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# Gifting in Museums: Using Multiple Time Orientations to Heighten Present-Moment Engagement

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HCI has recently increased its interest in the domains of museums and gifting. The former is often oriented primarily towards the past, while the latter is often oriented towards the future, in terms of anticipating the receiver's reactions. Our article provides a sustained and well-evidenced new theoretical framework on the role of time-orientation on the design of forward-oriented (gifting) experiences in past-oriented (museum) settings. This *Temporal Experience Design Framework* develops from the analysis of two such studies, one smartphone app and one VR experience using passive haptics. Both interventions prompted the user to reflect on the past while planning a gift or donation for future consumption. We apply a novel combination of analyses to both projects using the lenses of conversational storytelling, performance, and human geography. Our analyses reveal the power of orienting users towards the past and the future – simultaneously – to enhance the present moment of a performative engagement. Our aim is to provide a conceptual framework that can help design researchers to identify, name, and understand how time-orientation can be used to enhance user and visitor experience. We also extrapolate design guidelines that we expect may be fruitful outside these contexts.

Keywords: time orientation; interaction design; experience design; HCI; storytelling; performance; human geography; museums; gifting; framework

## 1 Introduction

The two case studies analysed in this article were created as aesthetically driven approaches to the concept of gifting within museums. They addressed questions such as *what could it mean to give something that you did not own?* One of the case studies, the Gift app, took a very personal approach, using the visitor's own smartphone to be guided in choosing objects for a close friend or family member, then to record the reason behind the choice and send the resulting audio-visual gift via a private communication channel: SMS, email, WhatsApp, or Facebook Messenger. The other case study, VRtefacts, engaged visitors one at a time in a virtual reality (VR) experience

in which they could physically hold a realistic-looking model of a real museum object. Their engagement was directed by a face-to-face engagement with a live performer who asked them to think of a personal story to share, either about or simply sparked by an object, for donation to the museum's collection. In effect, both the Gift app and VRtefacts experiences created an unexpected 'frame' or organisation of a socially informed situation as experienced by an individual (Goffman, 1974, pp. 10-11) of gift-giving, either to a friend or to the museum. The 'frame' of gift-giving is culturally inflected (Beatty et al., 1991) but still one of the few universal phenomena: in the UK, a personal gift can help maintain personal (Schwartz, 1967; Belk, 1988) and social (Cheal, 1986) identity, as well as the development of the relationship (Ruth et al., 1999; Komter, 2005). This in turn is experienced inside the larger 'frame' of a museum visit. For either of the city museums that hosted the case studies examined here, such a frame might include location; patterns of socio-economic, cultural, and ethnic inclusion or exclusion; the museum's popularity, throughput, and noise levels; and the enjoyment levels of anyone else in their group, all as sensed by an individual visitor. Each experience is designed to interrupt the museum frame by directing the user towards making a gift or donation of one or more stories inspired by an object of their choosing. This latitude of choice combined with the 'frame' of gifting – meaning no 'rules' except their own internalised expectations – invites them to think of their own personal past and the imagined future reception of the gift they are making. We soon realised that the combination of past-oriented museum context with future-oriented gift-giving processes presented each set of designers with a unique perspective on the use of time in HCI, one that nested frames could not address on its own.

The focus of this article is, of course, time in HCI, and for the most part, the substantial literature of museum studies and gifting research do not contribute to our

argument. However, we do feel it important to briefly introduce our Temporal Design Framework in each context to clarify our aims and limitations. First, in the context of museum studies, we see our Framework as the logical next step from that presented by John H. Falk in his work on personal identity and museums. In 2009, Falk argued for museums to transition from a demographics-based understanding of their visitors to an 'identity'-based understanding, using five categories defined more by an individual's contextualised motivations for a particular museum visit than strictly by their age, ethnicity, etc. In a subsequent text, Falk and Lynn D. Dierking (2012) explicitly name time as 'a crucial fourth dimension of this [their Contextual Model of Learning]' (p. 29). However, looking at the museum experience as a snapshot in time, even one that encompasses their motivations and their entire visit, still seems inadequate. Falk and Dierking themselves agree: 'One needs to pan the camera back in time and space to view an individual across a larger swath of his life, and the museum within the larger context of the community and society' (Falk & Dierking, 2012, p. 29). Our Temporal Design Framework acknowledges visitor identities through the much wider lens of their entire lifetimes and beyond, from stories their grandparents told them to imagined visitor groups in a century's time. In adopting this view of time, one gives up on even Falk's hopes of predicting what visitors will like and instead embraces the fact that each individual comes with their own personal memories and imaginations of the future that are not only unknowable by a designer or institution but often by the user themselves until conscious awareness is prompted by the intervention (see Falk, 2009, p. 82). As our case studies show, this understanding of identity in the museum context does allow interventions to trigger and encourage personally meaningful connections based on users' actual, unique identities, and our analyses show no reason to assume that this would not be the case in non-museum contexts.

We offer analyses of two case studies, grounded in sound multidisciplinary theories, to derive a Temporal Experience Design Framework that we propose as a means of bringing time explicitly and concretely into the design process. Both case studies aestheticise the personal interpretation of an object from the past as it is encountered in a particular space and time, planning for that interpretation to be seen and heard by others in the future. In other words, the designed experiences demand that users share anecdotes, thoughts, or insights that one might share in conversation, framed as 'stories'. The experiences draw stories out of people who would have walked right past their chosen objects, as their post-hoc interviews often explain, and create a layer of personal interpretation to supplement or disrupt the 'official' meanings attributed to them by curators. These descriptions would seem to imply that the most important effects of the experiences would be either oriented towards the past, reshaping what is valid knowledge about the artefacts, or oriented towards the future, when their content would be seen and heard. However, in both cases, by far the strongest effect was felt in the present moment of engagement. The more a designed experience invited simultaneous mental and emotional investment in the past and future, the more engaged users became in their experience of the 'now'. We do not claim that this is a magic key to user satisfaction, but we do feel strongly that paying deliberate attention to time orientations in relevant interaction and experience designs can open up new possibilities for generating and understanding personal engagement, even outside the context of museums or gifting.

We examine these case studies through three lenses; storytelling, performance, and human geography. Each lens offers insight into how time is experienced, manipulated, and enhanced within these case studies, ultimately contributing to the

formation of the Temporal Experience Framework that helps to identify, name, and understand how time-orientation can be used to enhance user experience.

## 2 Contextualising time

### 2.1 Previous work in HCI

This sense of being caught by surprise by something as foundational as 'time' is not a new experience for HCI researchers and practitioners. Sus Lundgren and Theo Hultberg (2009) noted the tendency to take temporality for granted over a decade ago. Their analysis of a handful of experiences or interactions that were designed with time in mind posit user control as the reward or trade-off for breaking free of the linearity of time as it is experienced in the real world. This sense of there being a singular world to which perceptions of time correspond is also apparent in Lindley et al.'s workshop on *Changing perspectives of time in HCI* (2013) at that year's CHI conference. Their abstract focuses on the split between linear clock-time, which follows the 'real world' (general relativity aside), and phenomenological time as it is experienced. Much of the work they reference in this context has to do with memory, reflection, and how time is conceptualised under the influence of various technologies.

Reminiscence is another, arguably more established strand of HCI research, usually aimed at supporting present-day reminiscence around personal objects from the past (e.g. the *Pensieve,* reported in Peesapati et al., 2010; Cosley et al., 2012). As Petrelli et al (2008) discovered, reminiscence is an activity that is enjoyed but not often pursued, part of its value lying in its rarity, a phenomenon supported by findings drawing from design (e.g. Frohlich & Fennel, 2006), psychology (e.g. Isaacs et al., 2013) and cultural studies (e.g. Andres et al., 2009). Another, 'richer' strand of reminiscence work in terms of time orientation is creating personal objects with digital

elements around which one might reminisce in the future (e.g. Petrelli et al., 2009; Benford et al., 2016). Petrelli et al (2009) conducted fieldwork on who and how people would create personal time capsules. Their findings support not only a phenomenological view of time, but a fundamentally constructionist approach as explained in van den Hoven and Eggen (2007), which requires memories to be actively reconstructed, not retrieved, in relation to the present-moment context of remembering as triggered by cues. Such cues, involuntary cues (e.g. van Gennip et al., 2015) and voluntary cues (e.g. Spence, 2015) can be designed for. Further examples of HCI design for personal memories are described in van den Hoven et al.'s (2012) introduction to their special issue of *Human-Computer Interaction 27* (pp. 1-2).

The generally accepted constructionist approach to memory asserts, basically, that memories are reconstructed anew through the present-moment act of remembering. Even from within this constructionist approach, though, the designs described above tend to be primarily backwards-looking, from the point of view of either present-moment or future reflection. However, HCI research is not simply about the past. Future designs in HCI research also exist in multitude, for example the use of design fictions to re-imagine and envision the future. Science fiction writer Bruce Sterling is often acknowledged as the 'father' of design fiction in HCI thanks to his 2009 article in *interactions* (Sterling, 2009), although Julian Bleeker was writing about that term as far back as 2008 and is cited by some of the earliest HCI researchers to use this term (e.g. Bannon, 2011; Tanenbaum et al., 2012). Other notable interactions with the future include sustaining engagement with technology over time (e.g. Kayali et al., 2018) or more disruptively, 'itinerative design' (Pearson et al., 2019). All of these designs tend to be primarily forwards-looking, perhaps using motifs or tools from the past but still from the perspective of today's designer or co-designer looking towards imagined futures –

dystopian, utopian, or quotidian. Moreover, although these future-oriented practices

may draw on personal or cultural memories, they do not do so in any systematised way,

and they are above all *design* practices, with the use of time as a design element not

necessarily intended for use in the design artefacts or experiences.

At times throughout these discussions we see tantalising glimpses of how past,

present, and future might overlap and interact with each other: one participant in an

exploratory study about the Echo app for recording and reflecting on memories 'reports

the profound experience of living life both *in the moment* and *retrospectively*, savoring

how precious a moment is (or will be) and by anticipating how it will feel when she

reflects on it later' (Isaacs et al., 2013, p. 1079, emphasis in the original). Similarly, a

handful of respondents in Petrelli et al. (2009) sought not only to capture memories to

relive in the future but to 'communicate with the future', such as sending gifts to

potential offspring or discovering whether a list of childhood goals would have been

completed; the emotional impact of these few elements was notably 'deep' (p. 1729).

This overview of the literature on time within HCI is broadly representative of

current or recent attitudes towards a linear model of time that some in the HCI

community are paying attention to and working *within,* but not necessarily working

*with*. Rarely do design projects creatively manipulate or combine multiple time

orientations, despite the fact that memory and imagined futures involve very similar,

interconnected psychological and neurological functions (Webster, 2013). It is

unsurprising, though, that such a fundamental experiential element as time is still so

often overlooked as a potential design element ripe for exploration. It feels rather like

asking a fish to design for water – how can we begin to think of working with

something that surrounds us every minute of every day, and which is (from a fish's

point of view) all but infinite and indivisible?

### 2.2 Storytelling lens: The 'Performance Continuum'

The concept of viewing technological phenomena through different 'lenses' was arguably first adopted for user experience design by Bill Scott (2010), an influential designer and teacher of user experience design. However, 'theoretical lenses' are discussed in the HCI literature at the same time (Kodagoda et al., 2010) or earlier (e.g. Odom, 2008). Scott explicitly recognised and articulated the potential of lenses as described in Jesse Schell's *The Art of Game Design* (2009). Schell used lenses as a way of taking concepts from a wide range of disciplines with which game designers might have no familiarity at all, transforming them into helpful new ways of perceiving their designs. To be effective, Schell argued, lenses should focus a (game) designer's attention on a single aspect of their design and lead them towards a novel way of perceiving it. What the designers do in response to that perception is outside the remit of the lens: it is enough that the designer be able to focus on one element from a fresh perspective and bring any new insights to bear on their developing design.

