ROOM FOR TRUTH

A NEW RITUAL FOR MEANING-MAKING IN A PHYSICAL-DIGITAL FUTURE

by

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B.A. Government, Smith College, 2011

A Major Research Paper

presented to Ryerson University

in partial fulfillment of the requirements

for the degree of

Master of Digital Media

In the program of Digital Media

Toronto, Ontario, Canada, 2019

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Abstract

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A NEW RITUAL FOR MEANING MAKING IN A PHYSICAL DIGITAL FUTURE

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Room for Truth introduces a new physical-digital ritual which strengthens the connection between the self and the other by integrating the body's sensory potential into social media. From self-trackers to Instagram, people are using technology to facilitate self-observation and connection with community, but mostly media fails to incorporate the body in two major ways. Firstly, the storytelling options available on mainstream platforms are largely restricted to photographic content and text-based commentary. This serves a visual-first design hierarchy which disregards the full sensory capacities of the body as an expressive organ, a natural storytelling interface which is the inheritance of all human beings. Secondly, the built environments in which people engage in genuine self-reflection are often private, tech-free spaces. However, public truth-telling can pull people out of filter bubbles, reduce polarization, instill empathy, and motivate people to take more informed action. The Room for Truth project aims to resolve these challenges by imagining a new social media which uses the body as its generative interface. It reimagines the method, the environment, and the appearance of existing methods of self-reflection to better facilitate collective truth-telling by focusing on uniting technology with the sensory storytelling potential of the human body. Specifically, the Room for Truth prototype introduces a new visual language for truth-telling

in three ways: 1) a public-private booth with theming that invites self-reflection; 2) symbolic objects with embedded NFC tags which draw upon memory and sensory attributes to inspire complex storytelling; and 3) a mobile application which captures data and translates it into meaningful abstract animations which are publicly searchable. This paper discusses the Room for Truth project and the implications of a truth-telling process which bridges the physical, digital, and emotional to capture, reflect, contextualize, and transform personal and collective experiences: a new ritual for meaning-making in a physical-digital future.

Acknowledgements

For the curious, playful minds that taught me the most this year: Steve Cober, Dr. Kathryn Woodcock, Dr. Ali Mazalek, Daniel Harley. For my classmates, who embody curiosity and share my commitment to building a better world by grappling with the temptations and limitations of technology. For those who reflect my power rather than diminishing it: SHOUTIES, my Smithie pals, my trans and genderqueer and neurodivergent sibs everywhere. And to those who give me gifts that make my life possible: Ahna and her courage; my parents and their gratitude for life; my brother for showing me how to better myself with gentleness; my sister and her commitment to togetherness; Mo for her deep and applied spiritual practice; and Joey and Maeve for always showing up at just the right time.

Dedication

To nine-year old Bonnie, whose bold declaration that she wished to be an artist *and* a pilot turned out to be closer to the truth than expected.

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1. INTRODUCTION

The 21st century is the era of fake news, exacerbated by digital media. From political administrations to personal relationships, digital media has made it more difficult for people to ascertain truth from lie. In pursuit of survival and profit, mainstream news networks publish negative stories to heighten feelings of polarization and viewership. On social media, and especially on Instagram, the inherent voyeurism and transactional nature of the platform has turned the *performance* of authenticity into social currency.

The limitations of technology to facilitate collective and personal truth-telling are often inherent to the infrastructure itself and deepened through prolonged use. For example, Facebook's filter bubbles and Instagram's literal filters enable the compartmentalization of society in ways previously unimaginable to previous generations (Pariser, 2011). The commodification of personal data along with the embedding of influencer marketing have created an atmosphere of distrust around social media and network technology (Pierce & DiSalvo, 2018). Social media is no longer a way to capture and share personal moments (Constine, 2017) but rather a performance of identity in which content is curated in advance and serves to elevate social status and career prospects. Furthermore, the corporate shadow cast by persuasive design and the mismanagement of data (Fogg, 2009) came to a head in 2018 and made people wish they could leave Facebook for good (Shane, 2018).

https://www.buzzfeed.com/louisekhong/fake-travel-tiktok-plane-challenge

As people are overwhelmed with fake news and deceitful technology, there is still a yearning for better ways to tell and discover the truth. Some are turning away from technology, but others embrace it as a comprehensive solution for self-reflection. People stay on social media, despite their knowledge of data mismanagement and monetization, because of a deep desire to stay connected with friends and to participate in a global community (Zantal-Wiener, 2018). They use self-trackers to manage their fitness, Facebook to stay connected with family members around the world, and Instagram to explore other ways of life. Instagram, after all, is truly a uniquely powerful platform for storytelling. Research shows that many millennials use Instagram as a tool for accessing motivation, inspiration (Janicke-Bowles, Narayan, & Seng, 2018), connection, and other "self-transcendent emotions" (Haidt & Morris, 2009). Facebook offers unmatched opportunities to connect with friends, families, and identity-based communities around the globe. Facebook's live-streaming capabilities help people connect with the rapid-fire spread of non-mainstream news and grassroots organizing efforts.

Social media has been wielded as a tool against democracy, as seen during Facebook's disastrous handling of the 2016 U.S. Presidential elections, but it can also be employed to pursue equity. In these best-case scenarios, social media offers individuals a way to reflect upon their own life in the context of a global community. Facebook has directly enabled or amplified some of the most societally impactful moments of activism in the 21stcentury (Larson, 2017), like the growth in white Americans' awareness of the movement for Black Lives generated by the videos of Sandra Bland and Philando Castile (New York Times, 2018), or the climate demonstrations motivated by photos of Greta Thunberg's School Strikes outside her Swedish parliament. Indeed, there are many ways in which technology can be used to empower and facilitate major acts of societal transformation.

And yet there is a growing trend, from Waldorf parents to major players in Silicon Valley, to move away from high-tech (Weller, 2018). This may be possible at some level, but the embeddedness of

technology and the stranglehold of capitalism indicate that going completely Luddite is simply not an option. Corporations will continue to prioritize technology's capacity to generate profit, rather than equity. In the end, although most startup algorithms are originated and managed by mostly white men in California (Settembre, 2019), technology itself is a tool (Winner, 1980) which can be wielded and forged by its users to serve a diversity of goals.

The deeper argument for social media is the notion that free and independent media is essential for a functioning democracy and a healthy, equitable society. Media helps to facilitate the flow of information and it can open up dialogue about societal issues. However, media literacy requires a fundamental awareness of the self, specifically understanding of one's personal identity as influenced by physical ability, privilege and structural power dynamics, language, and symbolism. Thus, it follows that before one can meaningfully analyze media and society, they must first understand themselves.

To some degree, people know this. The number of people who have seen a therapist, or who have accessed a mental health mobile application in the last year, is just under half the population in the United States (Barna Group, 2018). The field of personal informatics has inspired the creation of a "quantified self", logging and analyzing personal data to analyze one's own behavior in ways previously out of reach for the average individual. Today the trend is to pursue self-reflective experiences that are data-based and community-informed (e.g., FitBit health trackers). In 2019, access to data is not the problem; however, making sense of the data *is*. Ostensibly, people collect data to observe patterns and improve their lives. Engaging in personal informatics, whether on social media or via self-tracking, is a process which requires self-reflection and telling the truth. People are seeking to balance their need for better self-reflection with their dependence on social media. Data and social media have the power to literally world-build; Instagrammers present a manufactured reality to the world, which inspires others to duplicate their appearance and lifestyle. In this way, social media influences real-world purchasing

decisions and personal development. Instagram's recent decision to hide the number of likes on a post was, in part, driven by the awareness that many young people do not have the media literacy required to survive the online popularity contest (Yurieff, 2019).

At the other end of the social spectrum are those who pursue meaning in solitary, non-digital, tangible, and experiential (e.g., meditation retreats) opportunities, even as the number of young people attending church is declining (Sherwood, 2018). Data indicates that many young people, aware that they will never be able to afford a down payment on a home, are choosing instead to remain renters and spend their money on tangible experiences like food and travel (Morgan, 2019). Certainly, purchasing decisions among millennials indicate a general trend towards experiences as the means to create a meaningful life while overwhelmed by fake news and income inequality (Woo, 2018). For example, the growing popularity of witchcraft (Singh-Kurtz & Kopf, 2018) and off-the-grid-style homesteading (Mellino, 2011) among young people is indicative of a desire to embrace traditional ways of meaning-making. Under the pall of late-stage capitalism and climate change, Gen Y is making meaning by reinventing (and often appropriating for profit) tangible, traditional methods of meaning-making, and augmenting them with digital tools: tarot cards, tchotchkes, herb smudging, growing one's own food and homebrewing, crafting with hand tools (see: the resurgence of hipster hand-crafted Etsy wood carvings), and nomadic lifestyles (see: #vanlife). It is noteworthy that many of these people pair their off-the-grid lifestyles with cutting-edge media (YouTube channels, influencer lifestyles, high-tech personal trackers to optimize health). There is an undeniable trend towards tangibility and experiential meaning-making, and technology is still catching up.

New developments in transmedia technology helped to incubate this generation's desire for tangible storytelling and continue to lead the way when it comes to digital-physical platforms. Location-based entertainment, cross-platform storytelling, and internet forums have magnified the popularity of

broadcast mainstream entertainment by increasing the level of intimacy available to fandoms, particularly in fantasy and sci-fi genres (see: Marvel, Harry Potter, Wynonna Earp, anime). Thanks to new technology, stories have become worlds in which fans are co-creators (Johnson, 2007). These worlds offer a way for people to engage in acts of collective imagination. Technology enables diverse fans to experiment with changing the story, whether in fanfiction where outcomes, value systems, and language can change, or in themed environments like conventions or amusement parks which offer real opportunities to interface with the sensory elements of stories (costumes, props, architecture, actors). In 2019, fandom is a mainstream activity - enacted in the real world, not just existing in private online forums. People enact their identities through a combination of real-world play and community building inspired by fictional stories, and digital storytelling. They can meet up in costume at Harry Potter World and experience the built environment in proximity with other fans, and they can use immersive mobile apps to digitally overlay fictional worlds atop the physical world (Pokémon Go). Thanks to the kind of storytelling made possible by technology, people see themselves as empowered consumers, citizens, and fans -- and in every area, they expect stories to be multimodal, tangible, responsive, and experiential.

Moore's Law (Moore, 1965) shows that it is possible to predict developments in new technology: they tend to get smaller, faster, and more powerful, which facilitates the ubiquity of digital-physical storytelling. It is worth pointing out that fictional storytellers tend to agree with researchers on this general trend for the future of technology. Technology is becoming increasingly invisible, intuitive, and embedded in the physical world (National Research Council, 2001). Frictionless is the name of the game. Embodied and disappearing interfaces are being foregrounded both by real-life tech companies and by Hollywood. From *Minority Report's* touchless gestural interface to Joaquin Phoenix's earpiece with targeted advertising in *Her*, the silver screen envisions a future that is at once high-tech and deeply motivated by the natural affordances and gestures of the human body (Russell, 2013). In the business

world, augmented reality glasses like Google Glass are already pairing powerful computing with minimalist interfaces; indeed, the upcoming 3rd generation of Google Glass supposedly *reduces* battery size in order to make the product more comfortable to wear on the body (de Looper, 2019).

