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# **How was it for you? Qualitative Observational Methods to Assess the Experiential Value of Two Immersive Augmented Reality Stories, a Case Study.**

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ABSTRACT: Immersive storytelling using augmented reality is a well-established and widely researched practice with a growing body of literature spanning the last two decades in which researchers from various fields apply this technology to cultural spaces. Despite this, the methodologies used to assess the efficacy of these applications - even defined measures of what constitutes success - remain disparate and often aligned to the field from which they originated - these being HCI, Visitor Studies and New Media Art. The form these interventions take and the modes of storytelling they employ is steadily diversifying alongside theories and definitions of what constitutes a story. In this context of divergence, a reimagination of the methods researchers use to evaluate and assess their projects would be useful to ensure the nuances of the engaged experience and the value it offers to audiences can be captured. This paper proposes a methodological approach, seeking to enable the evaluation of experiential value. This methodological approach is then applied to two augmented reality immersive stories, created by the author, the first an educational, linear narrative and the second a non-linear narrative artwork. Using primarily qualitative narrative observation, participant interactions with both projects is explored, testing the application of experiential value as a measure and interrogating the chosen methodology's ability to capture it.

## 1: Introduction

I will begin with a perhaps overused but none the less relevant quote, stating that “the history of storytelling is as old as human history” (Yılmaz & Cığerci, 2019 p.12). This conjures up bucolic images of our ancestors’ sharing tales around the fire, perhaps even being multimodal in their delivery, using actions, drawing images etc. An experience that some, not least Dowling (2019) and Gröppel-Wegener & Kidd (2019) would argue to be, to a certain degree, immersive.

To most, both within and beyond academia, immersive is a term that is synonymous with technology. Immersive visual storytelling and its delivery systems is situated as emerging from within the fields of computing and HCI, and more latterly in the form of immersive artworks. A significant proportion of these use as their interactive medium Augmented Reality (AR), Virtual Reality (VR) or exist on a continuum between the two commonly referred to as Mixed Reality (MR). (Adhani & Rambli, 2012; Mesarsova & Sidor, 2018; Rubio-Tamayo, Barrio & Garcia, 2017). A significant proportion of these projects are situated within cultural spaces such as museums and art galleries, with these locations being popular with researchers (Tillon, Marchal, & Houlier, 2011). Such spaces possess both interesting things to tell stories about and willing audiences to tell them to, allowing a subsequent analysis of their responses. (Chung, Lee, Kim & Koo, 2018; Matuk, 2016; Schavemaker & Wils, 2011).

As these immersive interventions have become more complex (and more accessible to researchers) intricacy and ambition has grown, as has the appetite to imbue these experiences with meaning, disseminate knowledge or provoke emotion. Story has been one of the key mechanisms by which researchers have sought to do this, either by using traditional linear

narrative and characterisation or through more ambiguous, non-linear experiences. The two augmented reality case studies included here aim to explore the developing concept of story brought about by technologically mediated immersion and to provide additional insight into the characteristics and definition of story in this context. This process ferments a confluence of research areas: HCI (Human Computer Interaction), Curatorial Practice, Visitors Studies, and New Media Art practice. These investigations tend to refer back to their discipline of origin for the methodological approaches used to assess these interactive stories producing, at best, a degree of methodological confusion (Hein, 1998) and, at worst, methodologies which are incapable of capturing, in a meaningful way, the varied engaged experiences of audiences participating in immersive stories.

This paper considers the merits of methodologies drawn from the above fields of study and seeks to define a methodological approach that is equipped to capture and coherently decode the engaged experience of those participating in the two Augmented Reality immersive storytelling projects presented here, with both projects being designed, developed and produced by the Author with the specific aim of enabling a consideration of experiential value. The first, *'Temple Newsam AR' (TNAR)* is a site-specific, linear narrative experience, that is intended to be wholly educational, the second, *'Can't Stop Looking'* is a non-linear visual narrative in the form of an interactive artwork. The intention when designing and producing these applications and when observing participant use is to apply the same methodology to interactive stories at opposing ends of the spectrum of what is considered a story. At one extreme imbued with the traditional accoutrements of storytelling such as linear narrative, identifiable and relatable character and plot, at the other non-linear, non-task orientated, and without identifiable characters. Key to the process is the designation of desired outcomes and markers of success to facilitate the exploration of concepts of learning

and pleasure, of value and comprehension. In sum, to develop the concept of experiential value and ways of measuring it. To achieve this, a number of areas of investigation are required; an initial consideration of immersive stories and the mechanisms by which narratives engage and motivate will be made. Following this, a consideration of the methods used in a range of research disciplines to assess user engagement with Augmented Reality immersive stories will seek to define measures which can be applied to the divergent case studies presented here. This information will be used to inform the methodologies applied and reflected upon in the final chapter.

## 2: Immersive Stories in Cultural Spaces.

### 2.1 A (very) brief history or stories

Here, by necessity, a brief consideration of the purpose, history and power of stories will be presented, which by no means captures the nuance of this field, but serves to identify the key characteristics later required.

When considering stories from the perspective of narrative fiction, (Hudson, 2015; Yorke, 2013) the focus is placed firmly upon narrative and character. “The protagonists’ battle against their antagonist, their journey to victory through crisis, climax and resolution; these are the building blocks of every story” (Yorke, 2013, p.11). The assertion being that traditional stories have a recognised structure, follow a narrative arc (Blackburn, 2015) and when these are applied coherently, have power to convey information and elicit emotional responses. The primary mechanism being the self-identification of the participant (reader) of the story with the actions and experiences of the characters.

Stories are an essential part of how we make sense of our world. They can be internal - the stories we tell ourselves that construct our internal narrative and sense of self (Baumeister & Newman, 1994). Or, more pertinently here, they are constructed externally, often with the intention of imparting knowledge or understanding by using analogy, metaphor, symbolism, connotation or signification (Cohan & Shires, 2003), with fables & fairy tales often cited in this instance. *Little Red Riding Hood*, for example, is an allegory of, amongst other things, death and rebirth, the seasons and not straying from the path (Delaney, 2006). Stories are positioned as both an engaging medium within which knowledge or information can be imparted in a form that encourages consumption and a relatable medium in which the experiences of the character and the consequences of their actions can inform the subsequent actions, beliefs or behaviours of the reader. Stories are credited with significant power to alter individual and societal perspectives on a wide range of issues such as historical (Cronon, 1992) & political (Frischlich et al., 2018); “Fake news” being a contemporaneous example of this (Vamanu, 2019). To summarise, stories can impart knowledge and communicate meaning that is impactful and compelling in a form that is relatable and can motivate participants (reader, viewers etc.) to begin and continue to engage with the material. This motive force is primarily derived from an emotive connection the reader forms with the narrative or character.

## 2.2: Immersive stories for cultural spaces.

The power of stories to inform and engage is the primary motivation for their use when creating immersive experiences, as is now widely recognised;

AR and MR storytelling experiences have the potential to change how we view the world, to make us see the world from a different perspective... and to in turn change

our belief systems and values. (Azuma, 2015 p.274).

