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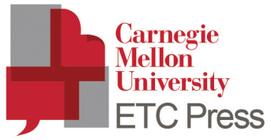

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DESIGN: Ryan Bown
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THE EXPRESSION OF EMOTION IN HUMANS AND TECHNOLOGY

Carnegie Mellon ETC Press

CONTENT

PRESS RELEASE

THE EXPRESSION OF EMOTION IN HUMANS AND TECHNOLOGY

The International Conference on Interactive Digital Storytelling (ICIDS) has a long-standing tradition of bringing together theoretical and practical approaches into interdisciplinary dialogue. The Art Exhibit at ICIDS 2019 is a celebration of artworks relevant to the field of interactive storytelling through the broad lens of the curated theme: The Expression of Emotion in Humans and Technology. The curatorial theme was intended to inspire (as opposed to constrain) creativity in the imagination and expression of the artist.

The advancement of synthetic imagery, complex avatars, AI mimicry, and enhanced portrayal of human beings via social media and emerging technologies beg the question of what is real and what is morally and ethically acceptable? Who and what should we trust?

What is the relationship between humans and technology and between AI agents? How might Human to AI and AI to AI interactions provide a basis for conveying emotional understanding and empathy? What perspectives may we gain about humanity through our cultural assimilation with technology?In the arena of social media, sociologists are studying the impacts of online interaction as opposed to person-to-person contact. What are the moral, emotional, physiological, and psychological implications of integrating AI and machine learning process and decisions into our communication, leisure, learning, and social experiences?

VR is now available to the masses, and as AR and Mixed Reality platforms continue to develop, will the future of communication and socialization consist of society adorned en masse with headsets and tactile feedback attire? How should we envision our future interaction with technology as we move beyond the keyboard and mouse?

Charles Darwin argued almost 150 years ago, the Universal Nature of Expression; which is to say that, “the young and the old of widely different races, both with man and animals, express the same state of mind by the same movements.” As technology, robotics, and artificial intelligence advances, it seems appropriate to ask how will we interpret and understand expressions of emotion from technology?

Taking a cue from Darwin’s seminal work in “The Expression of the Emotions in Man and Animals,” this exhibition encouraged the artist to explore the concepts of The Expression of Emotion in Humans and Technology. Submitting artists were encouraged to cross disciplines, technologies, and/or global societies to explore the impact on human experience through the following or relevant questions:

The Art Exhibit At ICIDS 2019 jurors chose to accept selections which were novel, thought-provoking, evocative, and sensor-rich interactive art experiences created by a diverse and broad group of creative practitioners. The selections were based on creativity, strength of concept, relevance to the theme, feasibility, and durability.

The Art Exhibit At ICIDS 2019 was presented in the Primrose Gallery at Snowbird Ski & Summer Resort, with an opening reception on November 20th at 6 pm (MST). The Art Exhibit At ICIDS Catalog contains artist’s statements with supporting images of the works selected by the Distinguished Jurors:

Jessica Bedingfield, Suzanne Freyjadis, and Alex Johnstone. The exhibit was organized by Ryan Bown (Chair & Head Curator), with assistance from Brian Salisbury (Co-Chair & Assistant Curator). This exhibit features work from 13 Digital Storytellers. Three certificates of excellence were awarded.

Fragile Equilibrium: An Action Game of Melancholic Balance received Excellence In Visual Design, Simmer received Excellence In Innovation, and Healer received Best of Show (the embodiment of the curatorial theme with mastery of visual design and technology).

“The theme, ‘The Expression of Emotion in Humans and Technology,’ drew submissions that recast a wide range of emotional experiences. How emotions can both be better understood as well as hampered by technology is an interesting theme running through the art that is represented.”

-Suzanne Freyjadis Founder, SHIFT Games & Education

This volume collects documentation of the 2019 International Conference on Interactive Digital Storytelling (ICIDS) Art Exhibition and new scholarly texts from the artists involved. The works collected here explore interactive storytelling through the broad lens of the curated theme: The Expression of Emotion in Humans and Technology.

Since 2013, the ICIDS Art Exhibition has been chronicled online, as well as documented in a printed catalogue. In 2017, the ICIDS Art Exhibition expanded its textural scholarship to document the work presented by collecting textual scholarship from the subset of the artist involved.