Developments in the field of tangible, embedded, and embodied interactions (TEI) are permeating every area of society. TEI is aiding science, helping to analyze DNA with tangible manipulables (Manshaei, 2017) and, in the creative arts, TEI has helped to inspire MIDI-style sound controllers which respond to the movements of the musician's body. A well-known example is Imogen Heap's glove controller for composing and modifying music with her body in live performances (Cooper, 2019). The field of TEI is pushing boundaries everywhere, and reinventing consumer expectations for how body, mind, and technology should work together.

These trends indicate the major challenge (and opportunity) of the 21st century. Technology must be multimodal, accessible, and tangible in order to satisfy today's consumers. There is a clear opportunity to utilize physical objects, and the stories embedded therein, to better integrate the full human body as a sensory entity into digital storytelling. Furthermore, it is feasible to pair new methods of tangible and embodied storytelling with existing interfaces from mainstream social media. How might the role of social media as a truth-telling platform change if it interweaves technology's analytic and connective affordances with the senses and rituals of the physical world?

The Room for Truth project is a first step towards articulating a physical-digital ritual of meaning-making for human evolution in the 21st century, one that responds to the need for truth-telling and self-reflection, foregrounds the affordances of social media and personal informatics, and respects the desire for tangible, intuitive, and embodied (Núñez-Pacheco & Loke, 2015) experiences of meaning-making. Room for Truth draws on traditional tangible rituals of self-reflection (personal diary, magic 8 ball, tarot cards) and reinvents the public-facing social media model of performative authenticity. It employs an

interface which guides users through a private “confessional” exploration of topics, capturing personal data, visually and abstractly presenting it, and discovering and presenting patterns to the user that facilitate better self-understanding, compassion, and decision-making going forward. Using simple principles of embodiment and abstract data visualization, Room for Truth teaches users how to journey from the deeply felt personal sense of self to a contextualized worldview that can highlight patterns of belief.

Think of the 21st century as a great concert hall, but one which has neither audience nor sheet music. Everyone is a player: the mind is the musician, and the instruments are technology and the body. Truth is the symphony, and its score can only materialize when the players operate their instruments. Room for Truth builds one more pathway into the hall, so that everyone may take up their instruments and contribute to this collective opus.

2. LITERATURE REVIEW

2.1 Personal Tracking & Ritualized Self-Reflection

The modern notion of a "quantified self" arose as a consequence and benefit of the shrinking size and increasing computational power of new technology. The development of wireless communication and improved sensors made possible the personal smartphone, and not long after, wearable technology became available. Many products, like the Fitbit, now provide users with visualized personal data regarding health and fitness activity. The idea is that direct feedback works; when users can easily understand their personal data, they can set and achieve goals with greater success. Wearables can collect all kinds of information, including biometric signals, location, duration of stay, purchasing patterns, and more. This data also permits companies and service providers to personalize interactions, manage crowds, and make strategic decisions (Borkowski et al, 2016). This data is being extrapolated to broadly represent emotions and preferences (Torres, Wei, Hua & Chen, 2018). All signs point to a growing trend in the use of personal interactive wearables across industries (Kim & Park, 2019). Some studies have even shown that wearables like Disney's Magic Band actually increase enjoyment of the attractions (Tussyadiah, Jung, & tom Dieck, 2018).

There are many mobile applications geared towards helping people track their moods and make decisions. Some are casual digital diary or decision-making apps, and others are used by individuals doing CBT (cognitive behavioural therapy) under the guidance of a counselor. Some of the most popular apps include EitherOr, FYI Decision, Reflectly ("the world's first intelligent journal" using a conversational AI bot), Youper, Daylio, Orange Diary ("comprehensive and irresistible features: rich content: text, photo, voice, location data; tagging for fast organization"), Feelings Diary, GridDiaryClassic, Perspective, Thought Diary, Moodtrack, Instant from Emberify (a quantified self

company), Moodpanda, Get Happy, Live happy, Mood kit, Experial, In Flow, Knomee. Most apps work by asking the user to input personal information on a regular basis and then using algorithms to re-present that data according to user-selected trends. Some go as far as facilitating a process of self-reflection by employing a chatbot.

A major problem with these apps is that they only work with regular use. Inputting personal information can be strenuous, requiring time and focus which can be difficult to muster amid busy schedules. If a user misses a day, it can interrupt the tracking mechanisms and make it harder to get started again. Additionally, the interfaces can be difficult to use, with a tone that does not inspire safety or vulnerability. Engaging in deep introspection typically happens in spaces that offer privacy and safety, like a bedroom or a therapist's office, but opportunities to input personal data via a mobile app often coincide with being in transit, or in public. Another major problem is the presentation of personal data. After all, it is a significant design challenge to create an app that offers a pleasant experience for diverse users to review their emotions in a neutral, intuitive way. Some apps use artificial intelligence, but ultimately people are still reluctant to trust an AI chatbot with helping them make decisions or manage their emotions (Teich, 2019).

In fields beyond mental health and fitness, models for personal tracking do not really exist. This is to be expected, since other data (like emotions) can be nearly impossible to quantify and neatly represent visually. Beyond therapeutic applications, social media and smartphones do not actually facilitate reflection but rather the performance of authenticity and the assemblage of identity-signifiers. Apps like Moment do help people reflect on their use of technology, but they fail to incorporate the body's complex sensory and emotional faculties to reflect on the messier parts of personal experiences. When technology is applied to a purpose like user testing or stakeholder surveys, interfaces are typically limited to screens and paper, and they request people to evaluate

themselves from the perspective of a company's interests, rather than their own intrinsic perception of self.

Nevertheless, as far back as ancient times, humans have always recorded and documented their activities, even if the methods were less methodical. The earliest cave paintings date back to more than 60,000 years ago, featuring shapes and colors created by the human hand. The ancient Egyptians developed a very complex concept of the self (Singer, 2004). Around 12,500 years ago, as human society moved away from hunting and gathering towards a more sedentary agricultural lifestyle, people rapidly accrued more time and more materials which aided in the development of more complex self-reflection. It is clear that no matter the culture or time period, it has always been important to capture, for communal benefit, important moments in a group's history like successful hunts, marriages, migrations. The societal valuation of community knowledge-keepers is high across classes, locations, and occupations, whether shaman, astronomer, or maritime captain (West, 2011). This collective knowledge is passed down and helps new generations to survive.

One well-known example is the Old Farmer's Almanac, which has tracked the tides and seasons to support North American agriculture since 1792 (Old Farmer's Almanac). The 1400s, which marked the beginning of an era of imperialism, launched a vast flood of diaries produced by colonizing explorers who documented and embellished their journeys in new lands (McKay, 2005)(Cavell, 2010). Lewis and Clark kept detailed journals about their route and the people they encountered crossing the American continent, and Robert Scott's Captain's Log contributed to humanity's scientific knowledge about the South Pole. These are examples of people who collected knowledge with the objective to share it publicly and so benefit their community.

But there were also many people who maintained a private, personal diary. Perhaps the two most famous personal diaries of all time were never intended to be famous, nor published: Anne Frank's

diary and Marcus Aurelius's *Meditations* (Welsch, 2017). Indeed, diaries and diary-keeping do not only document information; they are a means of private self-exploration and discourse with the self. As cultural artifacts, diaries provide deeper sociological insights into the social dynamics of culture at the time of writing. The events and language contained within diaries, whether public or private, become templates upon which culture is built.

Social media is essentially modern diary-keeping. Within the past two decades, it evolved from low-fidelity, unmonetized spaces like LiveJournal and MySpace to the influencer-saturated and highly public-facing platforms like Instagram, Facebook, and YouTube. It's now estimated that around 2.65 billion people used social media in 2018 (Statista, 2019). Integrating wearable devices like the FitBit with social media has enabled people to effortlessly capture and review data about highly personal activities, and then publicly share that data with the world.

In the 21st century, the fundamental human act of self-reflection is accelerating and changing dramatically, and designers and researchers are struggling alongside their users to figure out the best way to manage digital self-reflection. Some research has been done on best practices for the UX design of self-tracking applications, like contextualizing data, reinforcing desired behaviors, and designing for delight (Falmann, 2019). There is much research on how persuasive design creates ritualistic use of social media. Other research establishes the positive effects of personalization upon public experiences (Not & Petrelli, 2018) and personal user interfaces (Kwon & Kim, 2012). Innovations in themed entertainment highlight cutting-edge methods for using technology to capture individual experiences. A patent registered in 2014 to Orion Photo Industries Inc. describes a system that provides "coded personalized souvenirs linked to web-based personalized content related to individual consumer identifiers, locality identifiers and/or both… Additional embodiments also include laser engraved coded souvenirs." Another team of researchers

attempted an RFID-assisted souvenir generator system in 2014, but it was automatically generated. That is to say, it captured a user's individual data and produced a souvenir for them, but the system lacked any meaningful participation or co-creation from the visitors themselves (Duan, Hou, & Ma, 2014), which is a key element in imbuing objects with meaning.

A lingering question is whether today's consumers have the necessary mental model to derive as much meaning from digital-physical personalization as they do from purely physical or digital experiences. There are also unexplored ethical challenges that the technology of self-reflection presents (Anastasiadou & Vettese, 2019). Research on avatars and digital selfhood do not yet reveal any significant long-term findings about the effects of digital self-reflection on self or society, and there is certainly not yet enough research on physical-digital self-reflection to guide the development of new projects in this field. There is much work being done to understand the connection between the design of avatars and digital personhood, especially as it relates to consumer decisions in theme parks and branded experiences (So, 2017), but there is not sufficient research on its effect upon an individual's emotions or decision-making.

2.2 Visualizing Self-Reflection in Physical-Digital Ways

People generate more data than ever today, but that data is meaningless without a good way to make sense of it all. Data visualization is a rapidly growing field with applications across marketing, business, health, and science. Infographics and charts are often generated for stakeholder meetings, and data visualizations are frequently employed to demonstrate market potential at pitch competitions. When it comes to personal data, many people first encounter personal informatics through a health or personal tracking interface (Rapp & Cena, 2016). Business projects and health/fitness visualizations remain the most popular purposes for data visualization today. An extension of data visualization is data

physicalization which bridges digital experiences with physical objects. Many installation artists draw on this concept to create powerful community stories, such as inviting visitors to string yarn on a map indicating their migration experience. Another powerful example of data physicalization is a study done at The Municipal Museum at The Hague, in the Netherlands. Here, visitors could generate a personalized souvenir postcard which illustrated their journey through the exhibit (Petrelli, Marshall, O'Brien, McEntaggart & Gwilt, 2017).

Studies have been done that show certain types of data visualization affect users differently (Herrmann, Brumby, Oreszczyn & Gilbert, 2018). However, not much is known much about how data visualization affects post-event perception or loyalty. When it comes to UX, at the forefront of designing digital-physical experiences like AR/VR is the video game industry. Although best practices in UX are always being redefined, some work has been done to establish a methodology specific to the affordances of mobile devices (Dirin & Laine, 2018). It is still early stages, but trends indicate that AR/VR may soon become a domestic consumer experience, thanks to the maturation of Generation Y and the continually increasing improvements to VR technology, like reduced visual latency (Foundry, 2017). There is not yet enough information to determine how these multimodal interfaces will affect people or society, nor to predict how the touch- and sensor-based affordances of mobile devices may be fully exploited in the future, but it is apparent that the full potential of the sensor-rich personal mobile device as a meaning-making tool has not yet been realized.