Immersive Storytelling using AR and other technologically mediated processes situated in cultural spaces is the focus of a growing number of research papers, with these projects exploring a range of narrative forms, for example: (Boschloos, Nofal, Ramakers, Hameeuw, Moere & Vande., 2017; Danks, Goodchild, Rodriguez-Echavarria, & Griffiths, 2006; Keil, Pujol, Roussou, Engelke, Schmitt, Bockholt & Eleftheratou, 2013; Lombardo, Damiano & Park, 2010; Roussou & Katifori, 2018; C. Spurgeon, 2015; Spurgeon & Burgess, 2015; Vayanou, Katifori, Antoniou & Chrysanthi, 2016; Vayanou, Katifori, Karvounis, Kyriakidi, Roussou., Tsangaris & Pujol, 2014). Azuma (2015) identifies 3 common approaches through which all such Augmented Reality interventions can be categorised, these being Reinforcing, Reskinning, and Remembering.

Reinforcing applies immersive narrative content to “an object, person, or location, that is inherently compelling by itself” (Ibid, p.261). Here the intention is to enhance the existing physical context by offering new content that supplements what is already significant. This is the most common approach taken by researchers and can be applied to the majority of technological interventions in cultural spaces. These projects are often comparable to traditional Audio Tours (Mason, 2016; Othman, Sulaiman, & Aman, 2018). Two projects deserve special mention here, firstly *Project [Murmur]*, an audio intervention on the streets of Toronto in the form of non-linear oral histories, presented at and only accessible on the sites concerned. These invite the participant to partake in a “*psychogeographic derive*”(Eaket, 2008). The *CHESS* project is the second; a personalised approach to linear storytelling with participants assigned a specific narrative intended to match their predisposed interest. The narrative focuses on one of a number of specific characters represented in

sculptural form in the *Acropolis Museum* in Athens. (Katifori, Karvounis, Kourtis, Perry, Roussou & Ioanidis, 2014, 2018).

The remaining two categories postulated by Azuma are Reskinning and Remembering.

Reskinning is said to occur when the physical and digital contexts are co-curated, with the physical space built specifically as a site for the augmented content. Remembering is to a degree comparable to Reimagining, however the physical space is not in itself recognisably engaging; in this case the augmented content is used to unveil hidden spatial narrative.

Examples of augmented reality immersive stories in cultural spaces that take either of these forms are far less abundant within academic literature, and those that exist are more likely to be positioned as works of art rather than as educational.

As an example of the above, the recent immersive narrative artworks of Refik Anadol such as *Latent Being* (2020) at the Kraftwerk Building, Berlin or *Machine Hallucinations*, (2019), ARTECHOUSE New York, seek to “visualise data-based narratives” or provide a “constantly unfolding narrative in time”. (Anadol, 2022). In both these projects, the artist combines large databases of categorised open-source imagery (specifically of New York City in the case of *Machine Hallucinations*) and uses machine learning algorithms to interpret and present these in non-linear narrative sequences that are projected onto multiple surfaces within a building, to create a “hybrid reality” (ibid), mixing architecture with immersive visual content. As a second example, many of the works by Tokyo based TeamLab would suffice here, but *Sharing Mass Rock, Transcending Space* (2019) Tokyo and Shanghai has been selected. This non-linear narrative takes the form of two fully immersive physical spaces, one in each location, onto which mapped interactive content is projected, which senses and reacts to the physical presence of the participants. The same rocky surface is

projected in both locations and the interactions of participants in one location is displayed in real-time at the other location, thus creating a narrative between the participants across space.

Both the above examples present immersive stories that are divergent from traditional notions of narrative, being both non-linear and supporting the position that “The use of digital media in storytelling has led to the formation of new narrative structures and given new dynamics to the communicational aspect of the process” (Arsenopoulou, Papageorgopoulou, Charitos, & Rizopoulos, 2018 p.334). Beyond this that “Immersive virtual environments, as digital storytelling media, share similar characteristics with other digital media, namely, non-linear narrative structures and a certain level of interactivity” (Ibid p.335). These examples require us to consider the very concept of story and not all will agree that artworks such as these, in which the traditional apparatus of storytelling are absent, are in fact immersive stories. If they are accepted as such, this raises questions about what motivates participants to engage with these stories where linear narrative and recognisable characters are not present.

What are the essential qualities of an experience that makes it a story? It could be argued that it relates to instances experienced through time, that a picture speaks a thousand words but becomes part of a story when viewed alongside other works and experienced by the viewer in a sequential but not necessarily linear manner. For example, curatorial narrative relating to the artist life is a popular exhibition subject, providing a narrative through sequential experience of multiple instances through time – Rembrandt’s many self-portraits for instance. Or, to give another example, a single cell from a comic book only becomes part of the story when experienced in the context of the other cells in the comic. So, in relation to the examples above, by Anadol or TeamLab, these artworks can be considered stories on the basis that the viewer experiences developing iterations of the work across time and this

evolution is what simultaneously produces an immersive story and provides the medium for the message.

### 3: Defining Experiential Value

#### 3.1 Brief Introduction

The previous section sets out a particular, and arguably contentious, view of what constitutes an immersive story, with this term being applied to a wide range of interpretive and artistic outputs, some of which, as above, do not contain the traditional signifiers of a story, such as narrative or character. A story, from a traditional perspective, harnesses these characteristics to drive engagement, with this dichotomy unveiling our first research question.

**What motivates engagement with an immersive story, what experiential value do participants gain from engaging with it and what impact does the inclusion of linear narrative and character have on that motivation and value?**

To resolve this question a comparison is needed, between augmented reality storytelling projects that use narrative from opposing ends of what can be considered a story. With the two projects central to this paper designed and developed to enable this. One incorporating elements traditionally associated with a story, linear narrative and characterisation (*TNAR*) and the other positioned as an artwork, being immersive but with a non-linear narrative structure and without indefinable characters (*Can't Stop Looking*). With the means and processes required to achieve this comparison leading us to our primary research question, which is predominantly methodological.

**What comparative signifiers of positive engaged experience can be applied to both projects that will enable an assessment of their perceived ability to motivate engagement and offer experiential value?**

This is of growing significance to academic researchers and more broadly to creative practitioners and technologists who are seeking to use Augmented Reality or related technologies as a medium to impart stories/knowledge and or engage audiences. Developing and justifying concepts and measures of experiential value is the concern of this section, the term experiential meaning in this context, involving or based on experience and observation, real rather than theoretical.

### 3.2 Background to measuring experience.

When seeking to make comparative judgements about the value of experiences between an educational and an artistic immersive story, many of the common measures, See (Bollo & Dal Pozzolo, 2005; Cavazza Lee, Kim & Koo, 2002; Spanellis, Dörfler & MacBryde, 2020) applied within both Museum Studies and HCI to do this, become largely redundant. For example, 'dwell time' is used to measure how long a certain participant engages with something, with the embedded assumption that longer is better. (Anderson, Schofield, & Dethridge, 2015; Ding, 2017; MTM, 2009, 2013). However, when dwell time is applied to artistic appreciation and to experiential or social engagement with educational applications (Heath & Lehn, 2004) this is problematic. How long, for example, should one look at a painting? The same can be applied to other measures such as progression - how far through the programme the participant went – as this is not applicable to a non-linear narrative with no beginning or end. (Falk, Dierking, & Adams, 2006). Beyond this, concepts of comprehension or learning become confused; it is axiomatic that an intervention situated as

educational should convey meaning at some level and that a conceptual artwork should speak to its audience, but is the intended interpretation any more valuable than the unintended? (Scott, Hinton-Smith, Härmä & Broome, 2013). Germane is the fact that Cavazza, Charles & Mead highlight, this being “the need to develop evaluation methods that can measure the narrative relevance of stories” (2002 p.24).