This structured way of focusing attention is also extremely useful for experience design researchers whether or not they designed the experiences they are studying. Lenses that focus attention on a particular element of design in order to expand the thinking around its usage or experience can also expand thinking around its analysis (e.g. Zhou, 2019). Distilling a theory, method, methodological approach, or established concept from another discipline down to a single element, clearly presented in such a way as to focus attention on user response data, can illuminate both the analysis and the presentation of that analysis. We have used three lenses to triangulate the manipulations of time as evidenced by the use to which users put the two projects studied here, as well as their post-use reflections on their interactions with the technologies.

Our decision to explore storytelling as a lens for analysing designs involving

multiple time orientations came from work by Daniela Petrelli, Elise van den Hoven,

and others (mentioned above) because of their identification of autobiographical

memory as a key way of understanding people's active reconstructions of past personal

and/or cultural experiences (van den Hoven & Eggen, 2008; Petrelli et al., 2009). Van

den Hoven and Eggen (2008) describe autobiographical memory as not only '[h]elping

to predict the future based on the memories of the past' (p. 434) but as being largely

dependent on emotion and uniqueness, although of course habit and expertise allow

people to reconstruct generalised, likely events such as where an office worker was at

8:00 on a Tuesday morning (pp. 434-435). Petrelli et al. (2009) also explicitly ground

their work in autobiographical memory: They include one participant's desire to put the

newspaper brought to her by her brother the day their mother died into a time capsule as

it brings together both personally meaningful (indeed, extremely emotional) and

otherwise impersonal indicators of the external world at that time (p. 1727). As we will

show, our case studies perform a similar function of combining the personal and the

cultural, with autobiographical memory driving the storytelling at their heart.

The first of our lenses examines how the case study designs solicit storytelling. Noted

theorist and performer Mike Wilson writes about contemporary storytelling from an

interesting perspective: not purely as today's version of an ancient tradition, but

primarily as a close relation of alternative theatre movements of the past 60 years or so

(Wilson, 2005, p. 15). Through his work, he established the Performance Continuum as

a method of conducting performance analysis. We use it to explore how time

orientations manipulated by the experiences can impact storytelling performance.

Wilson's 'Performance Continuum' (2005, from Wilson, 1997) describes the contrast

between the kind of 'storytelling' that comes from the carefree sharing of anecdotes

between friends in the course of ordinary conversation and professional, staged, paid

storytelling in terms of a shifting continuum broken into six separate strata (see Figure

1):

FIGURE 1 AND CAPTION ABOUT HERE

We find the Performance Continuum (Wilson, 2005) most suitable for analysing

the design of our two case studies as the Continuum can be applied to the selection of

objects to discuss, the decision of what to say about them, and the delivery of the speech

act. The Continuum allows analysis of the degree to which such a storytelling act aligns

more closely to everyday conversation or to a fully 'cultural' performance of the kind

one would pay money to see at an established performance venue. Note that there are no

numerical indices attached to this method of analysis, as any given value can only be

argued, not computed. However, given the need to express our findings with this tool

without subjecting readers to the complete performance analysis that would be expected

in theatre studies, we will later assign values for ease - though not objective precision -

of comparison.

As an example, to assign a score on the 'Conversation' to 'Cultural

Performance' spectrum, we first looked at the types of stories that the elements of the

Gift App were designed to solicit, as established through interviews with the app

designers. We compare the Gift App's design on one hand to a typical relaxed

conversation between friends, and on the other to a staged, ticketed performance at a

public venue. The Gift App was designed to make users feel as close as possible to a

personal, even intimate conversation with their gift receiver, which would be

complicated primarily by the public setting of the museum. We therefore assign it a

value of 2, very close to 'Conversation'. VRtefacts, on the other hand, was designed to

encourage personal stories, but ones that would be captured on video and kept for posterity in a publicly accessible museum archive. The increased pressure involved with being evaluated by an unknown public would, we assumed, encourage stories closer to 'Cultural Performances', though without pay, ticketing, or a live audience. We therefore scored the design of VRtefacts as a 7, promoting stories more like cultural performances than conversations, but further from an actual cultural performance than a Gift App story would be from an actual conversation. These topics are discussed in more detail in the sections that follow.

In terms of the designs being analysed in this article, the sort of story or short anecdote one might relate in a conversation is (or can be) extremely casual and lacking intensity; entirely informal; subconscious (in the sense that one is likely to simply speak one's mind; or reply to a story with another on the same topic from one's own experience without any plan in mind); unchallenging to the teller's self-perception, relationship with the interlocutor, or reputation; and rewarding only inasmuch as it keeps the conversation going satisfactorily. Our analysis will show exactly how each designed experience's orientation of the performer towards the cultural, more formal side of the spectra involves oscillating or simultaneous orientations towards the past and the future as well as the present moment of engagement.

### 2.3 Performance lens: 'Performing Narrative'

The second lens we use redirects our attention from the designs aimed at eliciting the stories to the resulting stories themselves. Langellier and Peterson (2004) understand 'storytelling in daily life as *a communication practice* [that] reflect[s] our emphasis on performing narrative as performance and performativity' (p. 8, emphasis in the original). Their method allows us to approach the snippets of contextualised speech invited by the two case studies as a type of technologically enabled performance,

designed to convey thoughts, feelings, and impressions in a more conscious, intense, and risky way than normal, while honouring their primarily everyday, conversational form.

The four elements of Langellier and Peterson's analytic method are to examine conversation as it 'is (1) embodied, (2) situated and material, (3) discursive, and (4) open to legitimation and critique' (p. 8). They see embodiment as going far beyond the use of a body to convey a story, or as the physical location of the cognitive processes at work in its telling. 'Before performing narrative is conceived or represented, it is lived through the body as meaningful' (Langellier & Peterson, 2004, p. 9). Theirs is a fundamentally phenomenological approach based on the fact that storytellers perceive and actively situate themselves in relation to any characters that they refer to or represent, their own past selves if they appear in their stories, and to themselves and their audiences in the present (and the future, when they know their story is being recorded). The act of telling a personal story 'is not merely representing or displaying what happened to [the teller] on some past occasion but living [their] experience by occasioning it for this particular audience in the present situation' (Langellier & Peterson, 2004, p. 13). Thus embodiment encompasses agency, meaning, representation, self-image, and more, all in relationship to memories, the present moment of telling, and anticipation of future reception as revealed through the physical telling of each story.

The method's second element, the situated/material, refers to the bounds within which an embodied storyteller can tell their story. As Langellier and Peterson use as their prime example a co-located group of friends sharing anecdotes in conversation, they tend to focus on the interpersonal contexts and cues that allow a story to be told: how is attention given, amplified, or withheld? Are they in a private and comfortable

space, awake or sleepy...? However, the language they use to define the situated and

material anticipates later chapters that challenge this typical conversational situation,

including online story-sharing. 'There are no transparent situations or neutral material

conditions for storytelling. Instead, we ask what situational resources exist and how are

they mobilized [sic] and ordered? How do material conditions constrain [and facilitate]

storytelling?' (Langellier & Peterson, 2004, p. 14). These conditions and contexts are

precisely those that our case studies directly manipulate; we will highlight the evidence

within stories for those elements that manipulate time orientations and the resulting

situational and material conditions.

The third element, the discursive, is itself made up of four components based on

Michel Foucault's *L'Ordre du discours* [The Discourse of Language] (1972). While a

full analysis of all four is certainly possible and may be enlightening, we find the fourth

to be most impactful for an HCI and interaction design audience: its 'possible

conditions of existence (Langellier & Peterson, 2004, p. 20). Thus the discursive

element will 'explicate the struggles over meaning rather than to explain their causes or

motivations in the storyteller, audience, or text. ... this story could be told differently'

(Langellier & Peterson, 2004, p. 20). What can be said, especially in terms of authority

to speak, that may illuminate how each storyteller attempts to create meaning in the two

case studies? Here we will show evidence of a storyteller's attempt to construct or

deconstruct meaning, and to assert or abdicate their own authority to speak. Examples

of other components will be noted where relevant.

The fourth element, legitimation and critique, asks 'what strategic functions

does this storytelling perform'? (Langellier & Peterson, 2004, p. 26). Much of the

analysis in this category in Langellier and Peterson's prime example deals with the

exchanges between storyteller and audience members after the main story has been told.

While such exchanges between VRtefacts storytellers and Host can be found among the full-session recordings captured for research purposes, they are rarely contained within the stories themselves, and the Gift app does not allow for any such recordings. Therefore, we will again restrict ourselves to the most pertinent subject for HCI and interaction design, and look primarily at the strategic functions to which storytellers put their own stories, regardless of design intent.

### *2.4 Human geography lens: Hägerstrand's Time-Space*

Time and space impact performance and experience in numerous, deeply embedded ways (Fischer-Lichte, 2008), and human geography is regularly referenced in its literature (examples above). By analysing time and space as they are expressed even through non-'artistic', spontaneous performance, we make the frames of the experience (Goffman, 1974) visible. Within performance, manipulation of time and space can deeply contextualise the performance whilst also expanding the boundaries of what is involved:

> What performance offers […] is time: it gives dynamic to the frame, and duration to the event. […] it draws attention to all that the frame marginalizes: sound, odour, climate; social milieu; historical depth; all that is adjacent; all that is hidden behind the façade; all that makes a place distinctive. (Pearson, 2011, p. 9)

While the performance studies literature offers detailed and comprehensive ways to examine designed experiences involving a degree of user performance, it does not offer as much guidance for how to understand the interconnection of time and space in which the performances of these design interventions take place. This is problematic for HCI researchers and designers keen to understand what it means to work with the temporal, spatial, social, and cultural aspects of designed experiences in practical terms, although we note with gratitude the seminal work of McCarthy and Wright (2004) in these areas.

As such, we turn to the humanities and social sciences, schools which have a strong history in the HCI literature. Whether offering philosophical critique or methodologies to be adapted, the social sciences have been used within HCI for decades (Bardzell & Bardzell, 2016). Specifically, we turn for our third lens to human geographer Torsten Hägerstrand's conception of time-space to understand the factors that constitute experiences, and the impact of and opportunities they proffer both on these case studies and for future iterations and research.

Time and space are multifaceted, experiential, and deeply contested concepts that cannot be fully explicated here, except to say that a prevailing notion is that time and space are inherently, inseparably connected (Hägerstrand, 1970; Harvey, 1989; Giddens, 1990; Massey, 1994; Gregory, 1994; Thrift, 2006). For example, a visitor to a museum may be with their family, with whom they share motivations for visiting and similar social values. That visitor might also have a special interest in the content of a particular exhibit which their family does not share, providing them with an individual experience on top of their collective one. When the visitor and their family attend the museum, they may be doing so in their leisure time, bringing with them experiences from previously attended exhibits and knowledge of their children's capacity for learning, all of which affect the way they choose to navigate the exhibit. The exhibit itself contains artefacts and relics from a different time and/or place, interpreted by a professional curator who is not present, displayed for the public in a specially designed space, for a given length of time, etc. Therefore, in any examination of situatedness and materiality, time is as inherent in the context as space is, and is demonstrated in our case studies through storytelling and performance.