Another way to visualize self-reflection is by engaging in dialogue with a benevolent, intelligent interface. Some have humanoid faces (Walker, Sproull & Subramani, 1994), whereas others tend towards the abstract, such as Siri's flash of multicolored light. Robots, especially tele-present robots (Latikka, Turja & Oksanen, 2019), points towards a 21st century representation of

self that is both physical and digital. The overarching goal is to visually represent the self in a way that facilitates trust, data flow, and clear guidelines for use. This field presents an opportunity to explore the use of personalizable, abstract physical-digital avatars to make systems accessible and effective for diverse end users.

2.3 TEI and Performance Art

Innovative artists and businesses are incorporating the body more and more into their technologies. The field of tangible, embedded, and embodied interaction (TEI) captures a physical-digital sweet spot which indicates the future of human-computer interaction technology (Shimojo & Shams, 2001). TEI offers new opportunities for collaboration, intuitive navigation, and immersion. Indeed, interactions with responsive environments seem to be the way of the future, already present in smart homes and office buildings which anticipate and adjust to their occupants' needs. In an era of disappearing interfaces, experts predict more integration of the digital and physical, away from computer and keyboard interfaces (National Research Council, 2011). From Dr. Ali Mazalek's work in Toronto to Dr. Hiroshi Ishii and the MIT Media Lab, researchers in this field continue to develop new ways to bridge the digital and physical worlds. Theme parks have already caught on, and TEI technologies are currently in use at the queues for Seven Dwarfs Mine Train and Haunted Mansion at Disney World in Orlando, among others (Brigante, 2011).

Artists and researchers are at the forefront of projects connecting technology with the body. Marina Abramović and Allan Kaprow are two such performance artists whose projects fundamentally altered perceptions of time, boundaries of self, and the role of the onlooker. Many contemporary artists use tangible, embedded and embodied technology for astonishing self-expressive projects, some of which incorporate personal data or reprogramming smart voice interfaces like Alexa (Lessio). Works like Shiva's Rangoli (Gupta, 2018), useless machines, and

The Blue Studio out of MIT Media Lab (Jaasma et al, 2017) are all projects that use embodied feedback via smart interfaces to help put users at the center of their own storytelling.

But people from all age groups and disciplines share an awareness that screen-based technologies are not the decisive solution to humanity's need for imagination, analysis, inclusion, and self-reflection. Everyday people already benefit from TEI technologies, which have proven especially successful at engaging diverse groups by supplying highly accessible and intuitive interfaces. That is to say, TEI interactions can be democratize participation for people from wide-ranging age groups, who have differing physical abilities, and who speak different languages. Another major boon of TEI is personalization; depending on the complexity of the project and the input ranges offered, no two experiences of a TEI interface are ever quite the same.

To sum up, TEI technology is in the early days of its application to science and research, cultural institutions, and theme park queues, but it has yet to be applied to mainstream social media and individualized self-reflective practices.

2.4 Media Literacy & Society

Due to the convergence of new technology, low media literacy, and the impending effects of capitalism and climate change, the ability to self-reflect is a survival skill which is in danger of being lost. In fact, the capacity to perceive and critically engage with individual and collective stories is a foundation of a healthy society. America's Founding Fathers understood this when they enshrined freedom of the press and independent media. Now it is 2019, and people are overwhelmed with the convenience of data (Wong, 2019). Google can answer most any question, and new computing tools offer ways to explore and understand large datasets that were inconceivable in the 20th century. Access to data is, in large part, not a problem in itself. Rather, it is

the interaction with and analysis of data which are problematic. Putting aside military technology for a moment, the average citizen in 2019 is regularly exposed to mysterious black box algorithms, artificial intelligence, machine learning, and persuasive design techniques (Fogg, 2009) in nearly every technology. Many platforms do not include any transparency or guidance to assist users in evaluating and navigating complex technology. Technology values people only as data and attention. The commodification of attention is nothing new, but new technology is exacerbating the intimate ways in which people can be taken advantage of by media. Most people do not read the fine print and had no role in the design process, and yet media and algorithms are everywhere: homes, workplaces, cars, public spaces, and worn on the body. Rich Gold, in 1995, explored this idea to the extreme, writing

> What if your smart house remembered important dates like birthdays and sent cards and balloons, baked special cakes and chilled the champagne on the right days? Would you feel good if you received a card generated by your lover's house? If your otherwise always forgetful lover started remembering your birthday would you become suspicious? Would it be possible that you would break up with your lover based on the forgetting or the remembering to program their smart house to send a birthday card? (Gold, 1995)

Technology pervades society, but the majority of people are ill-equipped to manage its influence on their lives. One way people are making sense of this new reality is a hyper focus on the organization and presentation of data. In 2019, jobs in user experience (UX) design are one of the top favorites for employment (Onward Search, 2019). Influencer marketing continues to grow as generations of digital natives are poised to capitalize on their digital fluency and storytell for profit on social media. The opportunity presented in this field is to help people take a step back from addictive social media usage and reorient their relationship with technology. This could be done by

creating a substitute which retains all the connective and aesthetic benefits of social media but provides transparency and agency to the user and eschews advertising and other corporate influences so easily exploitable in photographic storytelling.

2.5 Physical-Digital Spaces for Meaning-Making

Technology is helping to expand not only tools but spaces for meaning-making. Architecture is one of the oldest human artforms, and it meets the dual needs of survival and communication (Neutra, 1954). Personal informatics is rapidly becoming "lived informatics" as adaptive architecture and live computing grow in popularity (Epstein, Ping, Fogarty & Munson, 2015). Whether big or small, sophisticated or simple, all technology must be embedded in some kind of physical space. It matters where someone is when they use technology, because space informs usage. The act of taking a selfie takes on a very different meaning when at home versus at a church service or at an holy site like Uluru in Australia. Truly, physical spaces offer many lessons for digital methods of meaning-making that are yet to be uncovered. Pattern language, themed spaces, and conflict zones all offer something crucial which can inform the design of a truth-telling space.

2.5a Pattern Language. Every building tells a story by its very appearance and architectural patterns, and personal and community structures naturally have different shapes and patterns. Christopher Alexander's much lauded book *Pattern Language* was published in 1977 (Alexander, 1977) and promotes the concept that patterns of architecture nest inside one another and can be applied as systems to nearly any environment. For example, worship spaces and churches have an architectural language familiar around the world (Meagher, 2018), with a vestibule for this and a hall for that. Buildings generate a framework for interactions, even before any human being enters.

Theme parks are an example of public spaces that have an existing interior design and architectural design hierarchy, usually to create a sense of immersion whilst meeting logistical

needs for guest capacity (Cabanas, 2019). Much is currently being written about sensory design in architecture and the ways in which responsive buildings can use technology to bring value to their occupants (Lehman, 2011). But not much research has been done on the architectural patterns of booths, however humble, and how they might connect to the architecture of memory and the process of embodied meaning-making.

In particular, the nexus between architecture and disabled bodies is a potent topic for embodied meaning-making. Beyond basic accessibility and universal design factors like ramps, there remains much unexplored territory when it comes to disabled peoples' sensory experience of physical-digital meaning-making spaces. The gap in the field of architectural pattern language is the public-private third place (Oldenburg, 1999). The booth stands out an untapped resource for facilitating moments of reflection that accommodate individuals of all abilities.

2.5b Themed Spaces. With the arrival of the Internet and exponentially more powerful computers, the 1980s and 1990s saw a fundamental shift in the nature of mass entertainment. Whereas amusement had previously been limited to a particular location, online gaming, text-based storytelling, and virtual reality opened up new possibilities for digital and physical spaces for storytelling. These powerful yet enigmatic innovations rattled the public's understanding of identity and participation, and warped existing models of gaming, gambling, journalism, and politics. Young people suddenly had access to stories, tools, and worlds beyond the reach of many people in older generations; their participation and identities shaped the interactivity and principles of emerging new media. Modern production studios caught on, and eagerly combined big data with behavioural psychology to deliver a power punch of profit.

By the end of the 1990s, the attractions industry had undergone a critical change in function. Traditional theme parks located beloved popular stories within simulated planned communities like

Disney's Main Street, planting opportunities for consumerism along the way. But by 2000, attractions bypassed simple nostalgia and entered the age of imaginative and immersive world-building. The *Harry Potter* series introduced a visual universe to billions of people, creating the world's largest fandom. In order to remain relevant and competitive, amusement centers responded to fans. They introduced bottom-up designs using multisensory stimulation and emotional persuasion borrowed from film and gambling. Location-based entertainment went from describing a miniature golf course to encapsulating a physical replica of a whole fictional world.

By 2001, the dot com bubble had burst, and a recession was on the horizon, but casino culture continued to steadily rise (Goodman, 2009). Persuasive design was no longer shady and implicit, but rather explicitly de mode: a celebrated feature of technology, not a shameful tactic. With the official launch of Facebook in 2005, persuasive design began to pervade all new media, which extended greater social permission for physical parks to use these same tactics in built environments.

Today, theme parks and cultural attractions tempt profit by utilizing gaming principles to produce experiences that highlight nuance and diversity, prolong engagement, and invite imagination. Their design strategies are enacted in physical spaces, and include variable rewards (Lewis, 2017), the five planes of player experience (Ferrara, 2013), uncertainty, absorption (Higgins, 2006), and multisensory embodied play (Waysdorf & Reijnders, 2018). Parks have learned to revere rather than reject fandom, observing that fictional worlds, by design, speak to a certain public (Warner, 2005). When people identify themselves as part of a public by entering a theme park environment, that space becomes particularly "welcoming and special. Being in the park not only means being surrounded by the narrative world but also being surrounded by this community" (Waysdorf & Reijnders, 2018). Designers are beginning to see that safety and inclusion can be profitable. Theorists are cautioning against the

trend towards gamification, a favored technique among many civic and entertainment bodies such as Ontario's Carrot Rewards program. Experts say that the qualities of the game itself has more merit than any "strip-mined" gamification could ever offer: games can persuade, simulate real environments, accelerate learning, and facilitate cooperative experiences (Ferrara, 2013).

But themed spaces have the benefit of well-fleshed out fictional worlds. When the Harry Potter series of books was adapted to film, it was an easy next step to create the visual language for the Wizarding World of Harry Potter. The fictional identities, usage patterns, and cultural values of the physical park were embedded straight from the novels. However, real-world spaces do not often have the benefit of a pre-scripted visual language. The field of political interiors explores the visual language of spaces like courtrooms and public squares (Capillé, 2018), which translate rather abstract value systems into physical worlds that support the negotiation and enaction of those values into reality. All too often, the theming of these spaces fails to inspire meaningful participation by the masses. Sometimes, this is done on purpose. For example, people do not experience the architecture of courtrooms very often. Most people live in a world of concrete, drywall, and IKEA furnishings, and they control how their bodies move in those spaces. At home, lighting levels and physical postures can be adjusted, and at coffee shops, anyone can leave if they dislike the music or the furniture is uncomfortable. Contrast the private domestic experience to a public courtroom experience, where visitors encounter mahogany benches, high-ceilings, and Grecian columns, and are not allowed to lay down or shift around furniture. At court, people are sworn to tell the truth, a process which is messy and intimate, but they are surrounded by materials and architecture which communicate something very different from truth-telling: power, control, rigidity, and intimidation (Corrigan, Robertson & Anderson, 2018).

So, what is the physical theming of telling the truth? Which materials, shapes, angles, and locations might encourage people to share authentic personal experiences? It is known that nature and greenery

can inspire healing – the Art Nouveau hospital of Sant Pau in Barcelona was an early effort -- (Schrank & Ekici, 2016) and that different materials contain sense memories which affect behavior (Thelen, Matusz & Murray, 2014)(Marschall, 2019). Therapy offices, courtrooms, and classrooms all attempt to design spaces for honesty, however there is not yet enough research on frameworks for theming spaces which inspire personal and collective truth-telling.