This indicates that our measures must relate to experience: was the participant moved, excited, educated and activated? (Reason, 2015; Warren, 2011) The position here being that this transcends the systems being used and considers the experiential value participants derive from engaging with it (Dieck & Jung, 2017). “To focus on the experience of the human subject in augmented space as opposed to particular electronic, computer, and network technologies”. (Manovich, 2006 p.220) This is of course predicated by a number of prerequisites: firstly the programme or experience has to work - not always guaranteed, it needs to be usable and fit for purpose, participants need access to the equipment hosting the immersive narrative and to have an understanding of how to interact with it effectively (Jefferies 2020). All essential items which merit the study and consideration they receive, being pivotal to positive experiences (for example Othman et al., 2018; Stoica, Fiotakis, Cabrera, Frutos, Avouris & Dinitriadis 2005). Nevertheless, these don't constitute the experience itself or deliver experiential value to the participant. What experiential value actually means in practice is considered next.

### 3.3: Defining Experiential Value.

For our purposes here, we have decided that experience transcends the systems used to deliver it. I have created two Augmented Reality immersive stories, one being educational and linear and the other being artistic and non-linear. In order to develop a methodical

approach that will enable the evaluation of the comparative experiential value of these projects, a definition of experiential value is required.

To begin let us consider *TNAR*, assigned as educational, on the surface this is easier, it is designed to teach something, so the most important measure of success should be whether or not it does this. Were the interpretive and or educational goals met? This is certainly the perspective proposed by Shettel (2001), who states that rather than using “arbitrary behavioural benchmarks” there should be a focus on whether an “exhibit communicates its intended messages... to its intended audiences” (Ibid p.327). However, if we consider this measure in relation to *Can't Stop Looking* things become more difficult. This is because the intended message is not explicit, it is not attempting to teach something but rather to elicit a non-defined response related to the artistic concept, this being both ambiguous and subjective. The artistic experience is “open (sic) in that it proposes a wider range of interpretive possibilities, a configuration of stimuli whose substantial indeterminacy allows for a number of possible readings” (Eco, 1989 p.85). In spite of this ambiguity of experience, it is widely accepted that an artwork should elicit some form of experiential response - should make one think or feel something. Placing a value on this in relation to conceptual art and using it as a measure of success has historically been problematic from a critical perspective (Clay, 1999). The act of appreciation being both a quasi-spiritual internal experience and an external demonstration of one's cultural capital (Bourdieu, 1991). In post Bourriaud world where we are relational actors who are required to give something of ourselves to the creation of the work (Bourriaud, 2002) considering the value and the return on that experiential investment becomes valid.

This relational perspective points the way to another measure which can be applied to categorising experiential value and is derived from theories of co-creation and relational participation. Relational artworks are positioned as drivers of social interaction and propagators of social and collaborative meaning making. Whilst this position is not without critiques, most notably (Bishop, 2004) it does chime a chord with much of the work of (Heath & Lehn, 2004, 2010) in that it takes account of the social aspects of participation and how meaning is constructed as a joint venture, between the artist and those who consume their work.

To conclude, it is argued here that successful experiences, educational or artistic, should elicit an emotional or conceptual response and that the informational component of that response is to a large degree incidental, with the viscerality of the response being both comparable and analogous with the emotive effects of storytelling detailed in Section 1. With experiential value defined here as the overarching ability of the immersive story to engage the participant and illicit a pleasurable response. Considering not what was learnt, or what the participant achieved but the extent to which they were activated, engrossed or enticed by the immersive stories being experienced; or more simply whether or not the experience was a valuable one.

#### 4: Measuring Experiential Value

Measuring, counting, and mapping have formed the basis of the vast majority of museum visitor studies. But...(this) does not provide an understanding of the value of that experience to visitors. (Hooper-Greenhill & Moussouri, 2006 p.371).

As the above quote illustrates, the idea that quantitative behavioural measures are of limited use is longstanding within the visitor studies paradigm, as demonstrated by for example (Shettel, 2001) and many others working in this and tangential fields (Brieber Nadal, Leder,

& Rosenberg, 2014; Dourish, 2006; Lehn, Heath, & Hindmarsh, 2005; Marques, 2017). Dindler, et al., (2009 p.11) succinctly articulated this broad position by stating that “Engagement is a situational phenomenon that occurs in the interplay between visitors and the exhibition space”. This position is notable in that it moves away from methods derived from behavioural sciences to models founded in cognitive and educational science (Lehn & Heath, 2005). Bicknell & Farmelo, (1993) point to developments in other fields of study, particularly the social sciences, and methods concerned with symbolic interactionism, phenomenology and ethnomethodology as being better equipped to deal with the complexities of experience and meaning making. From this, new methodologies emerge which focus on experiential value and social interaction, inferred through various modes of qualitative ethnographic observation. (Allen, 2002; Leinhardt, Gaea, Crowley & Knutson, 2003; Roussou & Katifori, 2018; Scott, Hinton-Smith, Härmä, & Broome, 2013; Tolmie, Benford, Greenhalgh, Rodden & Reeves, 2014).

It is perhaps a little surprising, in light of the above discourse, that so many research projects that seek to understand and measure experience, and to some extent employ methods with the capacity to capture it, offer results that are quantified, amalgamated and presented in a way that obscures the experiential, individual or social. I would argue that this urge to quantify and categorise is reflective of the conventions and traditions of the field of research, from which the technological interventions for cultural spaces emerge, despite the call of many within the field of HCI (for example Cairns & Power, 2018; Wright & Mccarthy, 2008) to take a more experiential view. There are, of course, a number of notable exceptions to this (Economou, Young, & Sosnowska, 2018; Kerren, Cernea, & Pohl, 2016; Raita & Oulasvirta, 2014; Vayanou et al., 2014), with the inherent ambiguities and subjective nature of emotion perhaps explaining this reticence (Scherer, 2005).

It is from within the fields of New Media and Interactive Art that methodologies emerge which are most appropriate here. These seek to directly assess social behaviours such as collaboration or co-created meaning making (Graham, 1997) and, importantly, subjective emotional experience such as pleasure or enjoyment (Bradbury, 2015; Costello & Edmonds, 2007) with the following examples offering much of relevance.

Firstly, in her (2008) PhD thesis titled “*The experience of interactive art: a curatorial study*”, Elizabeth Muller develops a mixed method approach to evaluating the experiential value of interactive artworks. She considers the experiential value of the act of engaging and the impact that prior expectation and post-engagement recollection has. This is based on John Dewey’s pragmatist concept of experience and specifically the pre-reactive and reflective aspects, the ‘moment to moment’ lived experience, characterised as “flow” and the temporal narrative, constructed from past memories and future expectations respectively (Dewey, 1959). Of note here is Muller’s methodology; she uses (amongst other measures) a technologically mediated observation technique dubbed Video Cued Recall in which participants are filmed interacting and then narrate that experience, thus accessing both the act of engaging and the memory of it.