The assertion of the interconnectedness of time and space led to the popularisation of the term time-space (or space-time) by Hägerstrand in the 1960s; who

argued that all of an individual's actions take place in time and space (Hägerstrand, 1970). Given a human body can occupy only one space at a given time, time and space impose constraints on both action and movement. However, humans are more than their bodies: at the simplest level, even within those bodies, they can act based on thoughts and feelings that immerse them in the past, project them into the future, or a rapid oscillation among them. Therefore, time-space cannot simply be defined by these 'constraints'. Davies (2001), echoing Massey (1994), discusses Hägerstrand's conception of time-space and demonstrates a need to incorporate social processes into any understanding of experience:

> … how we in fact use our time and locate ourselves spatially (the two being inseparably related to each other is dependent upon the social relations in which we are embedded. (Davies, 2001, p. 135)

The context of a person's given environment – how they came to be there, whom they are with, their immediate goals – all contribute to their experience of that time-space and subsequently any performed behaviours. Additionally, factors from further afield play important roles, including cultural background, social norms, and so forth. The increasing technological capabilities of any given environment also contribute to time-space. Contrary to Hägerstrand's assertion that humans can only occupy one space at a time, Davies (2001) points out that developments in digital technology and cyberspace, such as VR and digital archiving, allow people to transcend the physical world and coexist across multiple times and spaces simultaneously. This is best demonstrated in Milgram and Kishino's (1994) Taxonomy of Mixed Reality Virtual Displays, expounded by Benford et al. (2009). Their proposed mixed reality continuum advocates, albeit with some need for updating, how the real and the virtual worlds interact and overlap when mediated by technology (Benford et al., 2009). Through transitions and

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trajectories (Benford et al., 2009), the user is able to virtually navigate between different times and spaces without their corporeal body. Therefore, designers and researchers must be capable of recognising and adapting to a wide range of external influences on the time-space occupied by users.

Time-space, then, is generated through a combination of social relations, culture, individual experience, and, where relevant, digital technologies. To give meaning to a situation, time-space draws from the past. Past experience of similar situations, learned knowledge of cultural and societal expectations, personal motivation for entering the time-space: all these things enable a person to understand and access a place in the present. They also cause the time-space to become inherently more individualised, as each person brings their unique experiences and understanding of the world in with them. By absorbing enough of these recognised frames of reference from across the spectrum of influences available, time-space is able to subtly shape the perception and 'reality' of the present. In equal measure, time-space simultaneously draws on the future – the hopes and dreams of its inhabitants, their plans (short and long term), whom they are thinking about, how they will reflect on their experience within it, and so on. Each of these also become embedded in the time-space, shaping the way that it enables and constrains the person's behaviour and experience in the present and subsequently their performance. Meanwhile, the present also shapes both past and future, compounding learned behaviours and driving future expectations.

Because time-space is created and experienced through its contextual and individual natures, both of which are constantly in flux, it can be exploited and manipulated by HCI designers. Although for the most part time-space is experienced subconsciously through mundane and day-to-day activities, through deliberate action a person is able to push boundaries and reclaim parts of the time-space for their own

needs. Through performative interactions, they are able to affirm aspects of their

identities tied into time-space, rebel against others, call attention to the taken-for-

granted nature of experience within it, and even reshape the way in which a time-space

is experienced for others. Through interaction and experience design, HCI researchers

and practitioners are able to use digital technologies in tandem with other social and

personal aspects of time-space to enable people to access a given time-space in new and

provoking ways.

## 3 The projects

### 3.1 The Gift app

The Gift app as discussed in this paper is a browser-based app designed by artist group

Blast Theory for visitors to the Brighton Museum and Art Gallery to use if they wished.

The Gift app sets up a 'frame' (Goffman, 1974) of *personal* gift-giving or gift-receiving

inside the larger 'frame' of a museum visit. Its basic functionality is for the initial app-

user (the 'giver') to think of a close friend or family member to whom they would like

to give a gift. This instruction is delivered through an unnamed female narrator who

positions herself as an 'intimate stranger', speaking to the app user about how it feels to

make, give, and receive gifts and deftly integrating instructions into her musings. The

user then moves through the museum however they wish and photographs up to three

objects that they would like their receiver to have (see Figure 2). For each object, the

giver records an audio message for their receiver explaining why they chose that object.

Recordings are made directly into the phone running the app, in the museum, as part of

the gift-making experience. Gift makers can also type in brief clues to help receivers

locate each object within the museum. They send their gifts via the one-on-one method

of their choice: email, SMS, WhatsApp, or Facebook Messenger. Gift-receivers in turn

see clues written by the giver to help them locate their gifted object(s), view the

photographed object, and then listen to the giver's recording about their choice of

object. At the end, they can record a reply if they wish. They are also invited to make a

gift themselves. Receivers who cannot come to the museum in person can still access

the full digital gift from wherever they have an internet connection.

FIGURE 2 ABOUT HERE

Subsequent versions have been developed for and deployed at the Munch Museum,

Oslo; The National Museum of Serbia, Belgrade; and as a test with Chinese users at

museums of their choice in and around Shanghai (using WeChat for gift-giving). Future

deployments are under discussion, and a free version is available (see

https://gifting.digital/gift-experience/). The app was developed over a three-year period

during which the first author had access to Blast Theory's design process and iterative

outputs, part of which was a public deployment in 2018, during which 114

questionnaires or interviews were received from members of the public (following full

informed consent).

### 3.2 VRtefacts

VRtefacts is a VR storytelling experience in which the museum visitor who enters VR

becomes the storyteller. It generates a 'frame' (Goffman, 1974) of donating a *personal*

story inside the larger 'frame' of the museum experience. A 'story' is defined for this

purpose as any anecdote, memory, or association that the storyteller feels is valid from

their own experience: it does not need to have a traditional beginning, middle, and end,

or to relate to the established facts behind the object in any way. Stories are intended for

donation to the host museum who can share the stories in any way they see fit. The

transition from curious museum visitor to teller of personal stories for public

consumption is made possible through the careful guidance of a researcher known as the

Host, who actively performs according to an established but flexible script. The Host

first seeks to put the user at ease by having them sit in a chair with a table in front of

them, empty except for some paper work. The Hosts engages in light conversation

around the user's own interests, establishing a common conversational pattern of speech

that validates the user's individual personality and life experiences. The Host then

places the VR headset on the participant's head, adjusts it for comfort, and begins to

explain the VR environment. The Host reassures users that they are never more than a

couple of steps away, and the user can hear the Host's presence in the real-world space.

FIGURE 3 ABOUT HERE

The VR environment is the Donation Hall, a large, wood-panelled space housing

six large vitrines, each one holding a single object and its associated panel (see Figure

3). Users can see the contents, photo, name, and brief description of each object from

where they are seated; there is no navigation to complicate the interaction. This is

clearly a working space rather than a gallery, giving users a sense of being allowed

'behind the scenes' and making their contributions all the more plausibly valuable for

being shared before any curatorial decisions are finalised. The Host asks which of these

six objects is most compelling. When the user chooses one, the Host silently places its

corresponding physical component on the table, and the researcher controlling the VR

makes it visible in that environment. Three of the VR objects are 3D prints of the

museum object, scaled to a size that is easy to hold in the hand or by the clear acrylic

'plinth' to which it is firmly attached (and which holds the tracker that allows the high-

fidelity 3D model to track every movement of the white plastic object in real time). The

physical component of the other three is a single clear acrylic 'vitrine' (see Figure 4),

roughly the same dimensions as the 3D prints, into which one of three 3D models is

'projected'. As with the 3D prints, these 3D models track every movement of the vitrine (which also holds a VR tracker).

FIGURE 4 ABOUT HERE

Each user is guided to choose one 3D printed object and one 3D model to tell a story about. Stories are captured as a composite video using a real video camera mounted in front of the user, the audio taken from the VR headset, and a 'virtual camera' situated in the same position as the real one. This virtual camera captures the 3D model as it is moved within the VR environment and is represented by a virtual camera, flanked by floodlights, all of which turn on when the storyteller indicates their readiness to begin their story, and off again when they have finished. Further details can be found on https://vrtefacts.org and in Spence et al. (2020), and further deployments are currently under discussion at Derby's Museum of Making and a partnering museum in China.

## 4 Methods

### 4.1 Data collection

The corpus of the Gift app performances is the 20 'performed objects' that make up the gifts created and given through the app as it was used in June 2019 in a public deployment at the Brighton Museum and Art Gallery. These 20 users were interviewed about their experience with the app and gave us written consent, including permission to access the contents of their gifts. This was the latest, most fully realised version of the app (currently available to the public via https://gifting.digital). Each performance consists of a photograph of an object taken by the giver; the audio-only story of why they chose that object for their receiver; and a typed-in clue for their receiver to use when trying to locate the object in the museum. The spoken explanations for the choice of photograph form a type of personal story told through audio performance and

supplemented by still image and text. All givers have been pseudonymised and some details have been changed to maintain their anonymity.

Our roles in the two case studies vary. For the Gift app, the first author studied Blast Theory's three-year design process in detail. Between first-hand observation, many discussions, and four in-depth interviews with the designers, this author feels justified in attesting to the design intentions and strategies behind the Gift app. Two authors also have first-hand experience of the app's deployment and visitor reactions to it. VRtefacts, on the other hand, was conceived of, designed, and made by two of the authors with significant contributions by the third, and all three ran the deployment. Therefore, between us, we are equipped to speak to any element of our second use case.

FIGURE FIVE ABOUT HERE

The corpus for the VRtefacts performances is the 48 stories collected from 24 storytellers (two from each) during a public deployment at Derby Museum and Art Gallery in May 2019. The composite videos (see Figure 5) show general body orientation, gestures, and interaction with the objects fairly clearly, but the VR headset obscuring the upper half of the face makes it slightly difficult to identify the subtle expressions that can convey so much meaning. However, we can tell what was in the user's field of view and have a clear, reliable audio feed throughout. This interesting mix of incomplete information from the audience's point of view (face partially obscured) and incomplete information from the storyteller's point of view (as the specific object of their gaze must be extrapolated from a combination of the central point or key object, how long they stayed focused on it, and how it relates to their spoken material) makes for a unique condition for performance analysis. This is made more interesting when a few of the storytellers speak directly to the host, whose replies are usually inaudible and can only be deduced from the performer's reactions. In these

stories, too, the most reliable and expressive means of storytelling is through audio, supplemented by interactive image, object, and environment. The personal nature of each story is either made overt through speech or implicit in their choices. All users gave consent for the museum to use their real first names, but have been pseudonymised as they are being reported outside the context of Derby Museums.

The two studies were not related in any way other than their funding source and some overlap between researchers; the Gift app deployment in 2019 offered free museum entrance as compensation for time spent using the app and being interviewed, while VRtefacts offered no compensation and the museum itself does not charge for entry. All work involving participants received ethical approval and provided participants with full project information upon which each gave informed, written consent to use their gifts/stories. Both studies collected metadata such as time stamps, and both conducted semi-structured interviews with their participants. The former provided no information relevant to our methods, and as time orientation did not emerge as a research question or topic of interest until both projects were examined in light of each other, we did not solicit reflections on time orientations. Excerpts from participant responses are provided only where they may clarify or illuminate a point we are making through our analyses.