A goldmine of material on this topic can be found in literature about conflict resolution, which is so often a disagreement about ownership of physical spaces. It is worth noting the importance of symbolic and public space in the conflict resolution process during the Troubles, which took place at Stormont Castle in Belfast where negotiators finally hammered out the Good Friday Agreement (Bryan & McIntosh, 2005).

2.5c Conflict Zones and Peace Parks. Theme parks have transformative power specifically because they have boundaries and rules, enabling players to explore new ways of being within a level of acceptable risk. In this way, the idea of parks can offer a "framework to imagine potentialities and alternatives" (Waysdorf & Reijnders). There is a "core assumption…that visitors would like to intensify and bring a favorable experience into their real lives" (Dong & Siu, 2013). Public spaces can be seen as civic theme parks. They are the physical places where civic identity is formed and where negotiations of public issues occur. Playback theatre is one grassroots practice which uses art and physical space to help people in conflict situations. Trained actors are given a real story and they collaborate with the giver to act out, pause, replay, and try out different actions until a preferred outcome is achieved. There is peace-making power in community grounded in physical space, where people forge a shared identity and engage in a process of imagining new worlds together (Smigelsky & Neimeyer, 2018).

In the field of conflict resolution, physical space is an essential element of peace-making. Most experts agree that successful mediation utilizes "cognitive-historical pathways" (Lejano 2006). In

situations with two opposing "sides", this means that conflict resolution occurs when each side 1) affirms self-identity, 2) explores joint-identity, and 3) considers what a common identity might mean for the future (Lejano). When the conflict is related to territory, as in the two Koreas, an oft-implemented solution is a peace park which creates a neutral buffer zone. One limitation of peace parks, though, is that they reinforce the attitude that physical proximity can only exacerbate conflict. The peace park perspective also limits the concept of peace to a state-actor relationship. Whereas much conflict resolution and policy negotiations happen between government officials behind closed doors, the reality is that conflict is enacted by everyday citizens in a variety of public and private spaces with long histories of embodied meaning-making, like restaurants and classrooms.

An alternate way to view conflict over physical space is the model of care perspective, which posits that peace parks actually work because people act in "coherence with the web of relationships," not because of "clear lines of authority or the pursuit of individual interest." Under this model, peace is achieved when the identities of individual and community-actors *shift* in accordance with a new understanding of their relationship to other players. The space of the park becomes a "template upon which a complex web of relationships can evolve" (Lejano). The park is inscribed as "a moral 'contract' written not on parchment, but in terms of place."

The opportunity in this field is to reinvigorate the role of public space as a location for civic engagement. Beyond the voting booth, beyond the town hall, beyond protests at the park, public spaces host a revolving door of micro-behaviors that, altogether, create the fabric of civic identity and community life. In 2019, there are not enough public rituals of self-reflection that utilize the physical landscapes of everyday life (Pfister, 2017). Physical spaces offer an interface for negotiating community issues and activating a wide range of stakeholders, and there is an

opportunity to use public physical spaces to capture data and tell meaningful stories using embodied interaction.

2.6 Tangible Objects and Rituals of Self-Reflection

People have always collected objects as a way of making sense of their inner and outer worlds, ever since the earliest days of pagan worship and pocket-size statuettes. Today, many people have a habit of 'collecting'. Sometimes they collect items which belong to a set, such as trading cards or bobbleheads. Sometimes these objects are meant to be seen and not touched, as in mint-condition figurines. But other times, people collect objects somewhat unintentionally in conjunction with meaningful events, like pocketing a stone from the beach or holding onto a ticket stub. People retain physical reminders of pleasant memories. Souvenirs are an obvious enaction of this behavior. Souvenirs have their origin in holy pilgrimages, where pilgrims would complete their epic trek and return with small holy items to commemorate their journey and mark their new status (Swanson & Timothy, 2012). This line of inquiry reveals much about the process of imbuing physical objects with meaning through spiritual and physical journeys.

At home, personal spiritual objects might live in a special location, removed and handled only during very special moments of intention and self-reflection (Bey, 2012). A token might represent a good memory, like a trip abroad, or perhaps a value system or spiritual practice which the person aspires to embody, like a Buddha figurine. Ritual objects often serve as a phenomenological replacement for the mysterious, complex forces of nature that cannot be easily explained like ancestors, God, universe, or love (Shepherd & Kay, 2019). It is the tangible, ritualistic aspects of using personal spiritual objects for self-reflection that are now beginning to be studied (Lucas,

2014). Certainly, it is only in the last decade that researchers have begun to explore personal tangible rituals as augmented by digital media (Gould, Kohn & Gibbs, 2019).

One study takes a different approach, highlighting the benefits of ritualization to position brands in international markets (Sharma, Kumar & Borah 2017). Of course, there are capitalistic motivations for adhering to a specific collection and acquiring a given list of items. There is some research on customer motivations for souvenir purchases (Wilkins, 2011), but there is an overlooked sensory motivation for the collection of objects. Even in research related to souvenir objects and theme park visitors, there is a lack of work that studies the kinds of tangible qualities people find meaningful (Haldrup, 2017) and how these objects affect their probability of returning to the space, perception of their visit, and closeness to the brand. There has not been much innovation in the modern souvenir industry although people continue to purchase items in large quantities (MarketWatch), but this speaks more to the collective mentality of society than to the quality of the souvenirs on offer. Objects are only as powerful as the experiences connected with them: postcards from a backpacking trip to Europe and a wand from Ollivander's contain meaning because handling them recalls positive embodied experiences.

If tangible objects are spiritual souvenirs, tokens of inner journeys that keep their owners on the path toward enlightenment (Mäkelä, 1996), it becomes obvious that any meaningful personal development using digital media should be paired with physical objects for maximum impact.

3. RESEARCH QUESTIONS

The research questions which guide this project are centered on the opportunities described above. A first task is to understand the modern concept of the self as a basis for meaning making, and how technology is currently mediating that process. Next, to explore how best to unite physical and personal methods of self-reflection with the analytical and connective affordances of social media. Yes, there are existing ritualistic uses of social media, but how might they be overlaid with daily, sensory self-reflection, as opposed to the more removed experiences of self-reflection like meditation retreats, where someone goes away from their normal life? Another area of study is which physical spaces are best suited for individual and collective truth-telling. In which physical spaces are people most in touch with the truth? Where do people feel most comfortable telling the truth? Where do people feel most obliged to tell the truth? What would a space look like that balances the sensory elements of both comfort and obligation to truth-telling? A broader zone of inquiry is about which design languages most clearly transmit the theming of telling the truth. The field of political interiors does not reveal much about the visual language of truth-telling. This is perhaps because telling the truth requires a sort of neutrality and negative space, a receptacle for the truth and a culture which encourages honesty. More practical research questions are which data visualization tools might most effectively facilitate individual and collective self-reflection. What are appropriate applications of persuasive design principles for user retention and behavior change when it comes to personal development technology?

4. DESIGN RATIONALE

This section describes the design rationale, including ideation (user personas, user journey), as well as the significance and implementation of the objects, environments, and interface developed over the course of the project. The symbol of Room for Truth is the ampersand, which signifies the connection between self and other, self and society. Traditionally, the ampersand stands for inclusion, collaboration, combination, expansion, and layering. The "&" introduces the premise that the very act of engaging with Room for Truth serves as an act which unites self with society, and it hints at a pluralist understanding of truth.

User Personas. Who might visit the booth, what do they want, and how might they achieve it?

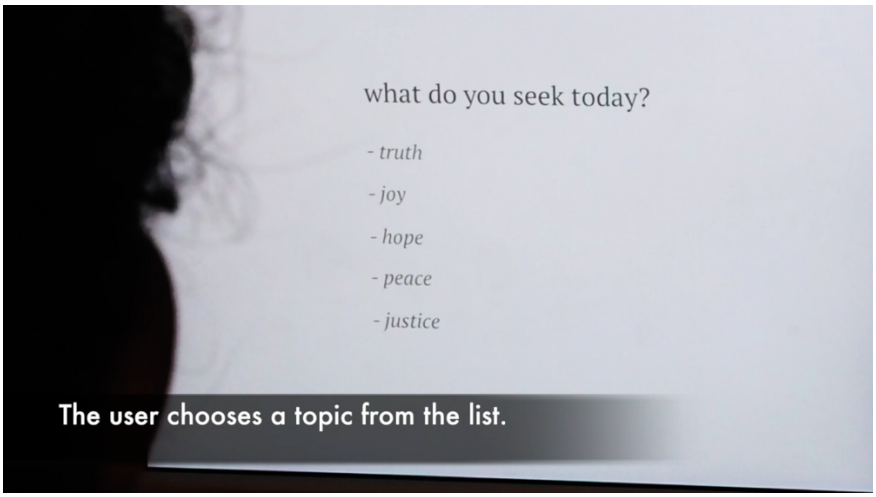
- Someone with a complex personal truth to tell
- Someone with a nebulous current feeling (perhaps in response to the news - climate, racism)
- Someone who wishes to articulate a vision for the future
- Someone who feels a desire to dialog with "the other"
- Someone without anything specific in mind but who is interested in tech & others' stories
- Someone who wants data, facts, plans, comparisons, clarity
- Someone who wants emotion, catharsis, creative experience, inspiration

User Journey. The Room for Truth user journey builds on the core user journey of all transformative experiences: someone arrives with a story, goes through a transformation with the aid of storytelling, and leaves with a different story and a physical token to help them remember.

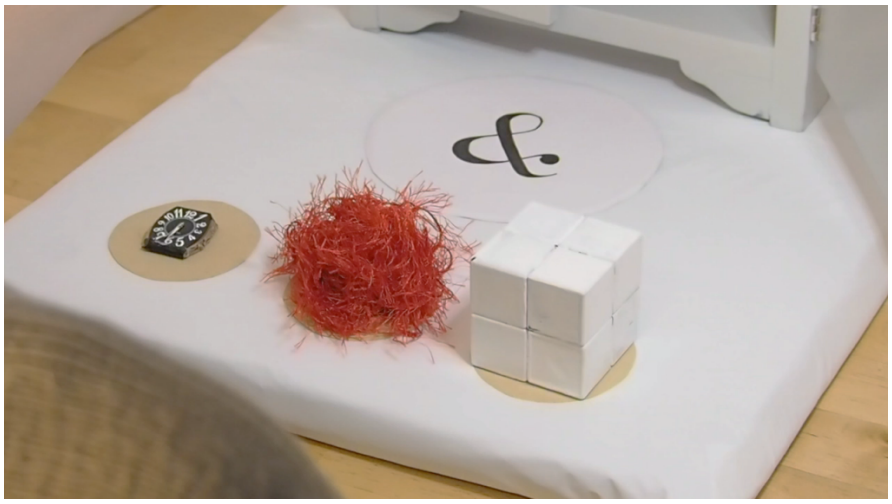
1. The first step in a user's journey is to identify a feeling of disorientation and connect it with a desire to resolve it. Many people go to a diary, social media, a trusted friend, or a personal

spiritual space. Room for Truth offers a familiar alternative: a physical-digital space, designed to facilitate self-reflection, which is easily accessible. The mobile application can be opened with one touch, and push notifications could invite users to participate in regular, prescheduled moments of self-reflection.