This extended format provides the artists a space to state their processes, unpack arguments, and show supporting evidence to what is possible in the field of interactive narrative.

JOHN BARBER
FLAVIA BASTOS
SERGE BOUCHARDON
BEREND FORFETIR

LUBNA GEM ARIELLE
ELIZABETH GOINS
LINDSAY GRACE

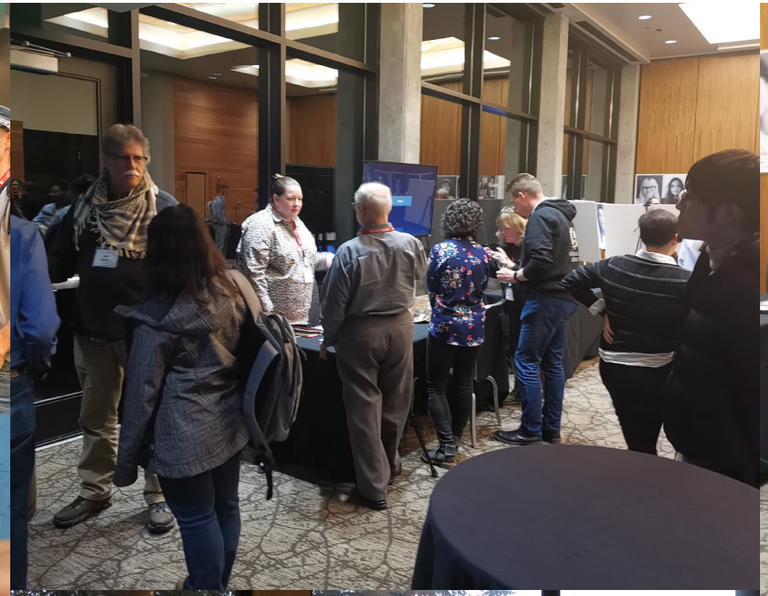
LISSA HOLLOWAY-ATTAWAY
BRENDAN PADGETT
ANDREW PHELPS

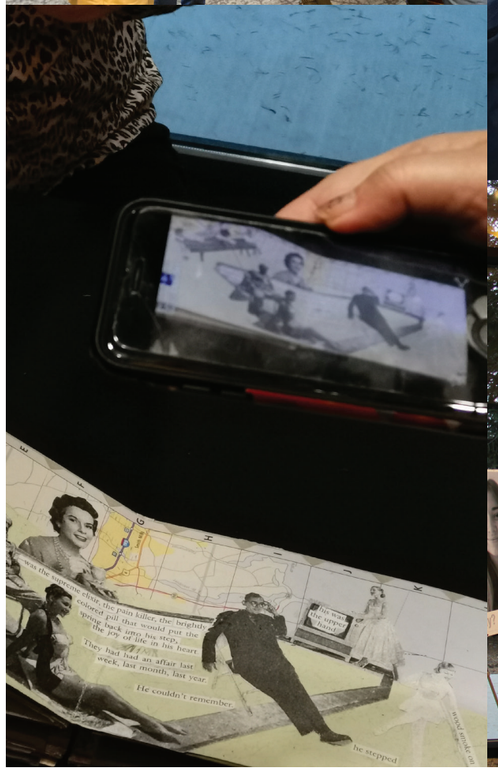
GREG PHILBROOK
JAMES REES
REBECCA ROUSE

ICIDS 2019 ART EXHIBIT

RECEPTION PHOTO GALLERY

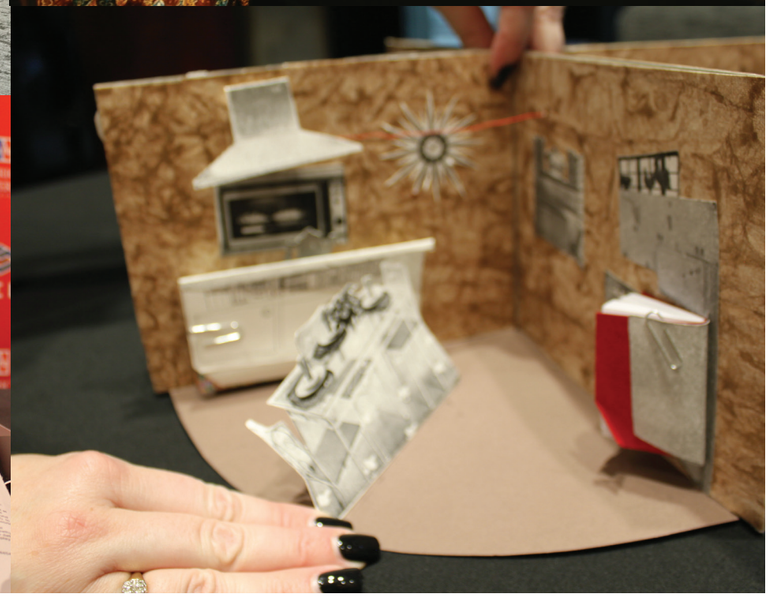

EXIT




He couldn't remember.
he stepped


Who is American Today?
Who is American Today?
Who is American Today?
Who is American Today?


Project Equilibrium



Acknowledgements

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In addition, we also thank the ICIDS 2018 Art Exhibit Chairs: Dr. Lissa Holloway-Attaway, School of Informatics, University of Skövde, Sweden and Dr. Néill O'Dwyer, School of Computer Science and Statistics, Trinity College Dublin, Ireland.

Documentation of Previous ICIDS Art Exhibitions

[ICIDS 2013] Art Exhibition Theme: Connecting Narrative Worlds URL: http://gamesandnarrative.net/icids2013/exhibition

[ICIDS 2014] Art Exhibition Theme: Remembering/Forgetting http://narrativeandplay.org/icids2014/exhibition.html

[ICIDS 2015] Art Exhibition Theme: Fragmentation http://icids2015.aau.dk/exhibition/

[ICIDS 2016] Art Exhibition Theme: Field of View http://icids2016.ict.usc.edu/exhibition/

[ICIDS 2017] Art Exhibition Theme: Time & Tempo https://icids2017.m-iti.org/?page_id=865

[ICIDS 2018] Art Exhibit Theme: Non-Human Narratives https://icids2018.scss.tcd.ie/art-expo.html

[ICIDS 2019] Art Exhibit Theme: The Expression of Emotion In Humans and Technology https://icids.eae.utah.edu/results/

BRIDGING THE BLUE

Lubna Gem Arielle

Introduction