### 4.2 Analysis lenses and methods

Our units of analysis here are the Gift app and VRtefacts themselves, first as designed experiences inviting certain types of performative interaction, and then the recorded outputs of those interactions as performed and recorded. The overarching methodology by which we approach these analyses is Research through Design (RtD, Gaver, 2012) in that we see the design process and comparisons of similar types of artefact as valuable sources of new knowledge. We complement the RtD methodology with a lesser-known

but very specifically targeted one known as  Performative Experience Design (PED, Spence, 2016). PED examines the outputs of designs with a performance element. It does not seek to evaluate designs against external criteria, but to investigate how they were used through performance. After all, stories performed by 'users' or anyone else along the 'Performance Continuum' constitute performance, which has a strong tradition of directly investigating and working with time. Indeed, for theorist Erika Fischer-Lichte (2008), time is the key element that separates performance from other arts. Unsurprisingly, then, we found that performance methods – the 'Performance Continuum' for the design and 'Performing Narrative' for the resulting stories – revealed more about the workings of time than more traditional HCI methods of working with stories such as Discourse Analysis or Conversation Analysis (with which we are also familiar). We found that these would tend to privilege the text over the embodied and emotionally nuanced performance about, of, and through time.

We adopt PED's basic approach of determining relevant types of performance and using them as lenses for analysing designed interactions. We first analyse the designs of both case studies through the 'Performance Continuum' (Wilson, 2005), and then, building on that, the actual outputs or results of the designed experiences analysed through 'Performing Narrative' (Langellier & Peterson, 2004). This second lens values the *stories performed by users* rather than observations, participatory practices, post-hoc visitor interviews, or other methods more commonly used in HCI and design research.

Finally, we draw design and use together by examining all findings through the lens of Hägerstrand's time-space (1970). Hägerstrand's theory gives practitioners and researchers a more explicit means of *working with* time in the context of more commonly used elements such as movement through space. Performance studies has a strong tradition of working directly with people's relationship to place through site-

specific performance and other, similar traditions (e.g. Pearson, 1994), and human

geography is not an uncommon methodology within performance studies (e.g. Heddon,

2012).

By applying three lenses to our two case studies, we gradually build a picture of

how storytelling and performance allow HCI and interaction researchers to consider

time as a discrete design element that can be worked with. This 360-degree perspective

on our two case studies leads to our Temporal Design Framework, which we believe

can be put to use by designers and HCI researchers alike when considering how to work

directly with time.

## 5 Applying the lenses

### *5.1 Storytelling analysis*

In this section, we analyse the designs of our case studies through Wilson's

'Performance Continuum' (2005, from Wilson, 1997), scoring the design intentions of

each case study as they apply to each of the spectra on the Continuum (see Figure 6).

For the sake of consistency, we apply a numeric scale of 1-10 to Wilson's Performance

Continuum, where '1' represents the conversational end of the scale (e.g. informal, low

intensity) and '10' represents the professional or 'cultural performance' end of the scale

(e.g. formal, high intensity). (Please recollect that these numeric rankings are intended

only for ease of discussion and are based solely on the authors' analysis of records of

the design process as described above.) To apply this lens, we will first offer more detail

on the specific modes of prompting, facilitating, and gathering stories for each.

FIGURE 6 ABOUT HERE

The Gift app uses the narrator's audio to heighten attention to the visitor/giver's past

experiences with, and the imagined future response of their gift receiver. The narrator

subverts the museum visit 'frame' (Goffman, 1974) by focussing the user to the present

moment through listening to the app, choosing gifts, taking photos, recording audio, and

– by design – 'being in proximity with the physical objects in, and the architecture of,

the building' (2018's Lead Artist John Hunter, 2018, personal interview). The narrator's

present-moment punctuations and shaping of the user's experience encouraged

reflection that prompted an oscillation within the gift-giver's mind between past and

present to inform their choice, and between present and future to imagine how it may be

received and what to say in their audio explanation. (By the same token, the narrator

punctuates and shapes the receiver's experience as the receiver imagines the giver's

choices and motivations, which not only occurred in the receiver's past but will be

informed by their shared past, and is invited to formulate a reply that they imagine their

giver receiving in the future.) Thus the same design tactic that orients users to the past

and the future also aims to increase awareness of their present-moment surroundings, in

terms of both individual objects and the socio-cultural and physical structure of the

museum.

Conversely, VRtefacts was foremost a co-located, real-time, in-person

engagement between visitor and trained performer. It was also explicitly designed with

Wilson's (2005) Performance Continuum in mind. In much the same way that the Gift

App utilised a narrator reading from a carefully written script, the VRtefacts

'performer', or Host, followed a carefully structured script that could be adapted to the

needs of each storyteller. The subversion of the museum 'frame' (Goffman, 1974) in

VRtefacts contained the entire designed experience, which provided a single, extended

punctuation mark for the user's visit. However, this does not make the experience

design any less complex in terms of time orientation. It makes use of the museum

location to adjust users' mindsets to think about objects from the past that they see on

their way to the room in which the experience took place. They encounter VR versions of six objects in the Donation Hall and connect to each one's history via their appearance, the accompanying text, or both. The Host asks the storyteller to select one that appeals most. The storyteller will then begin to oscillate between orienting themselves to the past life of the objects and their current feelings about each one. Then, having been prepared to tell a personal story about the object, the Host signals for the VR 'camera' and lights to come on. Now the design pushes the storyteller to consider the future as well, as they decide what to say and how to perform their stories for posterity via donation to the museum. VRtefacts's design intentionally places the storyteller in a position of negotiating all three time frames near-simultaneously.

*Conversational to cultural*

In terms of *conversational to cultural performance* (the top stratum of the Performance Continuum, Figure 6)*,* the Gift app relies on the pressures of 'successful' gift-giving or gift-receiving to move users' performances slightly away from the totally conversational. The narrator's first line is delivered in a familiar, informal tone of address that 'allows [the narrator] to put herself in the same boat with you and create a sort of instant familiarity' (Hunter, 2018, personal interview). 'You can tell a gift that somebody has thought about, compared to one where they panicked, or didn't bother, or ran out of ideas, can't you? A good one sort of tells you about what they think of you, what you mean to them' (narrator transcript, 2019). Blast Theory's rationale was to keep the giver comfortable enough to use the app in public (i.e., leaning towards conversation). Each giver's conversational 'turn' is recorded and can be listened to and re-recorded as many times as desired (likewise, receivers can re-record any responses to their gift). However, the receiver might not like their gift, and it is possible that they might share the gift more widely than the giver intended, making it potentially more of

a 'cultural performance' than a simple spoken anecdote. On a scale of 1-10, our analysis

of the design estimates the ranking for the Gift app as far closer to 'conversation' than

'cultural performance'; a 2 on the Continuum. VRtefacts also captures stories that are

best understood as originating in conversational storytelling in that they tend to be

overtly personal and always emerge from an individual's relationship with the object in

that moment. The Host establishes a friendly rapport through simple questions that

facilitate the transition to storytelling. Initial questions include: 'Are you from around

here? Do you know how many generations back?' or 'Have you been to Derby before?'

(Host script, 2019). However, VRtefacts works on the top stratum of the Performance

Continuum primarily through the not-so-subtle pressures of performing to camera and

donating the result for public viewing. The Host prepares the user for viewing their

chosen object by asking them to think of what they have to say about it: 'Don't tell me –

just think about it. When you're ready to start talking, let me know. These lights and

this camera in front of you will come on, and that's when we'll record your story for the

museum' (Host script, 2019). The Host even steps away while speaking so that the

storyteller hears the growing distance between them. As both the real-world Host and

virtual-world camera and lighting setup are designed to pressure the storyteller to avoid

conversation as much as possible without causing actual anxiety, we rate the design aim

of VRtefacts much closer to 'cultural performance' than 'conversation', although not so

far to the former as to alienate the storyteller, a 7 on the Continuum.

*Low to high intensity*

For the second stratum of the Performance Continuum, the narrative content of the Gift

app aims to gradually increase the *intensity* of the giver's contribution, notably through

the intentional focus and refocus on the museum frame as the narrator persuades givers

to 'Let that person [their receiver] be your filter as you walk – ignore the things you

know they're not going to care about, go and learn more about the objects you know

nothing about. Let them know the effort you've gone to, to choose the right things'

(narrator script, 2019). The narrator also directs the giver's attention to the present

moment of the museum frame by persuading them to speak their stories into their

phones in the presence of other visitors, who would be unaware of the gifting frame

being experienced by Gift app users. From low to high intensity, the Gift app rates a 4 –

slightly less than halfway along the Continuum – though individual willingness or

ability to engage can alter how low or high intensity the performance may be. VRtefacts

also gradually heightens the intensity via the lights and camera in the VR scene that the

Host draws the user's attention to while giving them a moment to consider the story

they want to tell and how they want to tell it. The design opted against a VR

representation of the Host precisely to discourage everyday chat and give storytellers a

sense of speaking to a professional-style camera and lighting setup. While neither case

study aims to push users to a level of intensity that would cause them to abandon the

experience out of any kind of performance anxiety, both work to create a context in

which users can feel a heightened intensity. For VRtefacts, as the conversational

dialogue gave way to the storytelling, the intensity is gradually but deliberately raised,

beyond the intensity of the Gift App, to a slightly higher intensity of 6.

*Low to high formality*

For both designs, the degree of *formality,* the third stratum on the Performance

Continuum, begins very low in line with the conversational storytelling strategies

described above. The Gift app starts with guidance towards informality – 'talk to them

as if you were leaving a voicemail' – but increases it soon after with instructions such as

'What was the thought [the giver's reason for choosing the museum object], and why

does it count?' and ends with offering givers advice on how to come up with 'a thought

you want to leave them with' (narrator script, 2019). From everyday voicemail to

parting thoughts that require advice to strategise: this is a good example of increasing

formality. The technology involved, too, requires the story to be recorded in a single,

unbroken speech, far less formal than a public, ticketed 'cultural performance', but

notably more formal than the back-and-forth of two-way conversation. We judge the

Gift app to sit towards informality at 3 on the spectrum, with the public setting and

unconventional experience intervening with a fully informal storytelling experience. In

the case of VRtefacts, the Host explains early on that 'a story can mean anything you

want it to mean – a memory, a wish, saying what about these things interests you or

makes you think of' (Host script, 2019). However, this reassurance is immediately

followed by a requirement not always assumed in conversational storytelling: 'It doesn't

have to be important for a historian, but it does have to be honest for you' (Host script,

2019). The Host replies to any questions about the object or the VR but does not engage

in attempts at conversation about the object, telling storytellers instead to wait so that

they can capture the storyteller's words for the record. The Host uses conversation as

sparingly as possible to draw out hesitant storytellers, but only the storyteller's voice

can be easily heard, and the Host is never seen in the story's composite recording. The

Host's distinction between free content and 'honest', monologue-style delivery in

combination with the formal setup of the VR scene and actual situation of donating their

stories to the museum is in our judgement one notch more formal than the Gift app, at a

4.

*Low to high consciousness*

The fourth stratum, *consciousness,* can be understood in Wilson's context as an

awareness of the self engaged in telling a story that will be heard as an intentional,

coherent speech act. The Gift app narration 'leads you through a process of thinking

which is intended to be guiding you into a much more reflective space' (Tandavanitj, 2019, personal interview). Reflection is a step away from the auto-pilot of easy conversation and a step towards conscious decision-making leading to conscious storytelling. The narrator increases the stakes when she refers to the second object in the gift as the 'difficult second album', putting givers in mind of the pressure a newly famous musician feels when trying to live up to their original success. We have ranked the level of consciousness provoked in the Gift app design as a 6 – definitively more conscious than not, though with a fair amount of un-self-conscious storytelling catered for. In VRtefacts, though, as soon as the users are settled in their VR headsets, the Host sets the scene as one designed for conscious reflection. 'You're in the Donation Hall. This is where the museum curators work on the objects they most want to hear your thoughts about. They only handle a few items at a time in here because the real focus is you and what you think' (Host script, 2019). Immediately, storytellers are made very conscious of their choices regarding objects and the expectation that they tell a story the curators will find valuable. Even though storytellers know they are free to choose at random and say the first thing that comes to mind, they have been made conscious of the museum's expectations. Thus we rank the VRtefacts design as a 9 for consciousness, with barely any room for un-self-conscious actions.