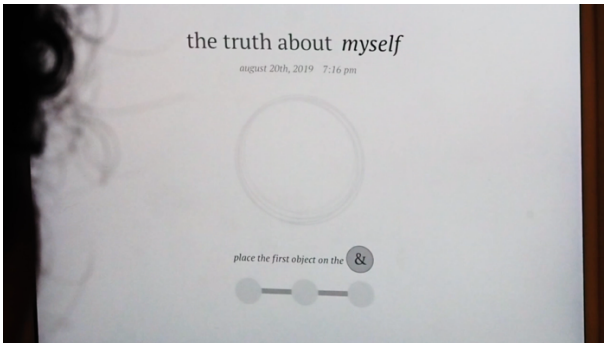
2. Next, the user sits down in the space with the objects. The user has moved from experiencing the problem to attempting to resolve it. They physically and mentally move to a space that has the tools they will need. At home, this physical space is wherever their precious objects are kept. In public installations, this could be a booth in a nearby community library with a virtual queue. The booth contains an iPad mount, a cabinet with objects, and a smart tablemat.
3. The user begins with a sensory orientation and settling in process. Like all rituals, Room for Truth has a preamble and a denouement. To prepare the body and mind for the storytelling process, the mobile app displays an ampersand as the Home button, a gently pulsing circle as the baseline animation, and slightly slower than normal transitions between screens. The aim is to encourage a user to begin paying attention to their own embodied rhythms, perhaps slowing their respiration to match the pulsing circle and adjusting their hurried mental pacing to the interface's leisurely tempo. In public booths, the soundproofing and the neutral theming help set the stage for the nervous system to relax and tune into sensation.
4. Now, the user is ready to select their topic. A list of general topics helps spark the imagination and allows the user to fill in the specifics with their own private prompts. It works the same way as tarot cards (Sosteric, 2014), where a user's perspective on random patterns generates new insight (Ruah-Midbar, 2014). It may be a feature of future iterations to allow private entities to host their own *Room for Truth* topics, accessible only to relevant stakeholders, as an alternative to conflict resolution or surveys (read more under **4.3 Interface** below).



5. After selecting their topic, the user is ready to tell a story using the objects. The interface invites the user to handle the objects, which encompass a broad variety of sensory and symbolic qualities. In private settings, a user will handle their own familiar objects, recalling memories and values associated with them. In public settings, there will be a set of universally symbolic objects (read more under **4.1 Objects** below). Each object has a tiny hidden NFC tag. After receiving sensory and emotional information from the objects, the user selects the three which best represent their answer to the prompt at the present moment and places them upon the small circles on the tablemat.

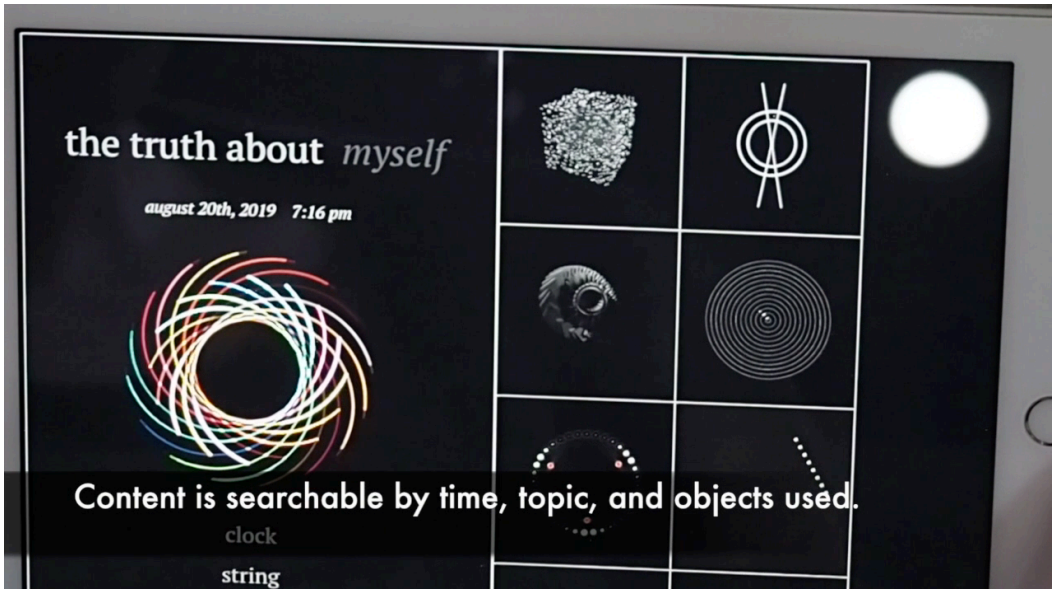


6. The user now scans their three objects, thereby capturing and submitting their story. An ampersand-adorned circle covers an NFC reader embedded in the tablemat, which connects to the mobile device via Bluetooth. One by one, in a ritualistic fashion, the user places each object upon the "&". Each NFC tag generates a unique, abstracted animation on the screen. After all three objects are scanned, they drift to the center and layer on top of one another, creating a new animation which combines the aesthetics of all three. After a moment, a thin grey square appears around the pulsing image and timestamps it, declaring 'thank you for telling the truth'. At the bottom of the screen, the user may either tap My Stories or Other Stories.



7. When a user taps My Stories, they see a collection of their own animations. When viewing Other Stories, they see a public newsfeed of recently generated animations. Content is searchable by date, topic, objects used, and appearance. When a given animation is tapped, it

expands and replays the three-to-one animation process of the original story. It also suggests similar stories based on any desired criteria, like Amazon's recommender algorithm.



8. Finally, the user's process of self-reflection concludes and their attention wanes. At home, the user may leave the app, shut off their mobile device, stow the mat, and reset their precious objects inside the original container. In a public Room for Truth, the user replaces the objects inside the cabinet and simply presses the "&" to return to the home screen. The mental and physical process of resetting the objects and exiting the temporary sacred space help the user with the re-entry process.

Room for Truth measures success on two outcomes: 1) the user's ability to tell the truth, and 2) the user's understanding of themself. A major focus of this research project was how to translate non-digital and digital rituals of self-reflection into a system with appropriate UX / UI, including data visualization tools, dialogue and interaction design, potential voice interface and machine learning, as well as the physical housing and installation procedures, such as fabrication and theming for physical elements. The final conception of Room for Truth offers both publicly and

privately located versions. The public situating of a Room for Truth booth exploits the existing societal functions of places like libraries, which are neutral, inviting spaces for knowledge and collaboration. User testing was unfortunately outside the scope of this project's timeline, but it will be an essential component of evaluating its success in future iterations.

4.1 Objects

The technological challenges of object design led to the selection of NFC (near-field communication) tags. NFC tags are accessible, affordable, require no external source of power, and are nearly invisible when embedded thoughtfully; putting tags inside objects gives them a digital personality whilst preserving their sensory affordances. This decision was influenced by comparing the benefits of low-tech Montessori storytelling with high-tech virtual reality storytelling. Simple wooden blocks used by children can be imbued with highly complex traits, and reused again and again with different storylines, all powered purely by the imagination (Montessori, 1912). Drawing on this concept, the final five objects selected for this project's prototype offer the user various sensory and symbolic characteristics (e.g., heavy/soft, personal/universal). They were selected to represent concepts essential to understanding the world, while remaining abstract enough to allow users to overlay their own meanings: self (*white cube*), other (*key*), time (*clock*), nature (*vial of water*), and change (*red string*). Using symbolic objects with a simple technology like NFC permits users to immediately begin storytelling, without the need for onboarding or purchasing additional objects. There is no need for the user to learn a new operating system. Navigation is intuitive, and individual object-meanings are already present; confirmation in the UX is limited to simple recognition of object placement.

On the other extreme is virtual reality (VR) and virtual objects. VR is a fairly inaccessible system of interaction in that it requires a lot of technical equipment and has non-intuitive interfaces where users must grasp controllers and trigger buttons in order to "pick up" digital objects. Many inventors are now exploring the use of expensive haptic wearables which can simulate resistance and weight in virtual reality environments, but the human vestibular system cannot be tricked, as professional gamers will affirm (Lang, 2018). There is simply no better storytelling interface than the finely attuned nervous system of the human body. So, by using a low-tech solution like NFC to enhance existing rituals of tangible meaning making, it becomes possible to unobtrusively generate personal data which can become accessible to others as a repository of stories.

4.2 Environments

Personal rituals of truth-telling and self-reflection usually take place in personal spaces, like a bedroom or home desk. Some people have an altar and perform a ritual with physical objects, or they may write in a diary or sit down to meditate. Generally speaking, self-reflection tends to occur in spaces where the user feels safe. This may be a space where they regularly practice self-reflection, where they have already 'themed' it with art and objects that facilitate their own process of relaxation and mindfulness. In public spaces, however, people are rarely invited to reflect upon themselves or society, as this kind of behavior is typically reserved for private environments. There are semi-public spaces where people are invited to engage in self-reflection: religious spaces, therapists' offices, and courtrooms. In these spaces, the invitation to self-reflect is suggested by the décor (a painting of Lady Justice), the physical behavior of people in the space (bowing heads), and/or through spoken or written instructions ("close your eyes"). This project's research into the physical locations of meaning-making led to the selection of third places as the best location for a

Room for Truth booth. The balance of personal privacy with public oversight is a reliable recipe for good behavior which has been used in environments from Bentham's panopticon to public parks.

One fundamental influence on the Room for Truth space is the voting booth, a true blend of personal and private space. Voting is an act which occurs in a public space and affects the public good, but the voter enters a private booth to cast their vote and their decision need never be made public. Catholic churches employ a similar tactic in the confessional booth, where parishioners reveal difficult personal truths to a trusted guide within a private setting. In both scenarios, the very environment of the booth encourages the act of disclosure and self-reflection by blending public and private. In the ideation process of designing the Room for Truth booth, informal user research among friends revealed surprising themes about which sensory elements inspire truth-telling. Many people interrogated the environment of courtrooms, explaining a conflict between the language of truth and transparency and the architecture of power. Some suggested elementary school classrooms or wide-open fields as the best places to tell the truth. One early sketch for the Room's interior combined the solemn, structured theming of a church confessional (velvet, dark enclosure, candles, pressure to share and receive penance) with the uninhibited, multisensory theming of nature (wheat, river rocks, a gentle breeze). Ultimately, however, it is impossible to predict what connotations these elements will provoke in unique users. There is no such thing as a neutral material or shape (Winner). The final Room for Truth environment attempts to limit instructive interior design and leave as much meaning-making as possible to the user while still providing a functionally private space. The booth design incorporates principles of persuasive design and the pattern language shared by experience designers across disciplines. It evaluates and build on theories of political interiors and sensory design to presents a third place devised to invoke interaction scripts which support reflection, personalization, safety, and play.

The installation opportunities for Room for Truth booths in public spaces present fabrication and accessibility challenges. Ideally, any civic body could install a Room by downloading a free booth template, 3D printing and assembling it, downloading the code, securely mounting the iPad, and purchasing or DIY-ing the mat / NFC reader setup. The mat is a simple mechanism for creating a temporary sacred space; it need only contain an embedded NFC reader capable of Bluetooth, and a symbolic ampersand and three circles printed on the surface to indicate where objects can be placed. The object circles have no labels because their sequence does not matter, except to the user. It echoes the universal nature of storytelling, which is rearranging elements into different orders and imbuing them with meaning. The interface of the mobile application affirms the user's mental model by mirroring the layout of the tablemat, with central ampersand and three-circles. The embedded iPad is used for onboarding and storytelling, modeled after the purchase process in most public photo booths. Maintenance for such a community space should be minimal, perhaps limited to sanitizing the tabletop and cheaply replacing any missing objects. Ideally, visitors will cultivate a sense of personal responsibility and community ownership over the space and treat it as a sacred place of self-reflection.

