ijinfomgt.2020.102279>
- Ravaja, N., Bente, G., Katsyri, J., Salminen, M., & Takala, T. (2018). Virtual character facial expressions influence human brain and facial EMG activity in a decision-making game. *IEEE Trans. Affect. Comput.*, 9(2), 285–298. <https://doi.org/10.1109/taffc.2016.2601101>
- Schubert, T. W. (2009). A new conception of spatial presence: Once again, with feeling. *Communication Theory*, 19(2), 161–187. <https://doi.org/10.1111/j.1468-2885.2009.01340.x>
- Sepasgozar, S. M. E. (2020). Digital twin and web-based virtual gaming technologies for online education: A case of construction management and engineering. *Applied Sciences*, 10(13), 4678. <https://doi.org/10.3390/app10134678>
- Sheller, M., & Urry, J. (2006). The new mobilities paradigm. *Environment and Planning A*, 38(2), 207–226. <https://doi.org/10.1068/a37268>.
- Sox, C. B., Kline, S. F., Crews, T. B., Strick, S. K., & Campbell, J. M. (2017). Virtual and hybrid meetings: A mixed research synthesis of 2002–2012 research. *Journal of Hospitality & Tourism Research*, 41(8), 945–984. <https://doi.org/10.1177/1096348015584437>
- Splendour XR. (2021). XR world. <https://splendourxr.com/explore/xr-world/>.
- Standaert, W., Muylle, S., & Basu, A. (2021). How shall we meet? Understanding the importance of meeting mode capabilities for different meeting objectives. *Information & Management*, 58(1). <https://doi.org/10.1016/j.im.2020.103393>
- Tan, K. W., Cuervo, E., & Balan, R. K. (2018). FocusVR: Effective and useable VR display power management. In proceedings of the ACM on interactive, mobile. *Wearable Ubiquitous Technol.*, 2018 September, 1–25. <https://doi.org/10.1145/3264952>
- Tavakoli, R., & Mura, P. (2015). ‘Journeys in Second Life’ – Iranian Muslim women’s behaviour in virtual tourist destinations. *Tourism Management*, 46, 398–407. <https://doi.org/10.1016/j.tourman.2014.07.015>
- The Verge. (2021). In *Inside facebook’s metaverse for work*. <https://www.theverge.com/2021/8/19/22629942/facebook-workrooms-horizon-oculus-vr>.
- Velev, D., Zlateva, P., Steshina, L., & Petukhov, I. (2019). Challenges of using drones and virtual/augmented reality for disaster risk management. Paper presented at the International Archives of Photogrammetry, Remote Sensing and Spatial Information Sciences. *Gottingen*, 42(3), 437–440. <https://doi.org/10.5194/isprs-archives-XLII-3-W8-437-2019>
- Wei, W. (2019). Research progress on virtual reality (VR) and augmented reality (AR) in tourism and hospitality. *J. Hosp. Tour. Technol.*, 10(4), 539–570. <https://doi.org/10.1108/jht-04-2018-0030>
- Williams, P., & Hobson, J. S. P. (1995). Virtual reality and tourism: Fact or fantasy? *Tourism Management*, 16(6), 423–427. [https://doi.org/10.1016/0261-5177\(95\)00050-X](https://doi.org/10.1016/0261-5177(95)00050-X).
- X-Golf. (2021). About us. <https://www.xgolf.com.au/locations/enoggera-qld/>.
- Yung, R., & Khoo-Lattimore, C. (2019). New realities: A systematic literature review on virtual reality and augmented reality in tourism research. *Current Issues in Tourism*, 22(17), 2056–2081. <https://doi.org/10.1080/13683500.2017.1417359>
- Yung, R., Khoo-Lattimore, C., & Potter, L. E. (2021). VR the world: Experimenting with emotion and presence for tourism marketing. *Journal of Hospitality and Tourism Management*, 46, 160–171. <https://doi.org/10.1016/j.jhtm.2020.11.009>
- Zero Latency VR. (2021). Experience. <https://zerolatenessvr.com/experience/>.
- Zlateva, P., Velev, D., & Galabov, M. (2020). Research on the applicability of virtual reality for emergency evacuation training in business buildings. Paper presented at the *International Multidisciplinary Scientific GeoConference: SGEM; Sofia*, 20(5.2), 417–423. <https://doi.org/10.5593/sgem2020/5.2/s21.051>



Dr Ryan Yung is a Lecturer in the Department of Marketing, Events and Tourism at the University of Greenwich. His research takes an interdisciplinary approach to tourism and hospitality designed to generate impactful contributions to digital transformations and innovations, accessibility, inclusivity, and sustainability. Ryan's track record of publications aligns to three core research streams: (1) implications and optimal adaptations of extended reality systems, (2) the concept of presence and emotions, and (3) digital innovations in marketing.



Brent Moyle, PhD., is an Associate Professor in the Department of Tourism, Sport and Hotel Management, Griffith University. Brent takes pride in conducting research at the interface between theory and practice, engaging extensively with industry partners to complete research with impact. The outcomes of his research have culminated in over 90 journal articles, with an emphasis on tourism, sustainability and regional development.



Dr Truc H. Le is a Lecturer in the Department of Tourism, Sport and Hotel Management at Griffith University. She graduated with a PhD at Griffith University in 2020 and worked as a research consultant at EarthCheck Australia after graduation. Her research focus includes risks and resilience, risk perceptions, cruise tourism, authenticity, user-generated content analytics, and machine learning. She has published in various top-tier international tourism and hospitality journals.



Prof Charles Arcodia is an experienced tertiary educator having taught and researched in the tertiary sector for over 20 years. His primary areas of research and engagement interest are in tourism and event management, and various tourism and related cultural issues. His primary areas of teaching and research interest are in event management, tourism and hospitality education, and various tourism and related cultural issues. He has held leadership positions in a variety of educational and business service contexts.