The second example is the research of Brigid Costello and Ernest Edmonds which provide measures for assessing the emotional and experiential value derived from engagement with interactive artworks, referred to in their research as pleasure. (Costello, 2009; Costello & Edmonds, 2007; Costello & Edmonds, 2009). In these papers the authors seek to break down both pleasure and play into their constituent parts, situating a range of experiences such as creation, exploration, discovery and difficulty as building blocks by which pleasure can be experienced. For example, discovery is the pleasure participants get from making a

discovery or working something out (Jefferies, 2017). Qualitative observational methods of various forms were used to assess and understand this, again coupled with post engagement dialogue, either through interview or questionnaire with the intention of capturing the emotional nuances of the participatory experience as it happened.

This is to a certain extent analogous with the long-standing concept of applying ethnomethodological processes to the understanding of the interactive or participatory experience, specifically between people and machine systems (Suchman, 1989; Turkle, 1986). Both these authors explore the act of interacting from a perspective of situated cognition to discover what that can reveal about the nature of the experiences. An ethnomethodologically situated process of detailed qualitative description drawn from observations, that seeks to produce a narrative account of a participant or group, offers much of merit. Indeed, there are several examples of observational methods being cited as best equipped to capture the experiential, and interpersonal (Allen, 2002; Falk et al., 2004; Leinhardt, et al., 2003; Tolmie et al., 2014; Crowley and Knutson, 2003).

## 5: Observation as Method

In this section a brief exploration of observational methodologies will be made, with this being used to inform the use of said methods when seeking to assess the experiential value of each project.

Within the literature two considerations emerge; the role of the observer and the observational relationship between observer and observed, with (Babchuk, 1962) categorising these as: complete observer; observer as participant; participant as observer; and complete participant. For Babchuk these form a continuum with the observer entirely removed from

the actions at one end (complete observer) and entirely involved at the other (complete participant). These relationships are viewed as altering the efficacy and validity of the findings, with the action of observing altering that which is observed. The implementation of each of the two practical projects and the findings sought necessitated a range of observational roles being taken and, whilst a full rationale for each project is presented below, an overarching consideration is also needed here.

This relates to the idea of ‘overt’ and ‘covert’ with Williamson and Williamson (2017) setting out a number of concepts. The first relates to overt observation, where the observer is known. Here the observer takes an active role in managing the interaction, with this seen to impact upon the engaged experience observed. In some cases this resulted in observations that could “no longer authentically capture real world usage” (Williamson and Williamson, 2017, p.9). The second, as proposed by Bulmer (1982), and Williamson and Sundén (2016), is concerned with the potential ethical implications, and to an extent the practical limitations, of covert observation. In relation to the practical, covert observation is made problematic by the proximity of the observer even if their observation is not explicit. Put simply, can you get close enough to see what is going on? In relation to ethical implications, covert observations have the potential to infringe upon the rights of those being observed, as informed consent by definition cannot be attained prior to observation.

## 6: Temple Newsam AR (*TNAR*)

### 6.1: Project Description

#### 6.1.1 Overview

*TNAR* is an immersive AR story that was situated in the “Picture Gallery” (Figure 1), one of the most historically significant spaces in Temple Newsam, a stately home near Leeds (UK).

This project was designed, developed and produced solely by the author, with the augmented reality content seeking to integrate traditional storied elements, these being linear narrative and character. With the aim of exploring the social and economic factors that influenced the construction and decoration of the physical space. The narrative focus was on two main characters, Sir Arthur Ingram, who commissioned the original construction of the picture gallery and his descendant, Viscount William Ingram, who was instrumental in its renovation. Historical choices and their consequences formed the linear narrative, in a process corresponding to Azuma's categorisation of Reimagining.(Azuma, 2015) This was distributed through proprietary application, available to download for free onto participants' personal devices, from IOS an Android App stores, using the bring your own device (BYOD) model. (Sayre, 2015)



*Figure 1: Interior of Picture Gallery and external View of Temple Newsam. the Author (2018)*

### 6.1.2: Content and concept

Two processes for articulating the narrative elements were tested. One used a series of interconnected photospheres (Figure 2) which the participant navigated between by activating image targets. Each photosphere immersed the participant in visual and audio content that presented the choices made by the central characters and which they viewed and interacted with by changing the alignment of their devices.

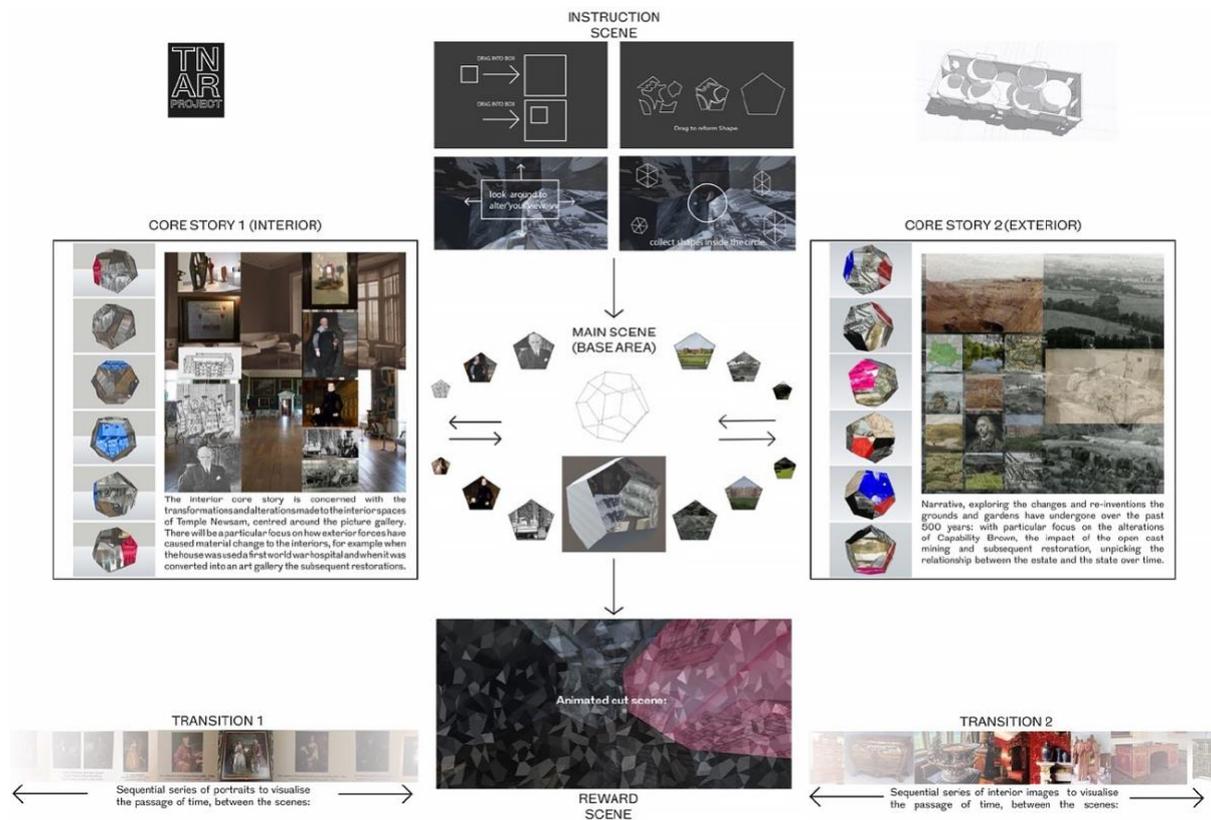


Figure 2: : TNAR Design Solution 1, Main Storyboard, the Author (2018)