4.3 Interface

Room for Truth moves away from GUIs (graphical user interfaces) and towards TUIs (tangible user interfaces). It is designed to be experienced on a touchscreen device in order to access the sensory experience of tapping and swiping, and also to take advantage of the ubiquity and computing power of the personal mobile device. The interface incorporates best practices in the UX of self-tracking and personal development, as well as popular features from social media like the newsfeed. These elements allow users to immediately and intuitively begin to use Room for Truth,

without having to learn a new interaction system. The interface draws on the familiar newsfeed functionality to connect users with others and display visual content. Like the FitBit and other personal data tracking apps, Room for Truth enables users to search for content by date, topic, objects, or appearance, allowing them to observe and reflect upon trends.

Inspired by hashtags, one iteration in the design process explored a topic selection widget in which users and developers could submit their own topics, to be publicly or privately available. But there is a stronger argument for keeping topics general rather than specific. For instance, “Parkland shooting” could be added to a list of topics, but phenomenologically, this could limit the ability of other users to make connections between more broadly related themes like violence, politics, education, and activism. Additionally, user-generated topics enable the creation of filter bubbles of people who use the same language, whereas Room for Truth aspires to avoid the filter bubble phenomenon.

The data visualization of Room for Truth is unique among existing social media platforms. The focus is on imagination and mood, rather than accuracy. The baseline animation for all interactions is an abstracted circle, which is a universal symbol of self, wholeness, and a cyclical view of the world. Abstracting the data into animations inspires curiosity and reduces the competition and comparison which is prevalent on photo-heavy platforms like Instagram. Each object has a different (but still abstract) effect upon the circle animation when scanned, inspired by the meaning of the object itself. For example, the clock face symbolizes time, and thus adds a subtle ticking movement to the circle.

The san serif fonts and minimalist grey and white color scheme present a sort of neutral slate to the user, where the only visible colors and animations are user-generated. The more the Room for Truth platform is used, the more personalized the interface will appear, which helps generate trust

and a feeling of ownership for the user. The physical-digital interface of the iPad, objects, and mat utilize tangible, embedded and embodied interaction to create a highly interactive, accessible, and personalizable interface for the majority of guests. As mentioned previously, tangible and embodied interactions have the potential to be the most accessible for people with various linguistic and physical capacities.

Ultimately, the Room for Truth interface creates a pop-up sacred space that is contained within the user's mobile device, lives in their pocket, and can be accessed and overlaid upon other physical spaces when desired. The interface replicates the neutral benevolence of the best self-reflective methods, like a good facilitator, priest or therapist might do, and it creates non-denominational space for messy storytelling and gently suggests universal themes which may help the user put their own personal story in context.

5. DISCUSSION & CONCLUSION

Room for Truth contributes one solution to the quest for meaning-making raised by the looming physical-digital landscape of the 21st century: equipping individuals and communities with better tools and better spaces to tell the truth. The ability to tell the truth can help people free themselves from societal structures not of their choosing, which is the foundation of human evolution. This project addresses the concerns shared by all people, which include surviving, thriving, and crafting an equitable and just world. This goal requires better, more thoughtful ways to use technology in service of people and planet, and not the other way around. The world of the future appears to be a physical-digital experience, neither purely tangible nor purely data. Room for Truth points to a new framework for personal and collective truth-telling that can withstand the rapid development of new technology while also complementing the ancient meaning-making faculties embedded within the human body. This project also breaks new ground in the UX of personal development and stakeholder management, turning away from literal accuracy and data analysis and introducing a messier, more correct visual language for truth.

In 2019, the media is obsessed with "telling it like it is" while devaluing critical assessment or presenting opportunities for action (Harsin, 2015). On the one end of the political spectrum is Donald Trump (Avlon, 2018) and his Twitter rampages which literally displace fact with individualized and tyrannical fictions. But the President is simply telling his personal biases and prejudices as they are, speaking "truth" to the large percentage of Americans who share his white supremacist and nationalistic opinions. On the other end is teenager Greta Thunberg, who points to climate science and encourages others to understand systems of power. This is a climate of polarized media, and it does not lend itself to much cross-community conversation. Poor attention spans and filter bubbles contribute to low media literacy and encourage consumption, commentary,

and the spread of flashy stories and extreme content. Plus, truth-tellers are now, and always have been, penalized by society (Peters, 2003). Whistleblowers get prison sentences (see: Chelsea Manning), and people with Asperger's or autism who have a proclivity to tell it like it is are reduced to television tropes and social outcasts (see: Big Bang Theory). Most media conform to the limitations and expectations of consumers. It is digital, bite-sized, and requires minimal interpretation. Media answers the need to be involved in societal issues, and to know what one 'should' think and do. But the world is rarely quite so straightforward.

A major danger of the 21st century is the belief that truth is only that which can be quantified (Rosenbaum, Billinger & Stieglitz, 2014). Similarly, it can be much easier to accept the *appearance* of someone telling the truth rather than set aside the time and energy to do one's own reckoning with complex issues. Yes, the prevalence of data analysis tools and the convenience of photo-heavy media platforms have generally improved people's ability to storytell, fact-check, and learn about different points of view. But more and more, technology is reinforcing exclusionary and polarizing behavior, and replacing analysis with convenience. Media consumption practices have begun to replace spiritual, community, and embodied self-reflection. There is a clear need for a new visual language for truth-telling, one which can begin to wean people away from clear-cut, algorithmically generated conclusions about highly complex themes. Ironically, in a physical-digital future, the best way towards the truth might be away from the data. People must once again become suitably suspicious, curious, and resilient enough to see past the guise of data and monetized media. There is, of course, a difference between fact and truth, and it is precisely this ability to discern between data-informed factoid and multifaceted personal experience of the world (truths) that can help cultivate a just and inclusive future.

This raises questions about whether people actually have the mental model to find meaning in a project like Room for Truth. This is a visual-first world where photographs, books, and spoken conversations are the primary ways in which people make sense of the world. With so much accurate data visualization available, it is possible that abstract animations would not be immediately satisfying storytelling mechanisms for many users. Even as people understand the limitations of language, the legibility and immediacy of existing social media interfaces make it easier to use Instagram and Facebook to evaluate the world, rather than engaging in lengthy and messy processes of self-reflection. But Room for Truth presents a new way of thinking and visualizing that is actually more in line with best practices in storytelling, conflict resolution, and relationship building. For instance, researchers know that abstraction and physical objects are excellent ways to communicate complex ideas and build common ground, especially in the midst of challenging and enigmatic themes. This concept is seen in wide-ranging applications like preschool children who use sticks and blocks to solve playground problems, or the peace process in Northern Ireland, where murals and symbolic objects played a key role in facilitating inter-community dialogue and ultimately laying the foundation to end the Troubles (Lisle, 2006).

In a physical-digital future, it may be impossible to make sense of the world without balancing technology with the body. More research is needed on integrating the body into social media, and trends indicate that in the near future, TEI storytelling will mature into an equal challenger for mainstream social media platforms (National Research Council). In the years to come, those who are embracing technology will discover new ways to expand the affordances and audiences of their products, and those people who are moving away from technology will have much to contribute to the conversation about the role of physical objects and sensory experiences in meaning-making. All artifacts have politics, whether tangible and universal or branded and digitally-augmented.

The core question for this project is how to thoughtfully integrate technology with physical spaces and objects to facilitate individual and collective meaning-making. There is a hierarchy and bias in consumer attitudes towards technology, which say that fancier is better, sleeker is better, more data is better, and more photographic accuracy is better. However, the movement towards experiential and embodied meaning-making is growing, and there is a corresponding need for more sacred (but secular) third places where reflection can occur. This need is intimately tied to the reclamation of public spaces from corporate ownership and surveillance for profit. Libraries are one of few third places that have declared and maintained a practice of welcoming people from all backgrounds and hosting free discussion of diverse ideas; it is in these third places where the future of physical-digital meaning-making lies.

There are other applications for the insights generated by this project. The discoveries made possible by the Room for Truth platform could help inform design trends, as market researchers might uncover consumer preferences for shapes, colors, and objects as they design products and advertising materials. Room for Truth is also well situated to help stakeholders work through shared issues, and it is possible that forward-thinking family therapists or conflict mediators may wish to bring Room for Truth to their communities.

As a next step, Room for Truth will become a fully functioning application with accessibility features for blind, deaf, mobility-impaired users, and non-English speakers. Early testers indicated a desire for greater personalization of the visuals, so the next iteration would include touchscreen-based methods for tweaking visualizations to alter the noise, color, and shape of the animations. Another important future feature is the ability for users to bring their own objects into the Room by affixing an NFC tag and selecting an animation effect. Once the app is ready, formal user tests can be conducted with people in their own homes using their own objects, which was not in the scope of

this iteration. User tests will measure outcomes related to ability to tell the truth, self-knowledge, sense of connection to others, connection to the visuals, and relationship with technology. Two topics which merit further research are how people relate to abstract visuals and how they interpret the physical theming of telling the truth. With sufficient developer support, the application can be made available to the public. The initial launch phase of a project like Room for Truth requires a strategic approach, because the app will provide more value as more people use it, which builds up the repository of stories and images.

Overall, the simple user journey at the core of Room for Truth is a universal model of personal transformation: arrive with a story, undergo a transformation with the aid of storytelling, and leave with a different story and a physical token to remember the journey. A physical-digital version of this process could have profound implications for personal development, community organizing, and even religious gatherings. Room for Truth offers people a familiar interface (social media and touchscreens), familiar objects (treasured items around them or visiting a library), and secular language (telling the truth) to move them towards the kind of benefits that meditation, prayer, and being in community in sacred spaces or accessing justice in court rooms can offer. The process of developing Room for Truth provides useful information about how digital tools might help people access their own data in meaningful ways, transform that data into a meaningful story, and transmit that data into an object imbued with a new story so it leads to a desired state of being. If Room for Truth grows popular enough to connect people from many different abilities, languages, and locations, it materializes a sort of universal human story as told through moments, objects, and embodied storytelling. Room for Truth could serve as a sort of living dictionary with the ability to poll and track the changing moods of a community or nation around hot topics.

Ultimately, Room for Truth aspires to facilitate self-reflection, and the potential benefits of the Room's multimodal, public-private storytelling are manifold: more physical and mental self-awareness, more thoughtful political decision-making and curiosity about other stakeholders, and a growing desire and ability to center the truth as individuals and community members. Room for Truth presents just one way to integrate the body and physical objects into digital storytelling, but it is firmly located in a vision for a physical-digital future in which the visual language for truth-telling is contextual, the technology is connective, and the opportunities are immeasurable.

REFERENCES

Abramovic, M. *breathing in/breathing out*. Stedelijk.

Abramovic, M., Biesenbach, K., & Museum of Modern Art (New York, N.Y.). (2010). *Marina Abramovic: The artist is present*. New York: Museum of Modern Art.

Abramovic, M. *Rhythm 0*. Tate.