Bridging the Blue is an interactive virtual reality (VR) experience utilising technology to access empathy and interrogate the effectiveness of different modes of listening when attempting to be supportive of friends, family, or colleagues with a mental health challenge and offers subjective playback and validation to those who have been unwell. The viewer is invited into Arielle's lived experience of severe clinical depression via an encounter with her, the artist, as a vologram (volumetric video captured from the real world) in a virtual world constructed from personal iconography derived from sensations, memories, and perceptions of being unwell.

Technology is intertwined with the human experience as the viewer's agency is restricted to moving between and witnessing different parts of the story without having any effect on the outcome. The virtual experience acts as a device to access and expose the mental and emotional space of lived experience of a human condition, and the work seeks to harness the 'novelty-factor' of VR in an attempt to change the quality of our attention in evaluating how we listen in conversations about mental health. Through this symbiosis, *Bridging the Blue* relates to the curatorial theme, 'The Expression of Emotion in Humans and Technology.'

The work challenges interactive storytelling norms where a viewer might influence the outcome of the narrative or progress through different levels as in a game. *Bridging the Blue* is positioned as an artistic work sharing lived experience mediated by technology to raise mental health awareness, normalise conversations about mental health, access empathy, and evaluate effective modes of listening.

The work was made in collaboration with computer science research group, V-SENSE at Trinity College Dublin, leaders in the field of visual computing including volumetric video (VV) enabling '6 degrees of freedom' (6DoF) where viewers are able to walk within the virtual environment. V-SENSE produced the VV or 'vologram' of the artist and recreated her personal iconography in the virtual world in *Bridging the Blue* using the Unity game engine and computer graphics elements within an open dialogic environment exposing technological limitations and possibilities which further informed creative choices. Through this collaboration and other 'creative experiments',

Figure 1. The Wasteland

V-SENSE evaluate and further develop their technologies in the context of a creative project.