The second process was influenced by text-based games (Figure 3). Again, participants activated passages of the narrative by interacting with physical objects, these being related to the attached narrative sequence. Participants were presented with scenarios based on the real historical actions of the characters and asked to make choices on how to proceed, with the consequences of these choices impacting upon their progression. When the participant successfully navigated one part of the story, they were rewarded with the opportunity to first build then decorate an augmented reality (Digital) version of the physical space, mirroring the historical events that led to this actually occurring (Figure 4 & 5). Initial user testing was conducted by “expert users” (Muller, 2008) and indicated that the linear narratives in the form of a text-based game was more impactful and less disorientating. (Figure 6).



Figure 3: TNAR — Initial Aesthetic Concept, the Author (2018)

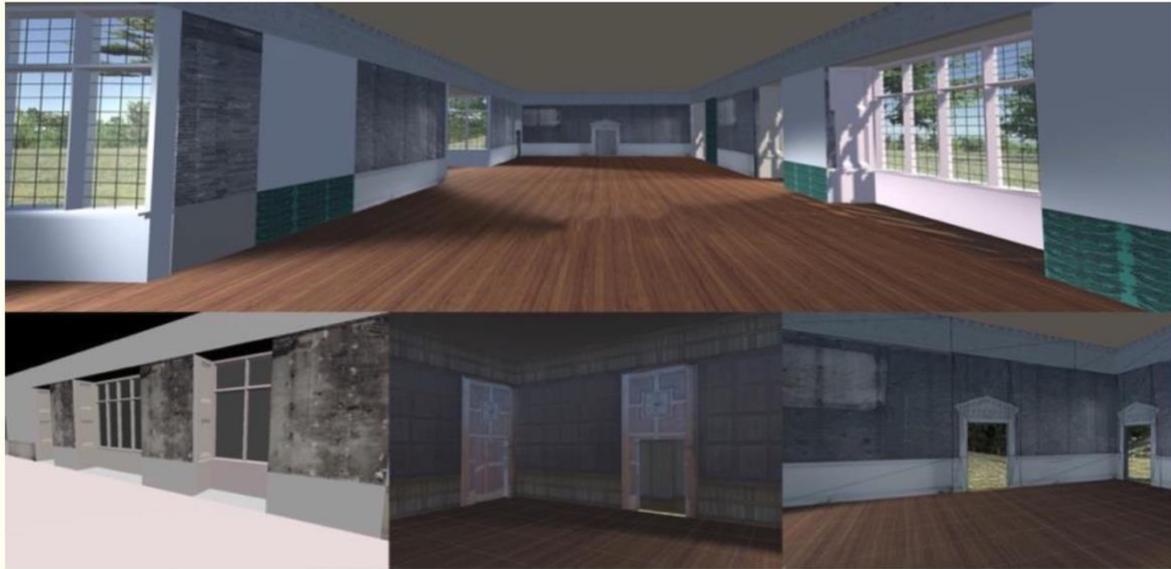
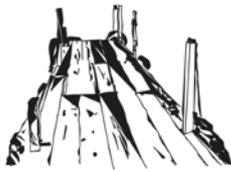


Figure 4: TNAR— Screen Shots from Early Redecoration Scenes, the Author (2019)



Figure 5: TNAR — Screen Shots from Final Redecoration Scenes, the Author (2019)



Your ship, "The Pearl"  
has docked in London.  
The harbour master,  
Lord Admiral  
Nottingham is bound to  
ask some difficult  
questions, do you come  
clean or smuggle the  
barrels in?



Come Clean

Smuggle

Figure 6: TNAR — Simplified Final Aesthetic with Self-created Imagery, the Author (2019)

## 6:2: Methodology

### 6.2.1: Dissemination

The intention was to offer this project to the general public, as happened with *Can't Stop Looking* (See Section 7), however accessibility concerns and the potentially alienating effect this may have on incidental audiences, related to WIFI™ availability and age-related software compatibility, precluded this. Seven participants were invited take part at Temple Newsam, with their experience designed to model those of an incidental audience as far as

possible (Figure 7). *TNAR* was also presented alongside *Can't Stop Looking* during a 2-hour workshop, involving 20 invited guests. In this case participants were given contextual information relating to the projects, their interaction with each project was recorded, and written feedback was obtained post participation.



Figure 7: *TNAR — In-use Documentation, the Author (2019)*

### 6.2.2: Applied methods.

The primary method used to evaluate the value of experiential engagement was observation, with the observer as participant approach used as described by Babchuk, (1962) in Section 5. This mode of observation was predicated by the use of invited test participants making covert observation untenable. Seven individual participants were observed, the process of participation was aligned to model that of an incidental member of the public, with no additional context or instruction provided beyond those built into the application. During observation, the observer only provided context or assistance when asked directly, with this noted in the observations, to mimic the type of experience a general visitor would receive. The participants' actions and observed responses, emotional, physical and verbal, were detailed in narrative form. This project was also presented as part of a wider research

workshop. In both iterations participants were asked for feedback, either verbally through informal post experience interview or in the form of open written feedback.

The observations, and other evidence, including verbal and written feedback, was then subjected to systematic review (Snelson, 2016) seeking interpretive commonalities, which were then categorised; these form the basis of the results and discussion to follow. All observational data available here <https://data.mendeley.com/datasets/mhycz789zr>

## 7: Can't Stop Looking

“Mesmerising, actually couldn't stop looking to see what happened next” (Participant Feedback)

### 7:1: Project Description

#### 7.1.1 Overview

This immersive, non-linear narrative augmented reality artwork was exhibited as part the Leeds incarnation of the British Art Show. The physical component of the artwork took the form of 3 plinths topped with vitrines. On each plinth a found object was displayed, with each being representative of a particular form of networked or digital communication, for example a 3-D printed gun (Figure 8). The wall of the gallery displayed a brief overview of the artwork's intention, and instructions on how to access the digital component.

