The Fun Palace: Designing Human Experiences at Mixed Reality Events to Increase Engagement

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Abstract

This article is the culmination of an intervention designed to improve active engagement with emerging technologies at a public mixed reality event. An opportunity arose to experiment with the design of interactive audience experiences at the *The Fun Palace: Carnival of Mixed Realities*—an event that took place in 2019 and featured 10 installations with close to 400 attendees. A number of strategies emerged to increase attendee engagement that may be useful for xR developers, museum curators, and event producers that present interactive technologies and installations publicly.

Keywords

Mixed reality events, installation, virtual reality, engagement

Introduction

The first section of this article asks the reader to reimagine two mutually influential concepts common to hardware and software development that inform how human experiences are designed at public events. One, is the term mixed reality (MR) that has evolved over time to describe human interactions within specific technological constraints and affordances. The other term is *users*, often describing people who interact with any technology. In the second section of this chapter, we will detail a specific investigative case, *The Fun Palace: Carnival of Mixed Realities* where strategies were implemented to increase engagement.

I: Rethinking Human Interactions at Public Mixed Reality Events

Oscillating Between Physical and Virtual Realities

The design of events in public spaces involving multiple types of interactive technologies is in growing demand. Assumptions are often made of the type of human interactions that will occur. *The Fun Palace: Carnival of Mixed Realities* aimed to identify those interactions and consider them in the design of the event. While some installations were curated with familiar interactions in mind, others were designed to experiment with contrasting interactions that traversed the continuum of physical and virtual realities. The experimental nature of co-constructing the event informed how we would come to define it as mixed reality: dependent on the shared experiences each person would have oscillating between the physical and virtual realities of the space. Where virtual realities can be isolating, we sought to make them social through this oscillation, driving human-human interactions mediated by human-system interfaces.

We draw from Milgram and Kishino's (1994) definition of mixed reality as a malleable continuum between virtual and physical realities that connects the virtual experience to its physical surroundings. [1] Milgram and Kishino's "virtuality continuum" predates associations with specific hardware devices, such as Microsoft's Hololens 2 and Magic Leap One, allowing us to design experiences that re-orient our focus away from specific technological affordances, and towards a variety of different human-human and human-system interactions in public spaces. This experience-oriented framework informed the following prompts: What are the needs of mixed reality event (MRE) attendees and how do we design experiences that captivate those curious but not yet engaged?

From User Experience to Human Experience

People who come to MREs may do so to experience the latest interactive and immersive technologies that go beyond the everyday, hoping to try out something they might not normally have access to. The event is a social one for many, where they go to share in those experiences with their friends. The term *user* is commonly applied to describe event-goers as the *users* of the technology. This term carries with it a hierarchical assumption, that the system is meant for the *user* to control rather than to experience, and extending from that, an obsession with *usability*. As suggested by Dervin and Reinhard, this leads to "user-oriented terms [that] privilege systems over people by rhetorically making

systems and use of them the center of attention." [2] However, this does not accurately represent the complexity of human-human and human-system interactions that take place during public MREs.

When the center of attention shifts to the human experience, then our *user's* entire experiential journey needs to be considered, as well as how we refer to them. The complexity of the actions they perform are not limited to *using* but encompass a wide breadth of social interaction. They may walk around aimlessly, or search for specific types of experiences. They may enjoy watching others experience something, and might take everything in first, understanding the installation at a distance before trying it for themselves. Avoiding the term *user* acknowledges this complexity and avoids privileging the designed experience over those unexpected and peripheral ones that might be just as important to the social encounters such a public event seeks to facilitate.

Our so-called *users* have also been defined as *audiences* given that their journey may include passively or actively watching others. These are what Dervin and Reinhard call, "amorphous groups of individuals that communication, media and information systems attract or entice with arrays of offerings of particular genres, programme types, or content." [3] Semantically, this term is not accurate since many audiences tend to watch something intentionally performed, and refrain from interacting with a performance to avoid impinging upon its predefined intentions. Even interactive performances that have challenged the performer/audience divide still refer to the role of an audience. During MREs the audience-performer boundary is fluid, as the interaction in this social space is performed and observed by an audience. Some people interact with different types of installations and technologies and others watch them. In fact, the same individual can be both the observer and the observed. In this way, we quickly come to the realization that if we are to design for events that offer numerous types of interactions, it may be better to abandon the terms *users* and *audiences* altogether.