*Low to high risk*

*Risk* is a complicated spectrum (the fifth of six), as it is well established in the gifting literature that gift-giving can entail anxiety. Even receiving a gift can entail unwanted senses of obligation to reciprocate or uncomfortably cross boundaries between acceptable and unacceptable levels of closeness in a relationship. Additionally, risk is inherent in any performance situation. Even conversational performance at the far left of all of Wilson's spectra (2005) opens the speaker to evaluation by others of the quality of

their tale and its telling (Bauman, 1975, p. 293; Langellier & Peterson, 2004, p. 25).

Because the Gift app is designed only for one-to-one sharing, both in terms of the script

and the available mechanisms for sharing, the risk should be in the range of everyday

personal gift-giving, amplified only by speaking in public and possibly the technical

literacy to know that the giver or their receiver could distribute the private gift more

widely. We therefore assign the Gift app a relatively neutral 5. VRtefacts storytellers

made their stories public from the beginning, leaving them open not only to evaluation

by a good friend but by complete strangers who have no reason to be forgiving of

errors, in situations and times completely outside their control. This is a situation much

more like Wilson's 'cultural performances' than an ephemeral conversation between

friends. On top of that, the VRtefacts video output showed users wearing the VR

headsets, often not the most flattering of looks. However, the VRtefacts experience

aimed for a positive user experience, even if the strategies above made it slightly

uncomfortable at times (Benford et al., 2012). Therefore, the design stayed away from

pointing out possible worst-case scenarios and had no reason to show users how they

looked in their headsets. It also had the advantage of visual immersion and surprise,

either through VR itself for new users or the passive haptics of touching and moving an

object accurately represented in the VR space. So even though the designers were

unsure exactly how risk would be perceived, the public nature of their stories led us to

rank VRtefacts as slightly more risky than the Gift App at a 7.

*Low to high rewards*

The final stratum refers to the *rewards* to be reaped from storytelling. Results of giving

a gift via the Gift app can vary enormously according to the giver's and receiver's

emotional investment and satisfaction with the gift. As designed, the app seeks to enable

meaningful gifts that keep the receiver front and centre in the giver's mind. It also seeks

to make that thoughtfulness visible to the receiver. For example, the narrator prompts

for the choice of a third object in the gift this way: 'Push them a little bit. Right?

Something they wouldn't get for themselves. You've got a pretty big building full of

stories. It's not too late to surprise them' (narrator script, 2019). For this reason, the

potential for high rewards would seem to match the intensity of the engagement as well

as how well the gift is received. On average, then, we estimate the rewards of the

average gift to be slightly below average, a 4. VRtefacts scores even lower, as the

'reward' for interaction is a non-physical donation to the museum, one which

storytellers had no direct access to, control over, or means of discovering how it was

received. The design attempted to make VRtefacts feel personally rewarding, both as a

VR experience and as a personal story to be archived and used by the museum. As

mentioned above, the Host told storytellers that the curators genuinely wanted to hear

whatever they had to say. The Host also gave encouragement throughout the process

and congratulated all storytellers on the quality of their contributions. VRtefacts scores

a 3.

*Storytelling and time*

Although Wilson intended his Performance Continuum (Wilson, 2005) to apply to

storytelling for the purposes of understanding it as a type of theatrical performance, we

find that all of the elements studied directly involve the manipulation of time through

design, to varying degrees. Intensity and formality are clear examples of how both

designs aim to amplify those elements of the storytelling experience by creating

overlapping, oscillating relationships to past and future in a context that also heightens

users' investment in the present moment. Intensity uses the past-orientation of personal

memory and future-orientation of story/gift reception to heighten the felt importance of

each choice made in the process of selecting objects and what to say about them;

formality increases as users are exhorted to create 'honest' stories that 'count'.

Consciousness and risk also work primarily in the tension between concerns about how

one might be negatively perceived in the future (as well as by other visitors in the

present in the cast of the Gift app). Rewards are anticipations of future feedback that

may or may not come combined with memories of the gifts/donations themselves and

their associations with the museum, especially if users revisit the museum later. And

while the Gift app generally keeps the actual audio design personal and conversational,

the design of VRtefacts hinges on how fully users can take on the role of a 'proper'

storyteller expressing their own personal experience around historical objects in a

coherent, engaging manner.

While the concept of time was not named as a design strategy for the Gift app

and provided only an overarching design concept for VRtefacts, the analytic method

used here reveals how it can be seen as a discrete and useful tool to work with,

especially in terms of prompting users to quickly oscillate between time frames.

Looking at the two designs together, it becomes clear that at least part of their intensity

comes from their engagement not simply with a visitor's preferences in the passing

moment but by quickly switching their awareness between that moment, their own past

memories, and projections into how their present-moment presentation of those

memories may be received in the future.

### 5.2 Performance analysis

In this section, we shift our focus from the designs and design aims of each case study

to the *results* of visitor interactions with those designed experiences. Thus our units of

analysis here are the recorded stories told by each participant as seen through our

performance lens. In the case of the Gift app, the results are the audio-recorded stories

explaining why the givers chose each object, supplemented by the photo they took of

the object. In the case of VRtefacts, the results are the composite videos of each

storyteller and their stories inspired by the two objects they chose. The findings

supporting the analyses in this section are taken from audio transcripts and still photos

(Gift app) or video transcripts and annotations (VRtefacts) of participants' recorded

stories.

Many of the elements that would traditionally be analysed in a performance

(Pavis, 2005/1985), even a recorded, intermedial, or one-on-one performance, were

either absent (e.g. facial expressions, lighting, costumes) or outside their control (e.g.

scenography, audience). We therefore find it more productive to take advantage of the

conversational basis of the performances by using the analytic method proposed by

researchers of narrative performance Langellier and Peterson (2004), which comprises

four criteria: Embodiment, Situated and Material, Discursive, and Legitimation and

Critique.

*Embodiment*

Embodiment is clearly demonstrated in performances from both designs despite their

reliance on audio and the limited scope of movement or visible facial expressions in

VRtefacts. For the Gift app, embodiment could be interpreted first through tone and

speed of speech. Only one user consistently spoke in the dispassionate, measured tones

of a broadcaster, and during the interview it became clear that this was a hallmark of her

personality and was treasured by her receiver. A more typical example is Diana's

single-object gift to Ed. It consists of a photo of a chair whose clue is 'Cool 1930s

chairs'. She takes on a humorously arch tone in her explanatory audio when

proclaiming the words 'In 1929' and 'virtuoso', both of which clearly mark out text she

is reading from the label. There is no announcement that this is what she is doing,

simply a combination of non-conversational, factual content that she presumably would

not otherwise know and an amusingly pompous voice. When she describes the chair in

her own words, she draws out the words 'cool' and 'bendy' so that you can almost

picture her taking on a 'cool' pose and gesturing the bends of the chair with her hands,

arms, or whole body. This, too, conveys a sense that she is poking fun, this time at

herself rather than the curatorial text. Diana is also a good example of the many users

who speak quickly and confidently when reciting text but then slow down and have to

reach, sometimes awkwardly, for their own words to describe why they made their

choice. Here, time gives receivers a powerful tool to mentally and emotionally recreate

their giver's performance from the traces of their moment-by-moment experiences

imprinted in the audio, and fill in the colour of the meanings and contexts of the words

their givers have used from their own memories of how their givers tend to speak and

move. In VRtefacts, where the story is donated by video, the contextual clues tend to be

slightly more visual than auditory. Storytellers were noted to use physical actions such

as gesturing the steepness of an incline with their hand, gesturing the movements they

described, indicating their face when mentioning masks (a popular choice of object),

and describing various parts of the mask according to the part of their face it would

cover. These movements indicate the embodied storyteller feeling themselves to be

engaged in the present moment rather than 'transported' to any past memories or

associations they are describing.

Ultimately, the embodiment of each case study shows an awareness of the

physical museum space in tandem with the present-moment experience of the

intervention. Samuel's second object for Natalie via the Gift app demonstrates this

embodiment perfectly. The two took part with their toddler, taking turns watching him

while the other made or received a gift. Samuel's second performance begins as

expected until he can be heard shifting his face away from the microphone to call out a

gentle warning to their son to be careful and then blending that interaction into the

relevance of that object as a gift. It could not have been planned better, and it is the

embodiment of the shift between loving gift-giver and watchful father that makes it so

satisfactory. Again, these shifts would not be made as clearly legible to the receiver

without the element of time inherent in the audio components of the gift.

A different orientation to time is also evident as a contrast to the many instances

of tellers inhabiting or portraying characters in the co-present, small-group stories

analysed by Langellier and Peterson (2004). VRtefacts storytellers arguably had no co-

present audience and no one known to them to direct their stories to for future reception.

They needed to either imagine a future audience (which interviews reported in Spence

et al., 2020, reveal that most did not) or immerse themselves in the moment-by-moment

telling of their memories or personally driven spontaneous fictions. They did the latter,

as revealed by a strong tendency to retain their own position within their stories. For

example, when describing his brother coming home with a piece of metal he had

machined, Len could have slipped into his brother's character and said, 'Look at the

piece I machined today!' In co-present, small-group storytelling, he easily might have.

Other stories refer to a generalised 'you' assumed to share their own experiences, such

as Arden's tale of 'you' finding the Frigger Pipe in a filthy, moist attic, or Viv's story

about the Bird Mask that 'reminds me of history class as well, all the strange things

they'd have in the classroom and you'd just want to touch it and the teacher would tell

you off'. She does not embody a student trying to touch an object or adopt the stern

voice of an annoyed teacher. Rather, she assumes her audience knows this sort of

experience and continues to embody her adult self reminiscing. All the VRtefacts stories

have this in common; they are grounded in the present, most often using phrases like 'it

reminds me of...'. They do not take their audiences with them on a journey to the past as

suggested by the historical object. Instead, they take their audiences through their own present-moment experience of encountering the object, searching their minds for relationships, and presenting the ones they deemed most suitable.

*Situated and material*

The situatedness and materiality of the performances are, like embodiment, made clear through subtleties in the audio. In the Gift app, the situatedness of the museum institution and the norms that prevail there are evidenced in the quiet tones adopted by all users. Even exclamations and joyous laughs are quiet compared to what they might be in a private space. A different example comes from Oni's gifts to Wallis. They begin with Oni clearly situating themselves in relation to the object, its information panel, and the featured new part of the museum, the 'Museum of Transology', dedicated to recording and celebrating the lives of trans people in Brighton and beyond. Oni looks at a tiny figure on an ancient carving and says, 'I like this little... person [short laugh]. I don't want to gender them'. The idea of misgendering might have been a perplexing idea in ancient Egypt, but Oni's performance brings that little Egyptian figure into the present-day context and gives the person represented the respect that would be accorded them in Brighton in 2019. Oni then also situates this gift in relation to the technology used to make it, explaining that it took so long to get the recording to work that they were now feeling – and sounding – tired, 'so that's why I'm now like totally off my game'. Oni's third gift to Wallis reveals a temporal range to the objects (ancient, near-contemporary, and early 20th century) that gives a sense of the museum's offerings, the breadth of the interests Oni thinks they share with Wallis, and an orientation to Oni's future (anticipating Wallis's response) and Wallis's immediate past (as Wallis will experience the gift laid out for them). Again, here, past and future serve to focus attention on the present moment.