This paper reflects the artist's enquiry and reflections on her practice. The technological journey is documented in Appendix 1.

Steering Through Stigma

The artist's journey of mental ill-health includes losing two close friends to suicide as well as her own experience of what is colloquially known as a mental breakdown. The artist did not confide in others about the challenges to her mental health at the time because of the shame in being unable to cope. Subsequently, Arielle reflected on whether speaking up would have prevented her deterioration in the first place and in the case of her friends, may have prevented their deaths. In an attempt to contribute to overcoming the endemic stigma that underpins silence, normalise conversations about mental health, and invite consideration of the value of empathy, the artist started to publicly share her lived experience within corporate mental health awareness sessions including details of what she experienced as empathy gap in misplaced albeit well-intended advice. Lived experience is seen as having value within a mental health arena (Pollard, 2018) and Mcintosh & Wright (2019) consider the value of lived experience in more depth including its relationship with phenomenological reflection albeit within the context of social policy.

A Synergy Between Technology and the Human Experience

While unwell, the artist predominately encountered 'listening to' or 'problem-solving listening' (Goulston & Ullmen, 2013), a mode of listening where the listener is quick to give unsolicited advice or offer solutions in an attempt to move forward and have a sense of accomplishment. The effects of this on the artist are addressed in *Bridging the Blue.* Mental Health First Aid, an organisation which trains individuals in first line responses to someone experiencing a mental health issues or crisis (parallel to the role of a physical first aider) emphasises the need for non-judgemental listening in assisting others. Goulston & Ullmen refer to this as 'listening into' or 'connective listening' where the aim is to understand, enabling others to feel seen and validated.

We might generalise the norm of interactive digital storytelling as being primarily focused on advancing a narrative and/or being situated within the world of gaming, where gamers 'play' and solve to advance through a game. Here, the technology has been harnessed as a device to catalyse shifts, prompting the viewer to evaluate and recalibrate modes of listening in the context of mental health. This hinges on three aspects. First, dramaturgically through contracted agency where 'press play' merely shifts the viewer between episodic encounters without any hierarchy or levels of advancement, nor any linear progression through the narrative. Second, technologically, the use of VV and 6DoF advances from VR experiences where a viewer might only move their head choosing where to look to one which is fully immersive, enabling the viewer to move inside the work. This embodiment leads to an experiential encounter with the artist and is pivotal to the transformative intentions of the work. Third, the work explores the inherent potential of the novelty-factor of pioneering technology to change the quality of attention in line with notions of defamiliarization or 'making strange' characterised by Shklovsky (1917) and discussed further below.

Here, the technology has been harnessed as a device to catalyse shifts, prompting the viewer to evaluate and recalibrate modes of listening in the context of mental health.

Contracted Agency

Controlled choices equate to 'rules of the game' commencing on an island surrounded by artefacts which may be selected in any order to enter one of seven immersive episodes with freedom to move around, choose one's relative position to the *vologram* of the artist, where and whether to look and listen, and even walk through her. However, this active and embodied encounter is one of contracted agency where the viewer/player is unable to influence or advance the narrative as their interaction with the 'character' is limited to listening, inadvertently modelling responses more consistent with empathy, support, and validation in the context of non-professional conversations about mental health where the natural tendency is often to attempt to offer solutions or advice without having the requisite professional expertise. Listening is generally held as a best practice within conversations about mental health by organisations including Mental Health First Aid in the UK, US and Australia as well as UK-based Samaritans and MIND.

Figure 2. The Island

The viewer can exit an episode at any time to return to the island and choose another. There is no prescribed order to the episodes, any episode may be repeated and there is no progression through levels or accumulation of points as a reward for advancement. This technology-enabled non-linear narrative, fragmentation and repetition offer the viewer insight into the distortions of time and memory of Arielle's lived experience.

Embodiment

Held & Hein's experiments in the 60's demonstrate how active immersion as opposed to passive observation enables a neurological basis for changes in perception (Held & Hein, 1963) and the 6DoF experienced in *Bridging the Blue* allows for such immersion where the viewer is with the *vologram* of the artist, not merely viewing her. Goleman (2013) identifies links between proximity, for example, directly speaking with others as opposed to hearing about their experiences second-hand, and the arousal of empathy. Here, the technology allows an embodied encounter with the artist in her physical absence.