As Dervin and Reinhard remark, "[human beings have increased] control over their access and use of all manner of information and entertainment systems". They claim that we may benefit from no longer seeing MRE attendees as "users or as audiences but rather as persons with agency." [4] The agency that people have when they journey through an MRE and choose what they wish to experience and what they do not, may help us define different levels of engagement within that continuum between physical and virtual reality. While we have identified that the people attending such an event should not be classified as users or audience members, we leave the development of an alternate term for future discussion. The varied levels of engagement any one person may have at any one time during an MRE makes it difficult for us to neatly categorize them as either user, audience, observer, participant, immersant, etc. For simplicity we will refer to them as attendees of our event as this term implies nothing more than their presence.

Figure 1. The *Fun Palace: Carnival of Mixed Realities*. Photo © Andreas Psaltis, 2019.

II: Designing for Engagement on a Continuum Between Physical and Virtual Realities

The Fun Palace: Carnival of Mixed Realities was an MRE prototype intended to investigate human responses to a variety of interactive experiences (shown in Figure 1) across a range of the virtual/physical and passive/active spectra that might increase their engagement.

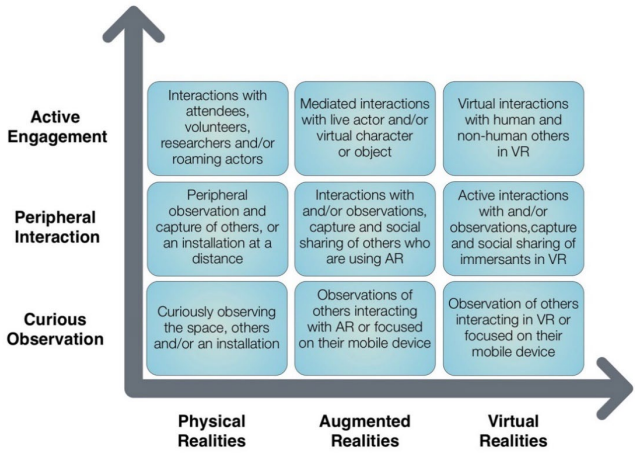

Figure 2. Public Mixed Reality Event Engagement Grid CC BY-NC-ND 4.0.

Our approach to designing for engagement drew from theatrical staging and user experience design traditions. Conceptual frameworks exist for designing engagement with technology such as that proposed by O'Brien and Toms [5], yet none are specific to MREs. Combining these traditions with Milgram and Kishino's MR Continuum, we mapped different types of anticipated engagement (curious observation, peripheral interaction, and active engagement) within and between physical and virtual realities that we anticipated and designed for (Figure 2). *Curious Observation* included observation that usually led to further engagement. As attendees engaged, they demonstrated *Peripheral Interaction* with others from afar with the intent to learn and try, captured others in AR or VR, and shared their experience across social channels. Those *Actively Engaged* socialized

with other attendees, volunteers and actors, became participants in a study, experienced different levels of interactivity using AR, or immersed in VR.

Engaging Installation Designs Mapped to the Engagement Grid

Each installation for *The Fun Palace* was submitted to a call for proposals and considered for how it might contribute to engaging a diverse audience in a multitude of ways. The *Small Stage* installation offered a site for more traditional audience-dancer engagement allowing audience members to choose different combinations of visuals and music that would inform the choreographed work. *Body RemiXer* proposed several forms of engagement, from curious observation of impromptu physical performances to active interaction with others mediated through a VR headset and body tracking. *JeL* was an immersive experience which sought to connect people through breathing. This experience actively engaged participants in a mostly virtual reality where their breath controlled the movement of a jellyfish and growth of a coral.

The Piano Bar tasked people to play the "correct" notes on an 88-key piano that corresponded to specific synaesthetic colour values, engaging them in a virtual puzzle that others could observe or help with. *Boids* allowed attendees to control a flock of birds projected on a screen through different body movements. *Colossus* actively engaged participants through a Muse 2 headband that triggered an ambient soundscape and visuals corresponding to their brainwaves in a virtual reality presented through a VR headset. Actors roamed *The Fun Palace* ushering attendees who appeared less engaged into a secretive *Curiosity Booth* to interact with actors in the roles of modern curiosities, through an iPad, drawn from the underbelly of social networks.