Looking at how situatedness and materiality are evidenced in a VR experience is surprisingly straightforward too, as long as the analyst is prepared to look for subtleties. Between the external, 'real-world' view of the storyteller and their own gaze within VR, we were able to ascertain key foci of attention: the object as felt in the real world and as perceived in VR; the additional information provided by the view of the large-scale object in its large vitrine and accompanying poster within the Donation Hall; the camera and lights that indicated all start times and most stopping points; and the Host, whom the storytellers knew was nearby but could not see within VR. Some of the elements relating most directly to embodiment are also relevant to situatedness and materiality, including strategies for indicating the end points of their stories through word and gesture.

Wallis's gift to Oni in the Gift app plays with situatedness and materiality to even greater extremes by presenting their first object, a painting of a dog, as a real dog with which Oni could have a relationship; in the second by audibly moving their mouth away from the microphone as their attention is distracted and then suddenly redirected to the object (heard in harsh plosives whenever facing the object and speaking into the phone); and in the third by drawing Oni's attention to its texture and stating the wish that Oni would continue on the trajectory established by the physical placement of these three objects in order to eventually arrive at the Museum of Transology, which Wallis had also wanted to give to Oni.

For Gift app users, a key situating focal point then was the anticipation of the reception of the story. However, as VRtefacts did not focus on specific receivers, this situating focal point tended to fall either within the VR – gazing at the object in their hands and sometimes also its representation in the Donation Hall and the informational posters there while they were being recorded – and sometimes to the Host. The Host's

success in contextualising the entire experience meant that even though they did not

make a sound and were visible to VR users, more than one turned in the Host's

direction when not looking at the object, especially when the storytelling devolved into

conversation (i.e. when the host intervened with questions to draw out a shy user). In

fact, Dexter finished his Boar's Head story by asking the Host if he had got his facts

right (which the Host did not know). Despite being literally invisible and practically

inaudible during storytelling, the Host maintained a strong hold on each storyteller's

sense of their situatedness in space and the materiality of the real world as it

interweaved with the VR. This further anchored storytellers in a present-moment

storytelling experience with an invisible but very present interlocutor.

These interactions demonstrate that storytellers are oriented to their present-

moment storytelling in both case studies, be that in the physical museum or the virtual

Donation Hall. These are only some of the more notable examples of how these

performances evidence their situatedness and materiality, and the overall effect is to

emphasise the present-moment process of gift or donation story selection, which relies

so strongly on the performed object's situation within the museum and its situation in

the shared experience of giver and receiver.

*Discursive*

Each user in the two case studies leant, to differing degrees, on shared knowledge for

which each must simultaneously conjure their own memory while judging how to evoke

recognition in the future from their receiver. For Gift app users, often this meant shared

knowledge between giver and receiver. For example, one of Katrina's gifts to Evan via

the Gift app was a photo of an ape with the simple comment, 'Looks a little bit like me'.

The entirety of the meaning lies in Evan's knowledge of what Katrina looks like and,

presumably, shared jokes about her looks; any struggles for meaning will lie with Evan.

Similarly, in Jake's gift to Johann, Jake has no problem describing the object and the elements he thinks will appeal to Johann, but he never articulates why he thinks they might appeal. A listener unfamiliar with their family history has no chance of deciphering the many shared references, and Jake's stilted wish that Johann likes it 'could be told differently' (Langellier & Peterson, 2004) – the emotion behind that wish could be expressed much more clearly, or Jake could reminisce out loud about the many experiences they have had together with similar objects. Instead, like Katrina, Jake abdicates authority for meaning-making to the future, to the receiver.

VRtefacts users, on the other hand, may have been oriented to the present but still evidenced the richness of that present moment through their anticipation of what audiences in the near future would understand in terms of shared cultural knowledge. People referred to local and faraway place names, popular culture (the *Game of Thrones* series, the 'Slinky' toy, model aircraft kits, etc.), historical references to plague masks and Viennese waltzes, loose interpretations of the term 'medieval', 'shared' experiences such as a fear of flying or the year numbering of a particular educational system, and so on. However, Filip, who conscientiously explained the background necessary to understand the foreign references in his first story, gave no such references in his second as though assuming they would be seen together. If users were primarily concerned with communication of their ideas to an unknown audience, Filip would have re-explained the cultural references that appeared in his second story, as there is no reason to assume his two would be shown in the same setting or session, and Slinkies or plague masks might have brief descriptions for the uninitiated. Clearly, although users were aware of the future-orientation of their storytelling with VRtefacts, analysis of the discursiveness of their stories reveals that they often used the histories of the actual

objects as they were intended to be used in this context – as springboards to their *personal* past experiences, with which they then tended to engage with strongly.

Evidence for the discursive also appears in VRtefacts through users' assertions or abdications of authority to speak confidently. Olivia's Boar's Head story ends with 'That's about all, really,' said in a tone that suggests she would offer more if she could. Filip is even more explicit in his abdication of authority in his Bird Mask story, ending it with 'So that's it probably for me, sorry'. This apologetic or dismissive approach to their stories was common enough to be a notable trend. This may be because VRtefacts users only had six objects to choose from for the first story and only three for the second, so they may have truly struggled to think of anything they would consider worthwhile for others to hear. Helen, for example, chose the Mystery Textile Equipment for her second object. She described her impression that it was made of wood but (sensibly, as it looked like wood but felt like plastic) doubted herself. She went on to say, 'I don't know. I don't know. ... I'm feeling a bit ignorant, I'm feeling that I should know what it is but I don't know what it is, and I don't know what it's for'. VRtefacts seems to have concentrated users' attention on the present moment, but differently from the ways at work in the Gift app. The lack of an individual to envision future engagement with seems to be linked to these apologies and feelings of ignorance, which were vividly felt in the present moment and unconnected to any specific recollections or realistic future encounters. Thus the performative use of these case studies seems to tap into both consciously chosen topics and more deeply rooted, subconscious patterns and expectations from the past: the storyteller as palimpsest.

*Legitimation and critique*

In the Gift app, the performers opened up the performances to legitimation and critique by their gift receivers. In well-chosen, aptly described gifts, legitimation is clearly the

aim (see the example of Kira to Jake above for an extreme example). Many stories relied heavily on shared understandings, private jokes, or the performer's articulated perception of what the receiver would prefer and are therefore very exposed to critique. (The one that these analysts would have seen as the 'weakest' performance because it seemed to contain the least personalised or emotional content – Namazzi's short, dry narration to Tamarh – turned out in the post-hoc interview to be very well received because Tamarh loves exactly those qualities in Namazzi that would make her create such a concise and informative gift.)

Comparatively, an exploration of legitimation and critique within the VRtefacts performances underscores the findings revealed by analysis of the discursive, namely just how little attention users gave to their future audiences and how much they felt open to critique in the present moment, sometimes pre-empting challenges to their legitimacy within their own stories with phrases such as 'that's all that I can think of'. Those who seemed to feel legitimated and unconcerned about future critique seem to be those most absorbed in the process of recounting detailed memories, working to make multiple associations, or telling fictionalised what-if stories. It could be illuminating to alter the design to address some user's concerns over legitimation and critique from a more holistic and embedded perspective than simply telling them (multiple times) that anything they have to say is valuable to the museum.

So, what deeper functions are these stories performing? We see the answer in terms of time orientation. Both case studies demand more than the selection of a gift or of a story to donate: they demanded a fully embodied, material, situated, and discursive engagement with receiver(s) through the prism of the memories and imagined futures triggered by museum objects. The present moment of performance does not just reflect the past and illuminate the future: it engages in an ongoing engagement with both, and

is apparently more vivid when that engagement has a personal focus. And as the last

two elements of this analysis indicate, a focus on the present moment of performance

without a strong oscillation with an easily imagined future and a personally significant

set of memories appears to correspond to a less rich, less immersive, more self-critical

experience.

### *Human geography analysis*

Both the Gift app and VRtefacts made consistent and strong use of time-space, drawing

on and adapting multiple time-spaces to enhance the 'presentness' of the experience for

the visitor. The Gift app draws heavily on the museum context, relying moderately on

the app giver's past experiences and learned behaviours to encourage the creation of a

time-space which allows them to behave in ways that they might consider deviant or

taboo in the normal museum context. Speaking aloud (all participants), light-heartedly

making fun of curatorial interpretations (as Diana did), or offering unofficial

interpretations without historical accuracy (much as Katrina or Tamarh did) – all

fostered a new context within the museum that was highly personalised and individual.

By sharing those constructed contexts with their receivers, givers made elements of the

gift's time-space shared between the two instead of individual, experienced not

simultaneously, but with the same histories being drawn upon in each giver's and

receiver's present moment. By overtly asking givers to consider the future recipients of

their gifts (and asking receivers to record a response for their givers), the Gift app was

also able to draw on previously developed relationships as well as the future

development of those relationships within their present endeavour. By thinking about

their histories with the recipient, their knowledge of the recipient's likes or dislikes

(Jake and Namazzi), or in-jokes that only make sense to the storyteller and recipient

(Katrina and Fraser), the storyteller pulled these influences into their present-moment

experience and even shaped the way they themselves viewed an artefact or object.

Additionally, by thinking of where the receiver might be when they opened their gift,

how they might receive it, and whether they would come to the museum to experience

and perhaps reciprocate the gift, potential futures embedded themselves in the giver's

present-moment context of creating and giving their gift (and the receiver's of

responding to their gift). Whilst all participants showed an awareness of their

embodiment in the time-space context of their visit through subdued speech

(demonstrated nicely by Kira) or observation of unspoken rules (Samuel gently

admonishing his child), they also demonstrated an awareness of potential time-space as

it could be experienced by their gift recipient, leading them through the physical space

with 'clues' and suggesting new interpretations and modes of exploring the exhibit (as

Wallis did in guiding Oni to the Museum of Transology).

VRtefacts also relied on the museum context in order to generate the time-space

of the experience. Instead of deviating from learned experience and past experiences,

however, it prompted the storyteller to recognise the context of a museum and lean on

learned behaviours to enhance the formality and content of their storytelling

performances. As with the Gift app, storytellers drew upon the past to affect their

present even before they began to speak. Drawing from the past was also heavily

prevalent in the storytelling itself. Stories were inspired by the artefacts on display in

the Donation Hall, and for the vast majority of storytellers, their stories came directly

from personal memories of past experiences (for example, Len and Filip). By

encouraging storytellers to think about past events, VRtefacts was able to pull those past

experiences into the present time-space and overtly change the way the storytellers

engaged with and thought about the objects on display. This was demonstrated by the

consistent perspectives used throughout the storytelling and the steady use of present

tense. VRtefacts storytellers were also asked to think about a future audience for their

story. This had the impact of encouraging them to draw the future into the present, to

consider who might be hearing their stories and which stories might be valuable to

potential future visitors, although as discussed, future timelines were not as strongly

considered by storytellers as anticipated. The time-space generated through VRtefacts

was much more heavily focussed on the past and present inhabiting one time-space to

enhance the present.