Alexander, C., Ishikawa, S., and Silverstein, M. Pattern language: Towns, buildings, construction. Oxford University Press, 1977.

Anastasiadou, C., & Vettese, S. (2019). From souvenirs to 3D printed souvenirs: exploring the capabilities of additive manufacturing technologies in (re)-framing tourist souvenirs. *Tourism Management, 71,* 428-442. doi:10.1016/j.tourman.2018.10.032.

Avlon, J. (2018, July 25). Donald Trump and the Ministry of Truth. Retrieved from https://www.cnn.com/2018/07/25/opinions/trump-tape-tweet-orwellian-tuesday-avlon-opinion/index.html.

Barna Group. (2018, February 27). Americans Feel Good About Counseling. Retrieved from https://www.barna.com/research/americans-feel-good-counseling/.

Bey, S. (2012). Seeking and collecting at home: Sharing personal histories in the art room. *Art Education, 65*(4), 8-14. doi:10.1080/00043125.2012.11519178.

Borkowski, S., Sandrick, C., Wagila, K., Goller, C., Ye, C., and Zhao, L. (2016). "MagicBands in the Magic Kingdom: Customer-centric Information Technology Implementation at Disney." *Journal of the International Academy for Case Studies, 22(3),* 143-151. Retrieved from http://ezproxy.lib.ryerson.ca/login?url=https://search-proquest-com.ezproxy.lib.ryerson.ca/docview/1847565722?accountid=13631.

Brigante, R. (2011, March 14). Video/Photos: Inside new Haunted Mansion interactive queue at Walt Disney World's Magic Kingdom. Retrieved from https://insidethemagic.net/2011/03/videophotos-inside-new-haunted-mansion-interactive-queue-at-walt-disney-worlds-magic-kingdom/.

Bryan, D. and McIntosh, G. (2005). Symbols: Sites of Creation and Contest in Northern Ireland. *The SAIS Review of International Affairs, 25*(2), 127-137. Retrieved from http://ezproxy.lib.ryerson.ca/login?url=https://search-proquest-com.ezproxy.lib.ryerson.ca/docview/231317775?accountid=13631.

Cabanas, E. (2019). Experiencing designs and designing experiences: Emotions and theme parks from a symbolic interactionist perspective. *Journal of Destination Marketing & Management*. Retrieved from doi:10.1016/j.jdmm.2018.12.004.

Capillé, C. (2018). Political interiors: The case of public libraries. *Space and Culture, 21*(4), 408-423. doi:10.1177/1206331217739825.

Cavell, J. The true Northwest Passage: explorers in Anglo-Canadian nationalist narratives. *Northern Review*, Spring 2010, p. 5+. Retrieved from https://link-gale-com.ezproxy.lib.ryerson.ca/apps/doc/A228715185/CPI?u=rpu_main&sid=CPI&xid=02c645c0.

Constine, J. (2017, June 22). Facebook changes mission statement to 'bring the world closer together'. Retrieved from https://techcrunch.com/2017/06/22/bring-the-world-closer-together/.

Cooper, D. (2019, April 26). Imogen Heap's musical gloves are finally available to everyone. Retrieved from https://www.engadget.com/2019/04/26/mi-mu-imogen-heap-musical-gloves-price-launch-date/.

Corrigan, L. T., Robertson, H. E., and Anderson, B. (2018). Performative interior design in the criminal courtroom. *Journal of Interior Design, 43*(3), 43-59. doi:10.1111/joid.12125.

De Looper, C. (2019, July 23). The third generation of Google Glass may be nearly ready for release. Retrieved from https://www.digitaltrends.com/wearables/google-glass-third-gen-news/.

Dirin, A. and Laine, T. (2018). User experience in mobile augmented reality: Emotions, challenges, opportunities and best practices. *Computers, 7*(2), 33. doi:10.3390/computers7020033.

Dong, P. and Siu, N. Y. (2013). Servicescape elements, customer predispositions and service experience: The case of theme park visitors. *Tourism Management, 36*, 541-551. Retrieved from doi:10.1016/j.tourman.2012.09.004.

Duan, D. B., Hou, W., and Ma, J. (2014). An RFID-assisted digital souvenir generation system. *Applied Mechanics and Materials, 571-572*, 807-810. DOI:10.4028/www.scientific.net/AMM.571-572.807.

Epstein, D. A., Ping, A., Fogarty, J., and Munson, S. A. (2015). A lived informatics model of personal informatics. In *Proceedings of the 2015 ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp '15)*. ACM, New York, NY, USA, 731-742. Retrieved from DOI: https://doi.org/10.1145/2750858.2804250.

Falmann, T. (2019, February 4). 5 UX Best Practices For Successful Self-tracking Apps. Retrieved from https://uxstudioteam.com/ux-blog/self-tracking/.

Ferrara, J. (2013). Games for persuasion: Argumentation, procedurality, and the lie of gamification. *Games and Culture, 8*(4), 289-304. doi:10.1177/1555412013496891.

Fogg, BJ. (2009). A behavior model for persuasive design. In Proceedings of the 4th International Conference on Persuasive Technology (Persuasive '09). ACM, New York, NY, USA, Article 40, 7 pages. DOI: https://doi.org/10.1145/1541948.1541999.

Foundry. (2017). VR's Eastern Promise: the growth of virtual reality in the Far East. Retrieved from https://www.foundry.com/insights/vr-ar-mr/growth-of-virtual-reality-in-far-east.

Gold, R. (1995). How smart does your bed have to be, before you are afraid to go to sleep at night? *Cybernetics and Systems, 26:4*, 379-386. DOI: 10.1080/01969729508927503.

Goodman, P. S. (2019, September 19). The Financial Crisis and America's Casino Culture. Retrieved from https://www.nytimes.com/2009/09/20/weekinreview/20goodman.html.

Gould, H., Kohn, T., & Gibbs, M. (2019;2018;). Uploading the ancestors: Experiments with digital buddhist altars in contemporary japan. *Death Studies, 43*(7), 456-465. doi:10.1080/07481187.2018.1544948.

Gupta, S., (2018). Shiva's Rangoli: Tangible and interactive storytelling in ambient environments.

Haidt, J., and Morris, J. (2009). Finding the self in self-transcendent emotions. Proceedings of the National Academy of Sciences. DOI: https://doi.org/10.1073/pnas.0903076106.

Haldrup, M. "Souvenirs: Magical objects in everyday life." *Emotion, Space and Society*, Volume 22, February 2017, 52-60. Retrieved from https://www.sciencedirect.com/science/article/abs/pii/S1755458615300748?via%3Dihub.

Harsin, J. Regimes of Posttruth, Postpolitics, and Attention Economies, *Communication, Culture and Critique*, Volume 8, Issue 2, 1 June 2015, Pages 327–333, https://doi.org/10.1111/cccr.12097.

Hermann, M. R., Brumby, D. P., Oreszczyn, T., and Gilbert, X. M. P. (2018). Does data visualization affect users' understanding of electricity consumption? *Building Research & Information, 46*(3), 238-250. doi:10.1080/09613218.2017.1356164.

Higgins, E. Tory. (2006). "Value From Hedonic Experience and Engagement." *Psychological Review, Vol. 113, No. 3*, 439-460. Retrieved from http://www.chicagocdr.org/papers/higgins.pdf.

Jaasma, P., Smit, D., van Dijk, J. Latcham, T., Trotto, A., and Hummels, C. (2017). The Blue Studio: Designing an Interactive Environment for Embodied Multi-Stakeholder Ideation Processes. In *Proceedings of the Eleventh International Conference on Tangible, Embedded, and Embodied Interaction (TEI '17).* ACM, New York, NY, USA, 1-10. https://doi.org/10.1145/3024969.3025002.

Johnson, D. (2007). Inviting Audiences In: The spatial reorganization of production and consumption in 'TVIII'. New Review of Film and Television Studies, 5:1, 61-80, DOI: https://doi.org/10.1080/17400300601140183.

Kaprow, A., & Lee, M. (1966). On happenings. *The Tulane Drama Review, 10*(4), 281-283.

Kim, J., and Park, E. (2019). Beyond coolness: Predicting the technology adoption of interactive wearable devices. *Journal of Retailing and Consumer Services*, *49*, 114-119. Retrieved from https://doi-org.ezproxy.lib.ryerson.ca/10.1016/j.jretconser.2019.03.013.

Kwon, K. and Kim, C. (2012). How to design personalization in a context of customer retention: Who personalizes what and to what extent? *Electronic Commerce Research and Applications, Volume 11, Issue 2*, 101-116. Retrieved from https://doi.org/10.1016/j.elerap.2011.05.002.

Lang, B. (2018, October 26). Hands-on: HaptX's VR Gloves is the Closest I've Come to Touching the Virtual World. Retrieved from https://www.roadtovr.com/haptx-vr-force-feedback-glove-touching-the-virtual-world/.

Larson, S. (2017, February 17). Facebook is playing an increasingly important role in activism. Retrieved from https://money.cnn.com/2017/02/17/technology/womens-march-facebook-activism/.

Latikka, R., Turja, T., and Oksanen, A. (2019). Self-efficacy and acceptance of robots. *Computers in Human Behavior, 93*, 157-163. doi:10.1016/j.chb.2018.12.017.

Lehman, M. L. (2011). How sensory design brings value to buildings and their occupants. *Intelligent Buildings International, 3*(1), 46-54. doi:10.3763/inbi.2010.0011.

Lejano, R. P. (2006). Theorizing peace parks: Two models of collective action. *Journal of Peace Research, 43*(5), 563-581. doi:10.1177/0022343306066565.

Lessio, N. Sad Home (Depressed Alexa 1.0). (ongoing) Retrieved from https://nadinelessio.com.

Lewis, P. (2017, October 6). 'Our minds can be hijacked': the tech insiders who fear a smartphone dystopia. Retrieved from https://www.theguardian.com/technology/2017/oct/05/smartphone-addiction-silicon-valley-dystopia.

Lisle, D. (2006). Local Symbols, Global Networks: Rereading the Murals of Belfast. *Alternatives, 31*(1), 27–52. https://doi.org/10.1177/030437540603100102.

Lucas, M. T. (2014). Empowered objects: Material expressions of spiritual beliefs in the colonial chesapeake region. *Historical Archaeology, 48*(3), 106-124. doi:10.1007/BF03376939.

Mäkelä, K. Alcoholics Anonymous, and World Health Organization. Regional Office for Europe. (1996). *Alcoholics Anonymous as a mutual-help movement: A study in eight societies*. University of Wisconsin Press.

Manshaei, R., Baig, N., Delong, S., Khayyer, S., East, B., and Mazalek, A. (2017). Tangible mtDNA: A Tangible Tabletop System for Exploring Genetic Mutations on Mitochondrial DNA Cancer Data. In Proceedings of the Eleventh International Conference on Tangible, Embedded, Embodied Interaction (TEI '17). ACM, New York, NY, USA, 101-110. DOI: https://doi.org/10.1145/3024969.3025005.

MarketWatch. (2018, November 28). Global Gifts Novelty and Souvenirs Market 2019 – 2023: Increased Demand for Personalized Gift Products to Boost Growth. Retrieved from https://www.marketwatch.com/press-release/global-gifts-novelty-and-souvenirs-market-2019-2023-increased-demand-for-personalized-gift-products-to-boost-growth-technavio-2018-11-28.

McKay, E. (2005). English Diarists: Gender, Geography and Occupation, 1500-1700. *History, 90*(298), 191-212. https://dx-doi-org.ezproxy.lib.ryerson.ca/10.1111/j.1468-229X.2005.00329.x.