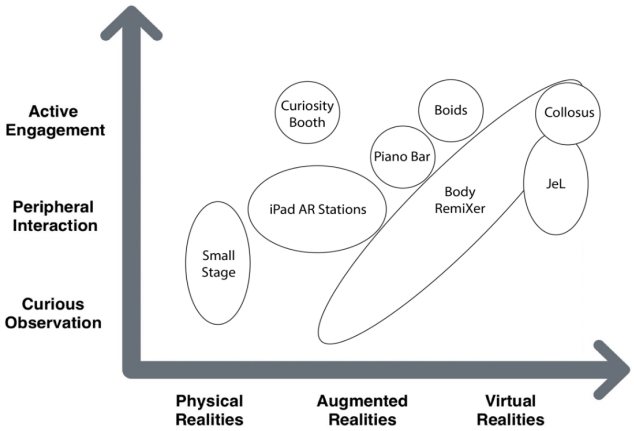

Figure 3. Installations plotted on the Engagement Grid CC BY-NC-ND 4.0.

To reduce the potential for disengagement and increase opportunities for active engagement we designed for multiple interaction points and implemented the strategies that follow.

Plotting Engagement Before, In-Between and After Experiences

Following O'Brien and Toms' framework, several features of *The Fun Palace* catalyzed different human responses before, in-between, and after their experiences, creating many "points of engagement" to keep attendees engaged and re-engage them as needed. These included roaming actors identifying those waiting and/or those who appeared bored to provoke interaction, guide them to a shorter line-up, or to enter the *Curiosity Booth* (Figure 4).

Figure 4. Posters hiding the entrance to the *Curiosity Booth* by Photo © Andreas Psaltis, 2019.

iPad stations (Figure 5) were available to attendees anytime in several locations and large markers on a centrally positioned scaffolding structure triggered augmented reality animations providing opportunities for engagement between installations.

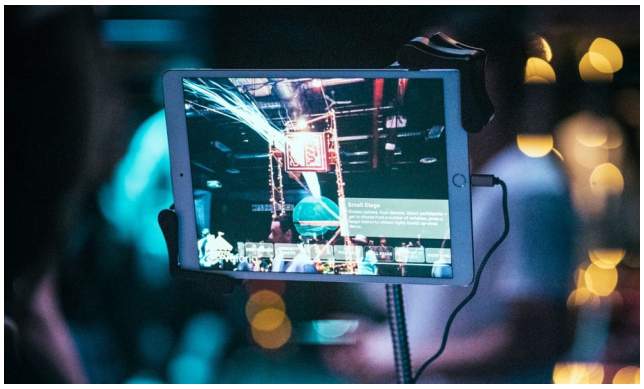

Figure 5. iPad Station with AR brain describing installations. Photo © Andreas Psaltis, 2019.

Timed group activities occurred every hour and a live master of ceremonies drew everyone's attention to twelve to fifteen volunteers holding their mobile devices in the air showing an animatic of a whale viewed through an AR application. The activity culminated in a conga line (Figure 6) that allowed us to rotate our growing list of attendees and provide them with a sense of closure.

Figure 6. Attendees in a conga line. Photo © Andreas Psaltis, 2019.

Post-experience activities included different research teams intent on capturing attendee experiences of specific installations and of the overall Fun Palace experience encouraging attendees to engage in a reflection of their experience. Some experiences, such as *Body RemiXer* were designed for open engagement, allowing attendees to directly approach the installation without waiting in line. Instead, they could interact through projections while they waited to put on the VR headset following a model of progressive engagement that allowed for interaction up to their level of interest and comfort. [6]

Increasing opportunities for social exchange through multi-person experiences

During the curation process we intentionally planned to include experiences that would simultaneously engage multiple people, increasing throughput and opportunities for social exchanges. The *Small Stage* seated audience experience allowed for 17 people every 15 minutes. *Body RemiXer* afforded up to 6 people to engage simultaneously for up to 10 minutes, allowing all 400 people to engage freely over the 4-hour event. *Boids* allowed 2-3 people every 2 minutes while *The Piano Bar* challenged 45 attendees per hour. All the installations provided opportunities for simultaneous participation, offering many opportunities for interpersonal engagement during and in-between each experience.

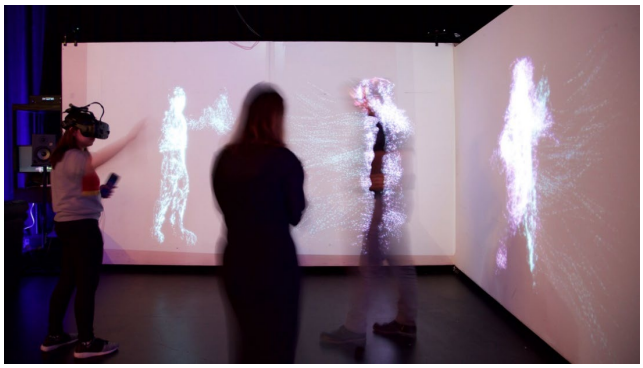

Figure 7. Peripheral and Active Engagement with *Body RemiXer* by Desnoyers-Stewart et al. Photo © Melissa Dex Guzman, 2019.