VRtefacts storytellers in particular also drew in other spaces to the present

moment, and not just other times. (It is possible that as researchers we were unable to

pick up on shared references to other places in Gift app gifts, but we still feel

comfortable asserting that VRtefacts participants made more active use of space.) Many

VRtefacts stories were deeply embedded in a specific space, for example a holiday

destination (Dexter) or local area (Len), which enhanced their relationships with the

space of the museum through forging emotional connections between personal histories

and the museum. For one storyteller, the experience even conjured images of semi-

fictional place (Arden), suggesting an opportunity to tie in other time-spaces generated

collectively by visitors, not purely through individual timelines. The contribution of

drawing on different spaces is the effect it has on the collective experience as imagined

in future use and reception. A lot of the participants were more able to consider their

future audience by assuming certain experiences to be universal or relatable, such as

referring to cultural schema (Viv) and the many pop-culture references.

As we have demonstrated in our detailed analyses based on storytelling and

performance methods, time orientations emerged as a significant finding. However,

while specific methods within the field of theatrical performance can be extremely

useful, they are also admittedly difficult to convey in full to an audience of HCI

specialists, who understandably need to know how they integrate into a coherent and practically applicable whole. In this section we have presented human geography as a means of integrating the specifics of those findings into the single and long-established concept of time-space. Time-space is a description of how experiences are composed, experienced, understood, and altered. The Gift app was designed to emphasise givers' mental engagement in the future reception of their gifts and in a full, thoughtful engagement with the museum space. The stories generated by use of the Gift app showed an equally strong pull between past and future, with each feeding into the other during the process of selecting an object and explaining the rationale behind the choice. This grounded participants very strongly in the spatial element of time-space. By contrast, VRtefacts was designed to anchor participants strongly in the physicality of the represented museum objects as well as in their personal plans for what stories to tell. The stories generated by use of VRtefacts then quite palpably placed the mental and emotional aspects of the storytellers into their own past (or in Arden's case, in their own imagination drawn in part on their own past), rooting their interior, felt experience in the virtual world of the Donation Hall where they were sharing personal stories with strangers in an unknown future. When all of these elements are drawn together - the different times, different places, different assumptions and requirements behind each set of interactions - it is clear that the temporal aspect of time-space can, indeed, be designed into an interactive experience with valuable affective responses to museums, individual objects within them, loved ones, strangers, personal memories, and flights of imagination, all generating a new the time-space in the present moment of experience.

## 6 A framework spanning HCI, performance, and time

So far we have presented our two case studies and examined them through the lenses of conversational storytelling, performance, and human geography. The analyses detailed

above reveal the underlying complex time orientations in what might otherwise appear to be straightforward storytelling exercises, enabled in these cases through novel interfaces and engaging performative premises. We began the process of tying together these many threads by looking at the use of time in these case studies through the human geography lens of time-space. We now move on to discuss how those findings, understood as manipulations of time-space, might be deliberately operationalised in new ways. It is worth reiterating that these two case studies were not designed to investigate the role of time in interactive performative experiences. Rather, they emerged as apt opportunities to highlight the underlying importance of time in these and probably many, if not most, similar experience designs. Although time is not often quoted as the central focus of technology-driven storytelling practices, or practices designed to solicit user-generated content or interaction in the broader sense, time remains an inescapable factor that can drive their design, execution, and the persistence of their digital footprints.

### 6.1 Time orientations as experienced

An observation raised from the Gift app data suggests that the time-space created by the use of the app is not rooted in one static location or temporal space. Instead, the time-space focuses around the performative relationship between the giver and the technology utilised. As the giver is required to navigate the physical museum in order to engage with the experience by exploring the exhibits and objects throughout, we suggest that the time-space arena created is vastly expanded by the mobility of the technology being used to connect all areas of the museum. With the contextual coherence offered by the single experience of the app, it is suggested that the in-the-moment engagement of the app allows for past and future to converge into one, much more mobile, performative time-space which moves with the storyteller instead of being

regenerated with each transition (see 'Gift app' row of Figure 7). The app's affordances regarding cohesion across differing exhibits opens opportunities for expanded narrative and increased 'collectivity' of time-space experiences.

Where the time-space generated in the Gift app was anchored to the augmented space of the app, the time-space of VRtefacts was anchored equally to two consistencies that defined the parameters of the experience. First, the virtual gallery, which mentally and temporally removed the storyteller out of the physical museum, whilst simultaneously keeping them within the museum 'frame' (see 'VRtefacts' row of Figure 7). The perceptions and learned behaviours behind engaging with a museum space automatically encouraged storytellers to focus on certain elements like the curatorial history of the artefact, the 'authority' of the museum, or the pattern of story delivery. The 'newness' of the virtual space deliberately countered some of these narratives, providing a somewhat neutral environment and encouraging different approaches to engaging with artefacts than might be anticipated in physical museums. Individual interpretations of the VR Donation Hall shaped the stories, as did the knowledge that the space was utilised by others for the exact same purpose. Both individual and collective time-spaces were therefore generated by VRtefacts in order to increase the experience of the present moment framing the storytelling.

The second consistency came in the form of the performer, who overtly guided the storyteller into the required frame of mind, and started to pull together the different temporal streams that would combine to enhance the 'presentness' of the experience. The performer was able to guide the storyteller into their own performance that pushed at the constraints of the time-space precisely by drawing from other times and places to personalise the artefacts with their own unique stories.

FIGURE 7 ABOUT HERE

In short, the time orientations in the Gift app and VRtefacts overtly shaped the time-space of the experience, encouraging reflection and engagement with past, present, and future simultaneously (albeit to varying degrees of intensity). A key impact of this convergence was an increased sense of 'present-ness' and engagement, often surprising the participants themselves with how absorbing or beneficial their experiences were.

### 6.2 Time orientations as performed

Crucially, in both case studies, story capture is asynchronous from its delivery. This, too, introduces an element of temporality to be considered. The user is physically inhabiting their current time-space. But as evidenced by the stories told, and the subsequent analyses, their storytelling performance took them mentally and emotionally both to the future and to the past (see Figure 7). By addressing a future audience, they projected themselves into the future, considering how their audience may experience their story and shaping their performance to suit. More often than not, they also cast themselves into the past, reliving a memory or recounting a tale that they performed in their present for this future audience.

These orientations and reorientations between past and future can occur several times or even flicker constantly between the two within the user's internal processes of interoception, remembering, associating, and self-regulating during the performance itself. Notably, both of the experiences were aimed at the present. The temporal reorientations of the storytellers, givers, and to a lesser degree receivers naturally emerged as an inherent part of the experience of telling stories, including personal stories and acts of imagination. In an attempt to illustrate the temporal orientations that users experience, we propose the Temporal Experience Design Framework, illustrated in Figure 8.

FIGURE 8 ABOUT HERE

### *6.3 Using the framework*

The Temporal Experience Design Framework (see Figure 8) aims to convey in a simple form the relationships we have explained in detail to those who may wish to engage directly with time as a design element. Potential applicable experiences range well beyond museum experiences or large-scale interventions and into everyday life. For example, social media technologies provide mechanisms and audiences for billions of users to perform for. Sharing personal stories inspired by virtual simulacra as simple as photos taken on a phone has also been common practise for well over a decade. The mental and emotional temporal reorientations that are described in the framework occur for these instances of storytelling, however brief, just as much as they appear for crafted storytelling exercises, whether in spoken, written, or alternative forms.

The framework posits that users – visitors in our case studies – remain centred in the present time-space. They do this primarily in three ways. First, they remain physically present within the designed time-space, wherever it may lie on any mixed reality spectrum (Milgram & Kishino, 1994; Benford & Giannachi, 2011). Second, they remain socially located within their physical time-space. The user is ensconced in a social situation shaped by the relationship they have with the setting and people around them. This will inform and drive their actions and reactions, and colour any storytelling they engage in. Third, they remain fully contextualised within their time-space (see the discussion of Hägerstrand, 1970, above). This is closely related to their social and physical contexts, but also includes the task, activity, and purpose that the user is engaged with. The ways or degrees to which users perceive themselves to be centred in their body's current time-space can be accentuated, altered, or diminished based on the design of various interventions, but for the foreseeable future, that time-space cannot be completely erased – or ignored as a design factor.

With the user physically, socially and contextually present in their current time-space, orientations to the past and future will occur primarily within their mental and emotional experiences, though as seen with both of the case studies in this article, physicalised technologies can have a powerful influence on these mental and emotional experiences as well. As performative storytelling relies on aspects of the past, whether recounting a past event, delivering memorised content, or simply responding to past experiences of performance, the user brings the past into the present through their performance. Similarly, they anticipate their prospective future audience, considering, shaping, and reacting to their present-moment performance as projecting themselves into their story's future. Perhaps counterintuitively, the more their awareness oscillates among two or all three of these time-orientations, the easier it seems to be for them to absorb themselves completely in the moment. This in turn leaves the audience more of a trace of their own enacted thought processes than a self-aware performance of such. These time-space journeys can and will occur for most or all users if the experience promotes them.

## 7 Conclusion

In coming to a close, we reflect and consider possible future directions. Although these case studies were both set in museums whose collections would be likely to prompt thoughts of the past, our analyses reveal that it is the personally meaningful memories, and thoughts of the future directed towards an individual, that made for the most compelling designs and the richest results of the resulting experiences (the stories told). Incidentally, these correspond in large part to users' own descriptions of their experience (see Spence et al., 2019, Spence et al., 2020). There is every reason to believe that other digital, physical, or mixed-reality objects or prompts might work as well.

As we have posited in the Temporal Experience Design Framework, designing with attention to multiple, overlapping, and shifting time orientations can build a stronger engagement with the user's current experience, thus evoking deeper and more meaningful reactions and seeding future engagements. Our analyses reveal that time as understood in the context of time-space (Hägerstrand, 1970) is an under-tapped resource inherent to all durational interactive experiences, especially but not exclusively in a context already imbued with resonances of the past.

These findings can be extended to the arena of social technologies as well, opening another possible avenue for more considered and responsible use of social media. By being mindful of the temporal aspects of a given platform, designers can encourage users to cast themselves forward, orienting towards a future audience and context, and anticipate the effects or repercussions of their content. Similarly, an awareness that such platforms, for all their fidelity, do not manage to accurately convey the context associated with a present narrative can similarly drive positive change, particularly in an era where such platforms have eclipsed traditional media as sources of information. We are mindful of temporal strategies already deliberately taken by different platforms and do not advocate a uniform approach; however, we believe that at least some may benefit from considering the implications of the Temporal Experience Design Framework on their own aims and the greater good (which is itself always contextualised, contingent, and unstable).

Another area in which we anticipate possibilities for this framework are new technologies for capturing and sharing content. In this context, audio and video were major revolutions, first with analogue, and then again with digital. Then came the proliferation of mobile audio and video capture, creating spontaneous content creation, and the internet for immediate dissemination. The most likely candidates for a sweeping

change to content creation and sharing are likely to be some form of mobile 3D

scanning, then widespread adoption of mixed reality technologies, initial steps of which

can be seen in the VRtefacts case study. It may be a matter of time before these or

similar technologies see wider usage. As the opportunities for novel performative

experiences within these mixed reality spaces increase, so will the interesting ways of

capturing and sharing them. And, as the technologies become richer, so too will the

opportunities for designing for time orientations within them.

*Background.* Much of the actual design work that we propose for this article has been published elsewhere (see Back et al., 2018; Spence et al., 2019; Løvlie et al., 2019; Spence et al., 2020). The first author has also already published a theoretical paper in answer to vagueness or contradictions within the HCI literature around the difference between sharing and gifting (Spence, 2019) as informed by these designs.