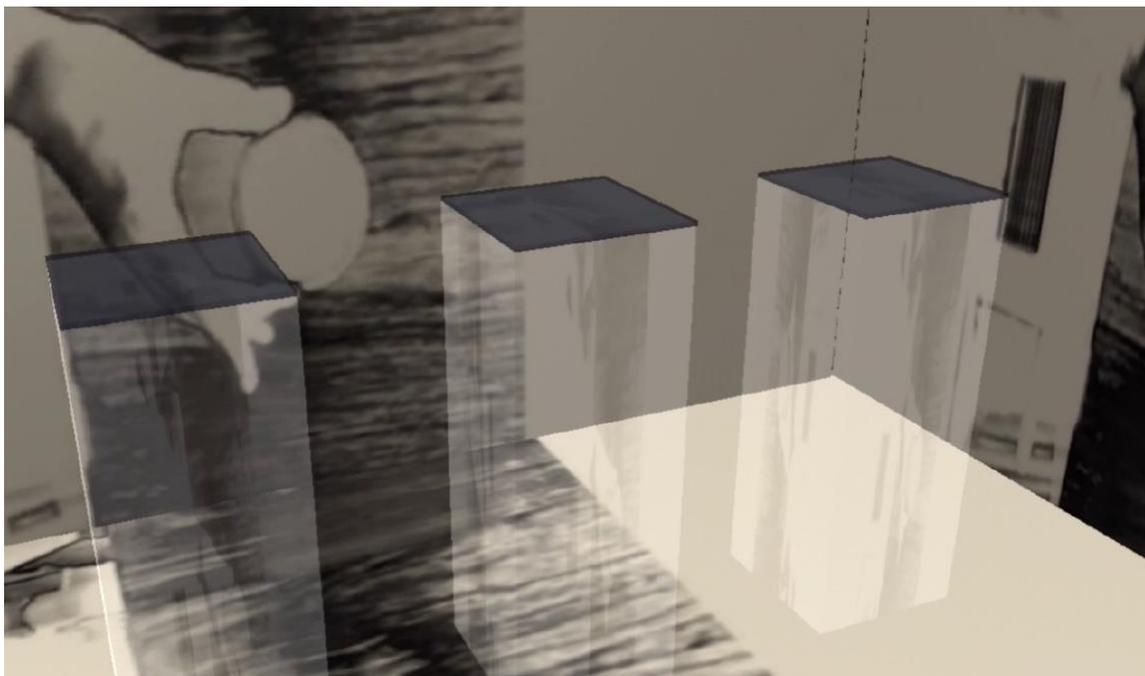


8: *Can't Stop Looking, Physical Component of Artwork, the Author (2020)*

The digital component was accessed through a proprietary mobile application, again available to download for free on IOS and Android App stores. Once a participant had successfully downloaded and installed the application on their own device (BYOD) they were instructed to point their camera at one of the plinths, this action triggering the immersive digital content. This took the form of a digital reimagination of the immediate gallery space including plinths, walls, floor etc. and superimposing this over the physical (Figure 9,10).



*Figure 9: Can't Stop Looking, Illustration of Extent of the Digital, the Author (2020)*



*Figure 10: Can't Stop Looking, Digital Component of Artwork, the Author (2020)*

### 7.1.2: Content and Concept

This artwork sought to respond directly to the overarching theme of the wider exhibition, this being “the real and the unreal”. The ambition in this case was to leverage the perceived innate ability of AR to blur the boundaries of the physical and the digital and use this as a vehicle to

encourage audiences to question their relationship to networked, online or digital content by altering their perceptions of and interactions with the space and its content. The installation offered a re-imagination of the physical when experienced through the distorted veil of digital technology.

To achieve this each plinth contained an object which, when focused on with the participant's mobile device camera, triggered a separate sequence of digital responses which increased in impact and complexity, tracked onto the surfaces of the superimposed virtual gallery. These responses were narratively connected but non-sequential, each being a separate but interrelated vignette that spoke to the characteristic on the object on the plinth, using the 3-D printed gun again as an example, documenting networked warfare.

## 7.2 Methodology

### 7.2.1: Dissemination

This artwork was displayed on three occasions, firstly during the British Art Show, then at a Higher Education institutional research show and finally as part of a workshop as mentioned above. The British Art Show Iteration will be focused on here, as this was the most significant; the other iterations are relevant in being the source of some written feedback later referred to.

The piece was displayed for the full run of the exhibition - just over 4 months - during which time it was downloaded and installed 260 times. Four days were allocated to observe participants engaging with the artwork. During this time over 120 people viewed the physical component with 10 going on to download the applications and fully participate.

### 7.2.3 Applied methods

In this case, as with TNAR, observation was the primary method used when seeking to capture perceived experiential value gained by the participants. In this instance, a complete observer model was applied, with the participants remaining unaware they were being observed: (covert observation J. Williamson & Sundén, 2016). Each participant observed was a member of the public attending the exhibition, each chose to download the application without prompting and proceeded to engage with it without interference from, or communication with, the observer who was seated a few metres from the artwork. While the participant, or group of participants, engaged with the artwork the observer recorded their perceived physical, emotional and verbal responses to it. Once their engagement had come to a natural end, they were approached by the observer, informed consent was requested and their opinions were recorded through unstructured interview.

During the two other iterations, participants were again observed, their interactions recorded, and written feedback acquired. Again documentation can be viewed by accessing the relevant repository <https://data.mendeley.com/datasets/mhycz789zr>.

All evidence was subjected to systematic review in the same manner as with *TNAR*.

## 8: Results and Discussions

### 8.1: Introduction

The results and discussion that follow are presented by project, with each project divided into two sections. These seek to respond to the question posed, starting by considering the perceived experiential value participants derived from participating. This is followed by a reflection on the efficacy of the chosen methodologies to assess and evidence this. The section culminates with a comparative reflection on both projects.

## 8.2: Temple Newsam AR (*TNAR*)

### Experiential value:

Systematic review identified 3 primary areas of interest when considering *TNAR*. an examination of each of these is presented below.

The first is related to interface and interaction. Five of the seven participants displayed observable signs of frustration when using the application, some non-verbal such as eye rolling and shrugging, but more often verbal, both through negative utterance or audible sighing. There were two primary triggers for this; firstly these participants found the application difficult to use, arguably due to lack of familiarity with engaging with mobile AR, evidenced by the fact neither expert user was affected. Secondly, frustration was noted when using the text-based game, which participants found repetitive and un compelling. Participants appeared in some cases to want to rush through this, arbitrarily pushing buttons in order to progress to decoration scenes, with only one participant stating that they learnt anything off value. The written feedback also reflects this. *“Felt very educational and text heavy., and “Too much text and difficult to read... I gave up.”* indicating that participants found characterisation and narrative delivered through text-based game choices unengaging, especially where stages needed to be repeated due to failure of a level.

The second area of note relates to interactions with the space. The premise of AR in this context is that it can use the physical and digital to co-create meaning ((Azuma, 2015) but here five of the seven participants were observed to disconnect from the physical context entirely, focusing solely on the screen for extended periods of time, visibly and audibly becoming frustrated, particularly when required to repeat sections. This behaviour was predicated by the mode of delivery chosen for the text-based story. On reflection this would

have benefited from editing and from drawing more context from the physical. Emerging from this is a conflict between the desire to offer complex narratives with compelling character and the expectations set by a visit to a cultural space, involving unfettered access to contextual information and expedience when capturing attentional interest.

The final area of note relates to the positive responses observed when participants engaged with the interactive decorating scene. Again, five of the seven participants demonstrated verbal and non-verbal signs of enjoyment and activated engagement, becoming more animated in their body language and uttering verbal statements of heightened experience. This is worthy of note in its own right. These passages of interaction were linked explicitly to the physical space, visually and accessibly presenting historical data about the structural and aesthetic history in what could arguably be called a non-character based visual story with participants making changes that illustrated the development of the physical space in a sequential format.