Disrupting Expected Boundaries

The physical and virtual boundaries that constitute a play area, especially in VR installations is usually well defined. In the case of *Body RemiXer*, the boundary between viewer and participant was made intentionally unclear to pull attendees into the experience. The result was a fluid liminal space in which curious voyeur could suddenly become part of the interactive work. In many ways this fluid boundary was exploited by several of the installations as they could be observed from afar through large projections, drawing curious observers until they fully engaged with the piece.

Stage the entire physical space with lighting, set and sound

Lighting was designed to set the ambience of the space along with a more pragmatic function of lighting specific AR markers required by four installations. Eight projected screens were used to afford multiple viewing angles and drew curious observers into being more actively engaged. These projections allowed attendees to witness others in VR, interact with some installations, and observe AR experiences enlarged from smaller devices.

A rich ecosystem of sound drew attendees to certain areas while headphone experiences could give them reprise from the audio carnival. Sound played through over 17 different speakers and 10 different sound systems on both headphone-based and amplified systems. The sonic ecosystem provided attendees with multiple instances of sound realities that were each related to the individual experiences around them, yet existing within the same space where attention was distributed and in constant negotiation.

Relating to the Engagement Grid as we Emerge from Covid-19

While our engagement grid was developed within a pre-pandemic social experience, our recent involvement in a post-pandemic event revealed that the grid is still applicable. The V-Unframed 2021 exhibition consisted of multiple mixed reality installations in the same physical hangar as *The Fun Palace*.

We observed similar human behaviours when it came to engaging with each installation despite mask wearing and social distancing regulations. The event required all attendees to show proof of vaccination against COVID-19 prior to entry, and a limited number of attendees were permitted in the hangar at any given time. Attendees roamed freely throughout the hangar, interacted with one another between time spent at each installation and VR headsets were worn along with masks in most instances.

Upon encountering the Star-Stuff installation at V-Unframed, some individuals engaged in curious observation perhaps waiting for another attendee to try the installation first. Some curious observers transformed into actively engaged participants in VR regardless of the constraints of mask wearing and social distancing.

Figure 8. Children playing in Active Engagement with each other via the Virtual Reality of *Star-Stuff* at a post-pandemic exhibition by John Desnoyers-Stewart. Photo Julia Read, 2021 CC BY-SA 4.0.

Even in a post-pandemic world where attendees' social norms have been significantly altered by nearly two years of social distancing and limited time in shared public spaces the Public Mixed Reality Event Engagement Grid continues to be a useful tool. By providing opportunities for engagement spanning this grid, V-Unframed 2021 was able to encourage a renewed sense of community and encourage the formation and strengthening of social bonds amongst those who attended.

Conclusions

Our MRE prototype offers an opportunity to implement strategies that transform curious observers to more actively engaged attendees. To succeed in that transformation, we believe there is a need to design beyond the on-screen experiences that dominate the attention of installation creators and event producers. An environment which facilitates various types of engagement through different means is essential to an engaging MRE. As we emerge from the Covid-19 pandemic the importance of intentionally designing human interactions in public spaces is even more important.

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Author(s) Biography(ies)

Dr. Patrick Parra Pennefather is an award-winning composer, designer of asynchronous, synchronous, blended and hybrid instruction, teacher, researcher and disruptor. He has mentored multi-disciplinary teams co-constructing scalable digital prototypes with over 50 companies and organizations in games, mobile dev, Mixed Reality, VR, AR, education and the arts. Patrick has facilitated human-centred workshops in-person and as a virtual cat for EA, Riot, Microsoft Games, and many others in the xR space. He's published multisyllabic words in the fields of 3D, Sound Design, xR, VR, MR, Bio-Medical Visualization and Agile application development. He's an Assistant Prof at UBC Theatre and Film, and a founding member of the Master of Digital Media (MDM) Program.

John Desnoyers-Stewart is an interdisciplinary artist-researcher who creates immersive installations and performances to encourage new perspectives on immersive technology and to better understand its true potential. Through his artwork and research, he hopes to encourage social connection and collaborative creativity, exploring positive social applications of abstract embodiment in virtual reality.