Figure 3. Untitled - (viewer kneeling)

Making Strange

Shklovsky notices how perception becomes automatic once it is habitual and considers the value of defamiliarization in promoting perception and attentiveness:

> *Art exists that one may recover the sensation of life; it exists to make one feel things, to make the stone,* ***stony.***

The pioneering technology breaks through the fifth wall to enable a perceptual journey into the artist's mind through images, music, speech, words, sound effects combined with the ability to move within the terrain, and even to walk through the artist, elements which are not available in the real world. Through this defamiliarization or 'making strange' *Bridging the Blue* attempts to jolt and enhance the quality of attention to mediate the gap in empathy experienced in default modes of listening.

Human Segues into the Technological Process

The underlying narrative of the technological process of creating a *vologram* offered a catharsis. For Arielle, the breakdown of recorded footage into streams of data, run through an algorithm to produce a mesh-only rendition to which texture was then added ran parallel to the human experience of coming apart, being reassembled by a formula of kairos/non-linear time and pharmaceuticals, and finally reactivating life (socialising, picking up interests, taking care of appearance) through a process of counselling. Each involved reconstruction albeit on different timelines and realities.

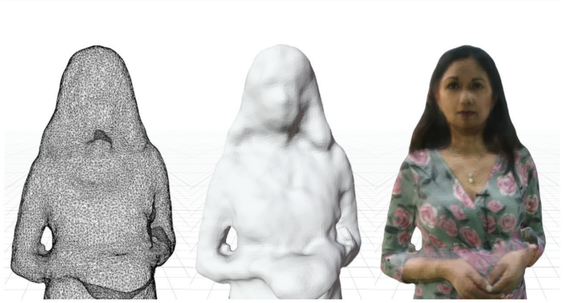

Figure 4. Mesh-Only

Iconography in a Virtual World

The physical world in which the artist spent almost a year was a small bed in the corner of a spare bedroom at her parents' house, but the real world was the inner workings of a mind that ricocheted through sensations, feelings, thoughts appearing in gridlock, emptiness, and everything in-between. In translating this mental and emotional space of lived experience into an immersive world, *Bridging the Blue* uses an iconography derived from images that were seen or perceived. This was handed over to the V-SENSE team in a storyboard with a mixture of photos, video footage, references and descriptions to build the scenography in Unity. The iconography is incorporated into three environments (The Island – *Figure 2.*, The Wasteland – *Figure 1.* and the Endless Corridor / Building Site – *Figure 6. pages 19-20*) and a number of artefacts. Through use of the VR handset these trigger the viewer's movement from the 'home' environment and into one of the other two environments in which the seven scenes take place.

Figure 5. The Path at Sandycove

The viewer's journey begins in the opening environment, an island based on a path that leads into the sea at Sandycove, Dublin Bay, a perfect place to walk into the sea the artist came upon without a wish to do so. The island, though relatively safe, also represents the isolation of mental illness in a world where stigma and silence still prevail and the risk of breaking the silence is the further isolation of feeling invalidated or even belittled by less effective modes of listening. Arielle compares this to a snapped off promontory as in 17th century poet John Donne's *'No man is an island,'* which acknowledges the need for human connection and co-existence. *Bridging the Blue* seeks to reconnect with Donne's mainland.

The broken plate is a leitmotif as a triggering artefact on 'the island,' comprising the ground in 'the wasteland' and within three scenes of a virtual triptych in 'the endless corridor/building site' where plates are held until they fall, and an attempt is made to piece a plate together and then a piece of plate is used as a receptacle for eating macaroni cheese. 'China plate' or 'china' is cockney rhyming slang for 'mate' as in friend. Conversations about mental health and attempts to bridge the blue are generally intended to be helpful, but stock advice can hurt. At times, as they can seem so difficult, they may be avoided altogether. The plates also refer to the quality and depth of conversations over the dinner table, our presence, what we are able to notice, and at times, who is absent.

Other symbols used as triggering artefacts are macaroni cheese, a pool of blood, a tornado of building dust and anti-depressant pills, a red butterfly, a raven with a piece of toast, and a matchstick.