#### Methodological Effectiveness:

When reflecting upon the methods applied to ascertain experiential value, a number of considerations - or perhaps more objectively problems - have emerged. Primarily this relates to observational focus, and the observer's ability to interpret emotional response. During observation, the elimination of subjectivity in interpretation of the emotional state of participants was a priority. On this basis, overt signifiers such as laughter, obvious animation or verbalised comments were recorded. Participants engaged individually with only the observer present and unobtrusive, resulting in prolonged periods of silence whilst the participant engaged with the interactive system. This has led to descriptive rather than interpretive results being recorded for the most part. Somewhat ironically these observations

are highly informative in relation to usability and functionality, giving a detailed account of the interactive process but often failing to record the internalised emotional or experiential value when navigating the narrative sections.

One further reflection on methodology is worthy of note. As above, during certain periods of engagement the participants showed very little outward signs of positive experience when using the text-based game and became more observably active and engaged during the decorative scenes. It would be possible to conclude that these behaviours are linked to the mode of engagement, one more inward and screen focused, the other outward and focused on the physical space. It was here that the additional written feedback was useful, as it clearly supported the conclusions drawn from the observations as articulated above.

### 8.3 Can't Stop Looking:

#### Experiential Value:

The first observed characteristic again relates to the participant's ability to effectively engage with the immersive stories' interface, the triggering of digital reaction and the maintenance of accurate tracking. Seven out of the ten observed participants demonstrated frustration through verbal or physical means whilst learning how to interact with what appeared to be an unfamiliar process. It is gratifying to note that the majority (9/10) managed to overcome this without assistance and then went on to have a largely positive experience, as evidenced by the comments and discussion observed to take place between groups of participants augmented by the physical evidence of satisfaction interpreted through body language and expression.

The second observation is perhaps the most significant here in relation to the efficacy of stories to motivate and prolong engagement. Six participants or groups of participants were observed to be motivated by the sequential and developing nature of the digital simulations, with a desire to see what happened next prolonging their interactions. Both physical behaviours such as waiting for the full loop to play out and user comments about wanting to see what happened next clearly evidenced this. The following quote, taken from the written feedback, both articulates and supports this supposition: *“Mesmerising, actually couldn’t stop looking to see what happened next”*.

The final idea explored during the process and best evidenced during the conversations post experience and in the written feedback is summed up succinctly by this quote. *“Very interesting, but I didn’t understand it.”* This connects directly to the caveat raised above about the comparative value of intended and unintended meaning. What is notable here is that 7/10 participants, when asked, were not able to identify (or possibly to articulate) the intended conceptual meaning of the artwork. But 9/10 were observed to have a positive engaged experience, deriving experiential value from the immersive story without understanding it as intended. Participants derived value from their own interpretations and the visual richness of the augmented reality experience. Again, the written feedback offers the most compelling evidence of this:

*“Visually engaging and aroused curiosity, due to the aesthetics and responsiveness of AR”*  
*“It looked really good, and I couldn’t stop looking, the colours and designs were really engaging.”*

Methodological Effectiveness.

When reflecting on the efficacy of the methodologies applied to assessing the experiential value of *Can't Stop Looking* the following points are most relevant.

The use of “Covert Observation” is deemed to have been successful in capturing the real-world experiences of those participating, with the act of observing being found to have had little impact on the actions and behaviours of those being observed. This offered evidence about the attitudes of those who chose to participate, with the conversations overheard between participants when engaging as a group offering greater insight into the experiential value of their experiences than where participants acted alone. Whilst covert observation is certainly effective it does have its drawbacks, primarily this is to do with time taken. The Leeds incarnation of the British Art Show was a busy venue: a small percentage of visitors engaged with this artwork’s digital component, meaning that during the 40 hours of observations only 10 participant or groups of participants were observed to engage of their own volition.

As with *TNAR*, observer subjectivity is a consideration: attribution of emotional or experiential responses to specific actions was discounted unless the response was clearly articulated by the participant. Often physical or behavioural cues can be taken as indicative of certain kinds of positive or negative emotional response, but this method lacks empiricism without positive verbal affirmation. (Possibly Muller’s video methodology would support more body language interpretation, particularly where substantiated by post experience interview). Conclusions from the observational data are supported by evidence from overheard conversations, post experience interview or written feedback. This supports the proposition that a mixed method approach is effective in that it provides multiple streams of

evidence. It also perhaps obscures that which is most compelling about covert observations, to wit, an account of the participatory experience that is not influenced by the presence of the researcher.

## 9. Reflections

This paper aimed to identify a measure which can be applied to the range of projects now described as immersive augmented reality stories and, secondly, to consider methods by which this measure can be employed and comparisons made. The proliferation of projects and interventions using Augmented Reality or other immersive technologies which situate themselves as immersive stories seems to require this. In Section 2.3, a perspective on what characterises an immersive story was posited, deviating from traditional narrative forms and expanding the notion of what an immersive story can be to reflect the range and diversity of projects, within and beyond academia, which use this term. This diversity and range of experience has rendered ineffective many of the traditional measures used in the fields of HCI or Visitor Studies, such as dwell time, or user progression, which do not sufficiently grasp the nuances or intricacies of the expanded range of immersive experiences.

The concept of experiential value was posited as a measure that could be applied to, and enable comparisons between, the two AR immersive story projects central to this paper (as defined in Section 3.4) with the measure being developed from the work of Costello & Edmonds. This definition of experiential value is, by necessity, relatively undefined to allow for the conceptual, non-task orientated and non-linear intentions of *Can't Stop Looking* and others like it. The focus is on observable signifiers of positive engagement, verbal or non-verbal expressions of pleasure, not tied to individual measures but rather to an overall interpretation of a participant's experiences, captured through observation, and recorded as a

written narrative. The reflections that follow will aim to achieve two things, firstly, to consider the efficacy of experiential value as a measure to assess the two projects and secondly to interrogate the methodology used to attempt to capture it.

The observations undertaken for both projects are revealing in a number of ways that relate specifically to the perceived experiential value participants drew from their interactions. The first of these relates to the assertion in Section 4 in which the engaged experience was said to transcend the system used to deliver it. This is largely demonstrated to be true, in that when participants were unable to engage effectively due to technical faults or inability to interact with AR content, their experience was dominated by this. The participant's attention and energy was focused solely on the process of interaction and attempting to navigate it, rather than becoming activated by the narrative experience. This prevented the participant from deriving experiential value and only once this was overcome, if it was, were positive experiences observed. The difference between the observed actions of a participant who was struggling to engage, and of those actively engaged by the immersive narrative experience was entirely evident to the observer. However, the signifiers for this are largely subjective, particularly when observing a single participant, resulting in a disconnection between the subjective interpretation of experiential value of participant observed and that recorded in the narrative observation which sought, by design, to offer tangible or explicit evidence to establish participant responses.