Meagher, B. R. (2018). Deciphering the religious orientation of a sacred space: Disparate impressions of worship settings by congregants and external observers. *Journal of Environmental Psychology, 55*, 70-80. doi:10.1016/j.jenvp.2017.12.007.

Mellino, C. (2011, November 7). Urban Homesteading Is a Popular Trend, but It's also Ruffling Some Feathers. Retrieved from https://thinkprogress.org/urban-homesteading-is-a-popular-trend-but-its-also-ruffling-some-feathers-11846e5b1fc3/.

Marschall, S. (2019). 'Memory objects': Material objects and memories of home in the context of intra-African mobility. *Journal of Material Culture.* https://doi-org.ezproxy.lib.ryerson.ca/10.1177/1359183519832630.

Montessori, M. (1912). *The Montessori method*. United States: Frederick, A. Stokes Company.

Moore, G. (1965).

Morgan, B. (2019, January 2). NOwnership, No Problem: An Updated Look At Why Millennials Value Experiences Over Owning Things. Retrieved from https://www.forbes.com/sites/blakemorgan/2019/01/02/nownership-no-problem-an-updated-look-at-why-millennials-value-experiences-over-owning-things/#444c5172522f.

National Research Council. (2001). *Embedded, Everywhere: A Research Agenda for Networked Systems of Embedded Computers*. Washington, DC: The National Academies Press. Retrieved from https://doi.org/10.17226/10193.

Neutra, R. J. (1954). Survival Through Design. New York: Oxford University Press, 1954.

New York Times. (2018, April 19). Black Lives Upended by Policies: The Raw Videos Sparking Outrage. Retrieved from https://www.nytimes.com/interactive/2017/08/19/us/police-videos-race.html.

Not, E. and Petrelli, D. (2018). Blending customization, context-awareness and adaptivity for personalized tangible interaction in cultural heritage. *International Journal of Human-Computer Studies, 114*(Complete), 3-19. doi:10.1016/j.ijhcs.2018.01.001.

Núñez-Pacheco, C. and Loke, L. (2015). The Felt Sense Project: Towards a Methodological Framework for Body-Centric Artifact Design. In the Proceedings of the 21st International

Symposium on Electronic Art (ISEA 2015). Retrieved from https://pdfs.semanticscholar.org/def4/a37700dd37005b80c9ca1aad9c26f55466fc.pdf.

Old Farmer's Almanac. Retrieved from https://www.almanac.com/content/about-us.

Oldenburg, R. (1999). The great good place: Cafes, coffee shops, bookstores, bars, hair salons, and other hangouts at the heart of a community (second ed.). Da Capo Press.

Onward Search. (2019). 2019 Salary Guide: Digital, Creative & Marketing. Retrieved from https://www.onwardsearch.com/wp-content/uploads/2019/01/Onward_Search_Salary_Guide_2019.pdf.

Pariser, E. (2011). *The Filter Bubble: What the Internet Is Hiding from You*. New York: Penguin Press.

Peters, M. A. (2003). Truth-telling as an educational practice of the self: Foucault, parrhesia and the ethics of subjectivity. *Oxford Review of Education, 29*(2), 207-224. doi:10.1080/0305498032000080684.

Petrelli, D., Marshall, M. T., O'Brien, S., McEntaggart, P., and Gwilt, I. (2017). Tangible data souvenirs as a bridge between a physical museum visit and online digital experience. *Personal and Ubiquitous Computing, 21*(2), 281-295. doi:10.1007/s00779-016-0993-x.

Pierce, J. and DiSalvo, C. (2018). Addressing Network Anxieties with Alternative Design Metaphors. In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18). ACM, New York, NY, USA, Paper 549, 13 pages. DOI: https://doi.org/10.1145/3173574.3174123.

Pfister, L.F. (2017). Ubication: a phenomenological study about making spaces sacred. *International Communication of Chinese Culture*, Volume 4 Issue 3, pages 393-411. Retrieved from https://link.springer.com/article/10.1007/s40636-017-0104-3.

Rapp, A., and Cena, F. Personal informatics for everyday life: How users without prior self-tracking experience engage with personal data. *International Journal of Human-Computer Studies*, October 2016, 94(Complete), 1-17. Retrieved from https://dx-doi-org.ezproxy.lib.ryerson.ca/10.1016/j.ijhcs.2016.05.006.

Rosenbaum, S. M., Billinger, S., & Stieglitz, N. (2014). Let's be honest: A review of experimental evidence of honesty and truth-telling. *Journal of Economic Psychology, 45*(Complete), 181-196. doi:10.1016/j.joep.2014.10.002.

Ruah-Midbar, M. (2014). The Sacralization of Randomness: The Theological Imagination and the Logic of Digital Divination Rituals. *Numen, 61*(5/6), 619-655. Retrieved from http://www.jstor.org/stable/24644826.

Russell, K. (2013, December 30). Here's How The Movie 'Her' Created The Most Believable Vision Of Our Future Yet. Retrieved from https://www.businessinsider.com/her-presents-a-realistic-tech-future-2013-12.

Schrank, S. and Ekici, D. Healing Spaces, Modern Architecture, and the Body. New York: Routledge. 2016.

Settembre, J. (2019, February 13). Venture capitalists still give most of their money to white men, study finds. Retrieved from https://www.marketwatch.com/story/venture-capitalists-still-give-most-of-their-money-to-white-men-study-finds-2019-02-13.

Shane, D. (2018). Research Shows Users Are Leaving Facebook in Droves. Here's What it Means For You. Retrieved from https://www.inc.com/dakota-shane/research-shows-users-are-leaving-facebook-in-droves-heres-what-it-means-for-you.html.

Sharma, A., Kumar, V., & Borah, S. B. (2017). Ritualization: A strategic tool to position brands in international markets. *Journal of International Marketing, 25*(2), 1-24. doi:10.1509/jim.16.0104.

Shepherd, S., & Kay, A. C. (2019). 'Jesus, take the wheel': The appeal of spiritual products in satiating concerns about randomness. *Journal of Marketing Management, 35*(5-6), 467-490. doi:10.1080/0267257X.2018.1556225.

Sherwood, H (2018, September 7). Church in crisis as only 2% of young adults identify as C of E. Retrieved from https://www.theguardian.com/world/2018/sep/07/church-in-crisis-as-only-2-of-young-adults-identify-as-c-of-e.

Shimojo, S. and Shams, L. (2001). Sensory modalities are not separate modalities: plasticity and interactions. Retrieved from https://shamslab.psych.ucla.edu/wp-content/uploads/sites/57/2016/01/Curr-Opinion-reprint.pdf.

Singer, A. (2004). The Many Aspects of the Ancient Egyptian "Self". Retrieved from https://serendipstudio.org/bb/neuro/neuro04/web1/asinger.html.

Singh-Kurtz, S. and Kopf, D. (2018, October 4). The US Witch Population Has Seen an Astronomical Rise. Retrieved from https://qz.com/quartzy/1411909/the-explosive-growth-of-witches-wiccans-and-pagans-in-the-us/.

Smigelsky, M. A. and Neimeyer, R. A. (2018). Performative retelling: Healing community stories of loss through playback theatre. *Death Studies, 42*(1), 26-34. Retrieved from doi:10.1080/07481187.2017.1370414.

So, W. (2017). Avatarme: Digital Avatars In A Theme Park Queue Creating A Better Experience And An Emotional Connection.

Sosteric, M. (2014). A Sociology of Tarot. *The Canadian Journal of Sociology / Cahiers Canadiens De Sociologie, 39*(3), 357-392. Retrieved from http://www.jstor.org/stable/canajsocicahican.39.3.357.

Statista. (2019). Number of social network users worldwide from 2010 to 2021 (in billions). Retrieved from https://www.statista.com/statistics/278414/number-of-worldwide-social-network-users/.

Swanson, K. K., & Timothy, D. J. (2012). Souvenirs: Icons of meaning, commercialization and commoditization. *Tourism Management, 33*(3), 489-499. doi:10.1016/j.tourman.2011.10.007.

Teich, D. (2019, April 9). AI Chatbots: Companies Love Them; Consumers, Not So Much… Retrieved from https://www.forbes.com/sites/davidteich/2019/04/09/ai-chatbots-companies-love-them-consumers-not-so-much/#3e6b56da284c.

Thelen, A., Matusz, P. J., and Murray, M. M. (2014). Multisensory context portends object memory. *Current Biology, 24*(16), R734-R735. Retrieved from https://doi-org.ezproxy.lib.ryerson.ca/10.1016/j.cub.2014.06.040.

Torres, E., Wei, W., Hua, N., and Chen, P. (2018). Customer emotions minute by minute: How guests experience different emotions within the same service environment. *International Journal of Hospitality Management.* Retrieved from 10.1016/j.ijhm.2018.06.021.

Tussyadiah, I. P. , Jung, T. H., and tom Dieck, M. C. (2018). Embodiment of wearable augmented reality technology in tourism experiences. *Journal of Travel Research, 57(5)*, 597-611. Retrieved from doi:10.1177/0047287517709090.

Walker, J. H., Sproull, L., and Subramani, R. (1994). Using a Human Face in an Interface. *Human Factors in Computing Systems*. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.91.8319&rep=rep1&type=pdf.

Warner, M. (2005). *Publics and counterpublics*. Zone Books.

Waysdorf, A., and Reijnders, S. (2018). Immersion, authenticity and the theme park as social space: Experiencing the wizarding world of Harry Potter. *International Journal of Cultural Studies, 21*(2), 173-188. doi:10.1177/1367877916674751.

Weller, C. (2018, February 18). Silicon Valley parents are raising their kids tech-free – and it should be a red flag. Retrieved from https://www.businessinsider.com/silicon-valley-parents-raising-their-kids-tech-free-red-flag-2018-2.

Welsch, C. (2017, July 5). The History of the Diary, the Original Blog. Retrieved from http://theoldtimey.com/history-of-the-diary/.

West, M. J. (2011). Public perception of astronomers: Revered, reviled and ridiculed. *The Role of Astronomy in Society and Culture, Proceedings IAU Symposium No. 260.* Retrieved from doi:10.1017/S1743921311002596.

Wilkins, H. (2011). Souvenirs: What and why we buy. *Journal of Travel Research, 50*(3), 239-247. doi:10.1177/0047287510362782.

Winner, L. (1980). Do Artifacts Have Politics? *Daedalus, 109*(1), 121-136. Retrieved from http://www.jstor.org/stable/20024652.

Wong, C. (2019, May 6). AI and Our Fight Against Information Overload. Retrieved from https://www.cdotrends.com/story/14279/ai-and-our-fight-against-information-overload?refresh=auto.

Woo, A. (2018, June 4). Understanding The Research on Millennial Shopping Behaviors. Retrieved from https://www.forbes.com/sites/forbesagencycouncil/2018/06/04/understanding-the-research-on-millennial-shopping-behaviors/#636946aa5f7a.

Yurieff, K. (2019, July 17). Instagram doubles down on test to hide likes. Retrieved from https://www.cnn.com/2019/07/17/tech/instagram-hiding-likes-test/index.html.

Zantal-Wiener, A. (2018, November 29). Looking Back on Facebook's Murky 2018: Here's Why Users Are Sticking Around [New Data]. Retrieved from https://blog.hubspot.com/news-trends/facebook-2018-user-motivation.