Each of the episodes takes place in one of two environments. Either a sparse wasteland, referencing the breakdown of self, society, and planet in Elliot's *The Waste Land* (1922), and consisting of a ground of broken china and a blue sky-like void. Four of the episodes take place here with different shades of blue representing the sky at different times of day, the passage of time, and the turning of the wheel of life even when one is at a loss. The second environment is redolent of a common

nightmare with an endless corridor and doors that can't open, said to represent the desire to escape a repetitive situation, in the artist's case an ongoing urban nightmare of problem neighbours and their building works. Three episodes are set here, a virtual triptych of breaking, trying, and accepting. Each of these environments also contain the shadow of a rose. As with Saint-Exupery's Little Prince and his longing for home and to be with his rose, this reminder of what might be real is the trigger to return to the island where the rose itself is located. The relationship between shadow and rose also resolved the quandary discussed in the collaboration of finding a human-centric and intuitive device to enable viewers to move between episodes.

vIn a sense, Arielle's rose was a barometer of the artist's mental health, an unnaturally tall rose she could see in her mother's garden from the bedroom window. The rose withstood heavy rain and strong winds while the artist was indoors without resolve. When she was finally well enough to leave, the rose had been cut back for the winter. Arielle comments that although she hadn't seen hope at the time, perhaps the rose had contained it, a variation of Dorian Gray's aging portrait.

Music

The soundscape includes commissioned music composed by Evangelia Rigaki in response to the notion of disjointed, constricted thinking space. She combines repetition with variation to evoke the sense of unease in grasping for the familiar in something that shifts.

Figure 8. Greenscreen / Production shot

Responses To The Work

The work was made available to the public at Open Quarter, Folkestone, Kent, UK (June 2019) and evaluative feedback obtained from 29 individuals requesting general reflections on the work and how the work had changed the way they would interact with someone who has depression or is mentally unwell. Comments reflected connection, the evocation of empathy, and technology's role in doing so. One viewer comments on 'taking steps towards the experience' and in observing how people engaged with the work, many of them stood very close to the *vologram* or knelt down at eye level in the seated scenes. Another referred to, 'Something about really immersing yourself and being in a very unfamiliar and unique 'space' opens you up differently.'

Most viewers noted in some way that they would 'just listen' if attempting to support someone who was unwell. Those who had been ill themselves commented on the connection they felt with the experience.

Figure 9. Folkestone

Conclusion

Bridging the Blue is an attempt to harness technology as an enabler of empathy through using its qualities and possibilities to challenge how we listen. Feedback to date suggests that Bridging the Blue offers an evaluative space for listening and the potential to consider empathic listening through an innovative and immersive experience. In particular, making use of novel technology and the attributes allowing for the viewer's experienced and embodied encounter with the work, limited agency and 'making strange' to offer effective ways of listening, and making it safer for those who are struggling to end their silence and reduce the stigma around negative mental health.

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Appendix 1
The Technological Journey

Aljosa Smolic

Volumetric video (VV) is an emergent digital media that enables novel forms of interaction and immersion within virtual worlds. VV allows 3D representation of real-world scenes and objects to be visualized from any viewpoint or viewing direction; an interaction paradigm that is commonly seen in computer games. Based on this innovative media format, it is possible to design new forms of immersive and interactive experiences that can be visualized via head-mounted displays (HMDs) in virtual reality (VR) or augmented reality (AR) i.e. a visualization including real and virtual elements. Within certain limits, users can freely and naturally move around the VV and not just look around by rotating the head from a fixed position. While the first method is more natural and often referred to as "6 degrees of freedom" (6DoF), the latter is restrictive and called "3 degrees of freedom" (3DoF). As such, VV enables novel formats of creative storytelling, which are immersive, interactive, support full 6DoF, and include real-world content, as opposed to containing only synthetic computer graphics content. *Bridging the Blue* is a pioneering example of new VV storytelling.

For the generation of a VV, live performances are captured with multiple synchronized cameras in a dome-type setting that surrounds the performer, typically in a green screen studio to allow for the separation of the performer from the background (chroma-keying). Several specific studios for VV content creation exist worldwide, many are expensive, professional setups that include a large number of cameras (64,100 or more) and other types of sensors (depth). The studio in the V-SENSE laboratory is a more affordable setup utilizing 12 synchronized cameras (4k and HD resolution) that are distributed around a space of sixteen square meters, completely enclosed by green screens (sides, floor, ceiling), including monitoring and recording equipment, LED lights, and audio recording equipment.