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Figure 1. The Performance Continuum (Wilson, 2005), showing the most conversational characteristics of storytelling on the left and the most 'professional' on the right.

Figure 2: An overview of the Gift aapp experience, from the opening premise, through the creation, to the sending of the gift.

Figure 3: The VRtefacts virtual space.

Figure 4: The three plastic 3D prints on plinths housing trackers, and a participant interacting with the vitrine housing a tracker that projects a 3D model in VR.

Figure 5: Still image from the composite videos that were recorded during the VRtefacts performances.

Figure 6: Our analysis of the Gift app and VRtefacts designs according to the Performance Continuum.

Figure 7: A summary of mental/emotional time orientations (emanating from upper body) and physical time orientations (emanating from lower body). Dashed lines indicate weaker orientations. Thickness of lines underfoot indicate strength of present-moment engagement in physical space, while thought bubbles indicate mental/emotional engagement in non-physical spaces.

Figure 8: The visitor (centre) occupies the present time-space in social, contextual, and physical terms. Mentally and emotionally, they orient to the past (left) and future (right).

# Acknowledgements

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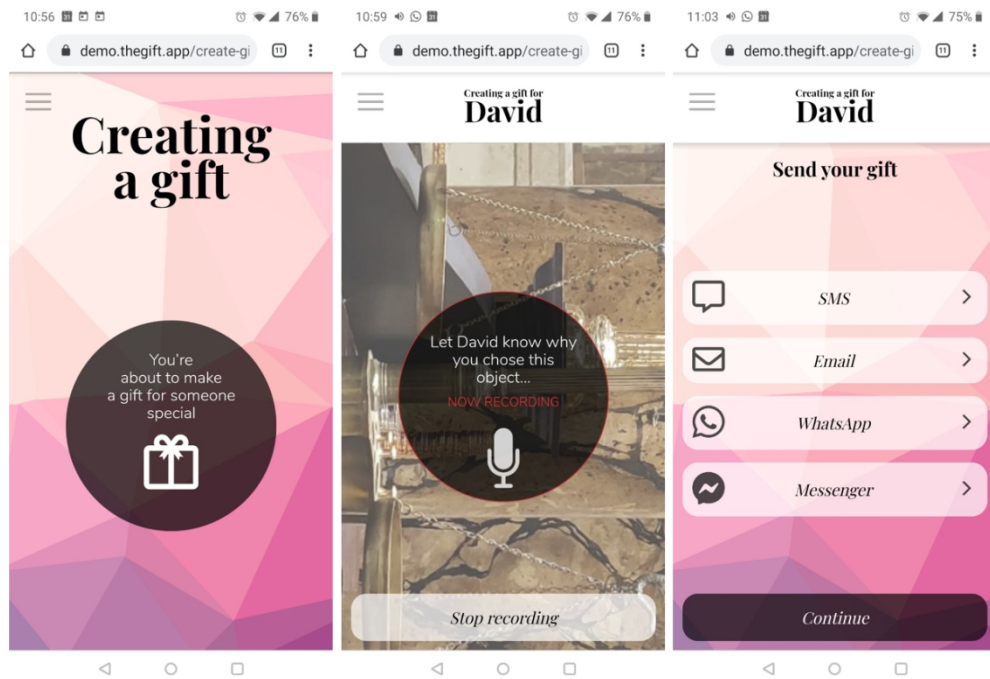14
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| Wilson's Performance Continuum | | |
|---|---|---|
| Conversation | | Cultural Performance |
| Low Intensity | | High Intensity |
| Informal | | Formal |
| Subconscious | | Conscious |
| Low Risk | | High Risk |
| Low Rewards | | High Rewards |

The Performance Continuum (Wilson, 2005), showing the most conversational characteristics of storytelling on the left and the most 'professional' on the right.

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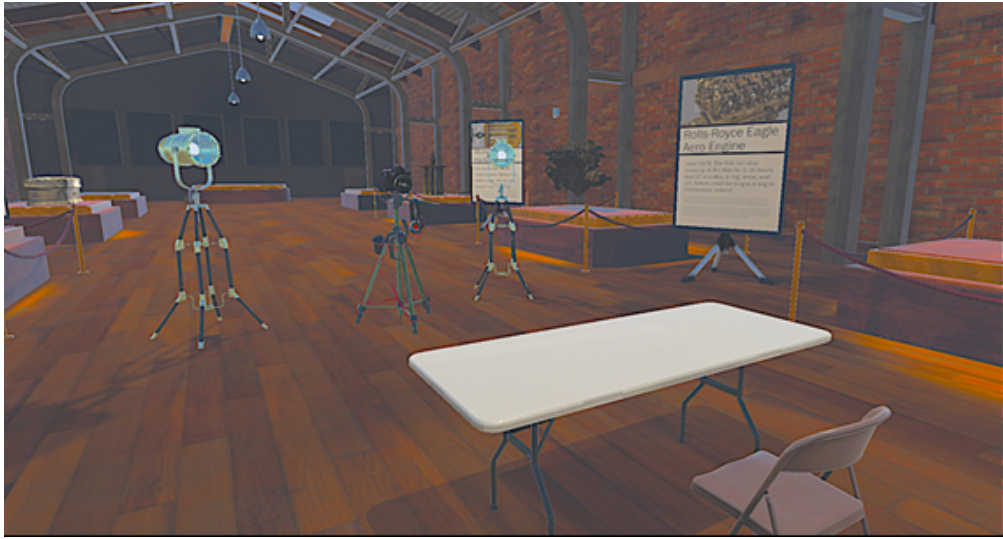47
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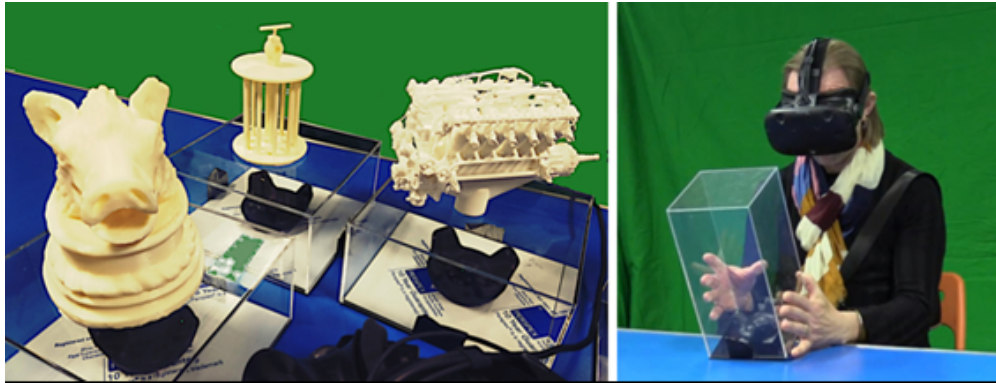51
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An overview of the Gift App experience, from the opening premise, through the creation, to the sending of the gift.

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The VRtefacts virtual space

The three plastic 3D prints on plinths housing trackers, and a participant interacting with the vitrine housing a tracker that projects a 3D model in VR.

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Still image from the composite videos that were recorded during the VRtefacts performances.

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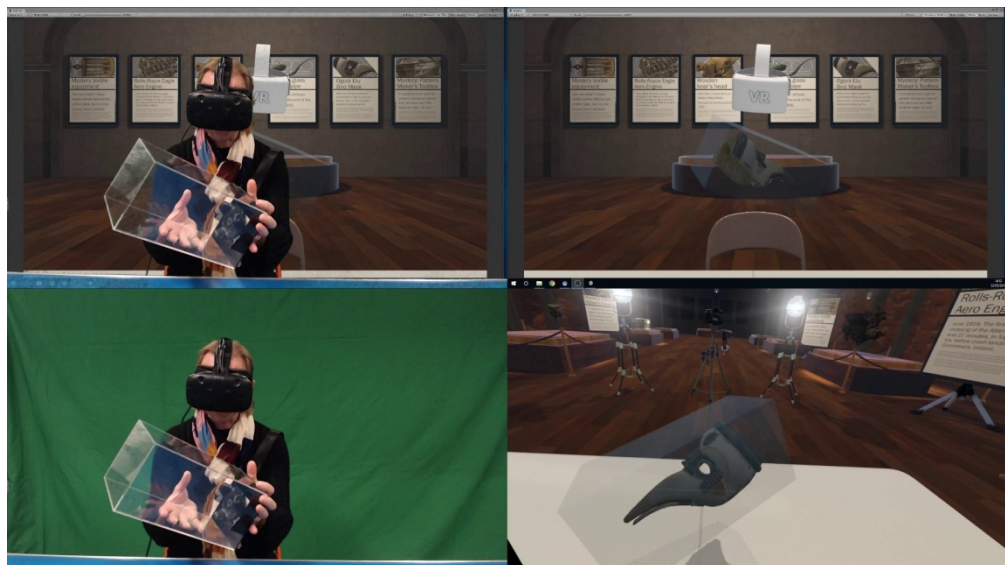
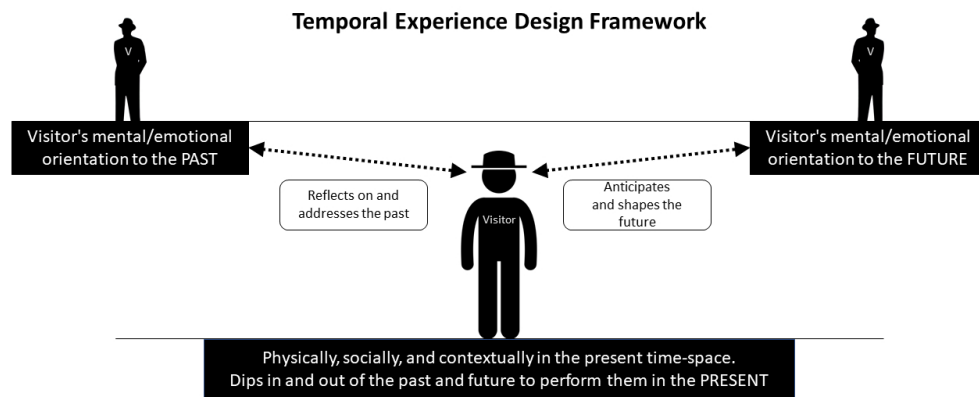| Wilson's Performance Continuum | | | |
|---|---|---|---|
| Conversation | 2 | 7 | Cultural Performance |
| Low Intensity | 4 | 6 | High Intensity |
| Informal | 3 | 4 | Formal |
| Subconscious | 6 | 9 | Conscious |
| Low Risk | 5 | 7 | High Risk |
| Low Rewards | 3 | 4 | High Rewards |

| Gift App | VRtefacts |
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Our analysis of the Gift app and VRtefacts designs according to the Performance Continuum.

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A summary of mental/emotional time orientations (emanating from upper body) and physical time orientations (emanating from lower body). Dashed lines indicate weaker orientations. Thickness of lines underfoot indicate strength of present-moment engagement in physical space, while thought bubbles indicate mental/emotional engagement in non-physical spaces.

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**Temporal Experience Design Framework**

Visitor's mental/emotional orientation to the PAST

Reflects on and addresses the past

Visitor

Anticipates and shapes the future

Visitor's mental/emotional orientation to the FUTURE

Physically, socially, and contextually in the present time-space.
Dips in and out of the past and future to perform them in the PRESENT

The visitor (centre), occupies the present time-space in social, contextual and physical terms. Mentally and emotionally, they orient to the past (left) and future (right).