The second key premise relates to motivation and the perceived power of story and narrative to inspire participants to engage and continue to do so. In the case of Can't Stop Looking this was certainly observed to occur, with participants being driven to continue to engage by the promise of the new and a desire to see what happened next. The opposite was observed to

occur in *TNAR*. This at first seems counterintuitive as the latter was a more traditional story: sequential, narrative, having characters, peril and narrative outcomes, all things seen to emotionally engage the participant and offer educational and experiential value. The observations and other feedback again indicate the reasons for this, with the method chosen to communicate this story, being “*too text heavy*” and, reading between the lines, boring. Which confirms that, yes, narrative elements such as character have the potential to inspire but the immersive modality used to do this is important and needs to be aligned to the contextually informed expectations of the participant. Participants were not at home in a comfortable chair with hours to spend fathoming a narrative, they were standing in a large and interesting space with multiple items competing for their attention and limited time to spend there. In this context, reading long passages of text was an imposition rather than a pleasure. This position was reversed during the redecoration scenes. At this point participants became animated, were observed to express interest and excitement. With this mode of interaction, like that in *Can’t Stop Looking*, making use of Augmented Reality not just to deliver content, but to motivate action in and appreciation of the physical space in which it was situated.

What the above interpretation also does is demonstrate the efficacy of observational interpretations of experiential value and illustrate the imperative of the narrative descriptions made. It is through interpretation of user reaction to specific events such as the redecoration scenes above that such conclusions were drawn. This is relevant and facilitates conclusions about the perceived successes or failures of specific elements in immersive stories, but it also raises questions, particularly when seeking to make comparative judgements about the experiential value derived from engaging with these two projects.

These questions are essentially concerned with empirical, verifiable evidence. The subjective verdict of this author, as observer, is that participants derived comparatively more experiential value from engaging with *Can't Stop Looking* than From *TNAR*, but the narrative accounts compiled during the projects do not substantiate this. In order to move forward from this point, a reflection upon the observations undertaken and the narrative accounts produced seems appropriate, to understand this disconnect between observed impression and narrative evidence.

As above, narrative qualitative observation was a useful method, capturing significant detail about the active participation of those who engaged. However, the data was exclusively descriptive. The narrative detailed what the participant was doing, how they interacted, the problems they faced and how they overcame them. The observer data provides information about interactions with more clarity and nuance than do interviews, questionnaires or written feedback. The data cannot, however, provide conclusive data about experiential value.

Verbal cues and those physical indicators that are backed up by some form of verbal response is invaluable information, but much of the experiential is internalised and can only be inferred by the observer. Inferences can and were made, but these need the support of other methods applied to draw concrete or meaningful conclusions.

In sum, reflecting honestly about the utility of observation as methodology, strategies for verifying body language and other non-verbal cues such as video footage (but see above for issues of consent) or dual observer confirmation could be applied to develop the efficacy of observation as a means of assessing experiential value. This would substantially improve the range of interpretative data but still would not necessarily capture the internalised experience of the participant. A driver of this paper is the need to take tangible and comparative

measurements of intangible and subjective experience: to convert the nuanced narrative of experiential value into specific findings supported by proof. Observer data is a valuable tool in the researcher's toolbox and the more verifiable the data the more effective the process but other forms of data collection – video footage, participant feedback, questionnaires, measures of progress through applications etc. - are all invaluable sources of data that can contribute to the goal of a verifiable gauge of experiential value.

## 10. Closing Remarks and Areas for Future Research.

In this final section I will attempt to draw some conclusions and consider the implications of these findings for future research in the field.

Experiential Value as a measure has the potential to provide insight into the comparative efficacy of diverse augmented immersive stories, or perhaps more pertinently, alternative versions of the same story, using different narrative mechanics. It has the potential to identify the projects, or elements of projects, which participants accrued most value from engaging with and does so in ways that are not task orientated or reliant on specific measures.

However, for this potential to be realised, the narrative accounts of participant interaction need to move beyond the descriptive and have the capacity capture more detail about the participant's internalised, conceptual engagement with the immersive story. To provide context to the subjective observational judgements made about the experiential value being accrued and provide evidential accounts from which conclusions can be legitimately drawn. Potential ways this might be achieved in the future is the next consideration.

As detailed above, the narrative accounts created when observing participant engagement with the two projects featured in this paper are descriptive and lack insight into the

complexities of the engaged experience. Any measure of Experiential Value will require subjective first-hand user accounts of the experience to substantiate the objective observer reports if they are to be considered reliably empirical and verifiable and thus provide grounds to offer judgements about comparative efficacy. Methodological choices were made about the evidence of verbal or non-verbal signifiers of positive or negative experience that should be recorded according to a pre-determined evidential benchmark. Relying upon explicit signifiers of positive or negative engagement, with experiences that are primarily cognitive and internal resulted in a body of observational narratives which fail to capture much of the nuanced details of that experience. There is a consequent disparity, as previously noted, between the observed perceptions of participants' experience and the evidence, in the form of individual narrative accounts, relied upon to draw conclusion. These narrative accounts were useful as an aide memoir for the observer, but are an incomplete record of observer perceptions, containing only limited evidence to corroborate and rationalise these perceptions. Fortunately, the process of research and observation has also highlighted a number of methodological measures which could be applied in future to close the gap between perception and real evidence, with each of these considered next.

Firstly, Video Cued Recall, developed by Costello (2009) and described in Section 4, provides a methodological approach which seeks to access this internalised cognitive interaction between participants and artwork, or immersive narrative. The method is to film a participant interacting with the artwork followed immediately by a request to the individual to narrate their internal thoughts or emotions whilst watching the recording. This approach was inapplicable to the projects explored here due to the ethical considerations around consent with reference to incidental participants, issues of potential politeness bias and lastly due to complexity of set up and the commitment required from participants.

Next, the use of multiple, independent observers is proposed, with each recording an account of participant interactions, but doing so with the intention of including subjective or non-explicit signifiers of positive or negative engagements, alongside the explicit. This would achieve two things, firstly provide a more detailed and informative account of interactions from which to draw inference and secondly to provide multiple data points which in combination would offer greater credibility to conclusions inferred.

Finally, the observation of groups of participants interacting together, as in the case of *Can't Stop Looking*, was found to offer increased scope for witnessing explicit references to the participant's internal experience, in a natural way, using covert observation, that did not impact upon the observed behaviours. This mode of observation provided the greatest level of insight into experiential value and is made convenient by the fact that many people visit cultural spaces in groups. The process provided much of the benefit derived from the video cued recall considered above but also had advantages in terms of participant commitment of time. The conversations occurring naturally between participants provided observable and tangible evidence of experience. The use of groups when observing invited participants rather than incidental audiences would offer many of the above benefits.

Researchers interested in Augmented Reality immersive stories, from all fields, need to find methods that better reflect the diversity of projects and outcomes emerging. Methods that tackle the disconnect between a desire for unambiguous quantifiable evidence and the nuanced, subjective, and ultimately experiential journey participants go on when engaging with Immersive Augmented Reality Stories. There is a need to embrace subjectivity in these methodologies, but also a need to provide opportunities to create scenarios where participants can give voice to their internal experience. It is hoped that, over time, with repetition and

refinement, qualitative methods, such as those described here, will emerge that can coherently decode the nuances of engagement and provide evidence of comparative experiential value. This being of increasing necessity due to the proliferation of Augmented Reality, the development of metaverses and the prediction that people will be spending more of their time in augmented space. It is in the interests of all prospective users to ensure these spaces are pleasurable and offer experiential value.

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