The capturing workflow for VV is different from classical film or TV production, due to the specific conditions of surround capture with multiple cameras. In the V-SENSE studio, V-SENSE starts by synchronizing the capture with all 12 cameras running while the performer is not yet inside the studio. Then, V-SENSE captures specific calibration patterns and color charts, which allow V-SENSE to accurately calibrate the multiview setup in post-production. The studio is then cleared and the talent enters the green screen capture space alone. In such a capture setup there is no "behind the scene" as the crew is located outside of the green screen space and can only follow the performance via monitors. Likewise, the performer does not have a line of sight on the crew or director. Shooting is systematically performed take after take without stopping the cameras and a review of takes is not possible due to the practical limitations of the capture process. In between takes, interaction is only possible with the director and crew through the green screen. Shooting continues until the storage of cameras is full (around 30 min) or the team is satisfied with the captures. However, there remains some risk that something may have gone wrong, and reshooting is sometimes necessary. Typically, VV scenes are restricted to a length of 30 seconds to 5 minutes, due to storage and processing limitations.

Postproduction starts by loading all videos to a workstation server. The best take is selected for further processing, including color correction (as multiple cameras can vary in color balance), geometric calibration, and keying (separation of the performer from the background), which are particularly interactive and time-consuming tasks. Only then can the core VV creation process start. Here V-SENSE applies patent-pending technology [Ref1], currently being commercialized by a spin-out company Vologrames [Ref2]. The process is computationally expensive and currently requires a skilled operator to fine-tune parameters and correct errors. The result is a VV asset, a dynamic 3D representation of a human performance that can be visualized with 6DoF.

For visualization in VR or AR across various platforms a scene is built using the Unity game engine. The Unity scene defines the scenography of the experience and is typically composed of one or more VV assets, computer graphics elements, and static real-world objects that are often generated by photogrammetry (i.e. generation of 3D geometry from multiple 2D images as input). Different scenes can be designed and combined into a narrative. Interaction, navigation, etc. are all designed using common game engine functionalities. The same VV assets may be used in different versions of the content, such as VR and AR HMDs or a hand-held device. V-SENSE has developed several such 6DoF experiences, including a VR and an AR version of Samuel Beckett's Play, a cultural heritage experience of meeting Jonathan Swift in the Old Library of Trinity College Dublin, and others. Each creative experiment with VV was unique and experimental, allowing V-SENSE to develop pioneering technology, production workflows, storytelling, scenography, and art all at the same time.

Bridging the Blue posed specific novel challenges for implementing the ideas of the artist which had not previously been encountered. This included the usage of props, sitting positions, and furniture. Most contemporary VV creation technology is optimized for standing human performances. Therefore, the capture workflow and postprocessing had to be modified and extended accordingly. Firstly, V-SENSE adapted their VV creation algorithms to work with sitting poses. Secondly, chairs and tables were covered with green fabric to eliminate problems caused by occlusions, which were difficult to handle. This way the artist could interact with them, while V-SENSE were able to remove them in post-production and replace them with computer graphics elements. Thirdly, the use of props turned out to be difficult for our algorithms; however, one solution was to mime prop use when filming and adding computer animation in post-production (crashing plates, eating macaroni cheese, and the plate puzzle). Having completed all 7 VV assets, the experience was implemented as a Unity project via 8 scenes, with the island acting as a central portal from which the seven episodes could be visited. This was done following the direction of the artist in an iterative process that challenged both sides and needed some compromises to be made. Navigation was realized via interactive elements, such as the seven island symbols and the shadow of the rose. Environments, objects, elements, props, and animations were designed according to the creative direction. Finally, audio tracks were added including the speech performance for each episode, the music, as well as sound effects for the island.

Appendix 1 has been authored by Aljosa Smolic and emanated from research conducted with the financial support of Science Foundation Ireland (SFI) under the Grant Number 15/RP/2776.

[Ref1] Pagés, Rafael; Amplianitis, Konstantinos; Monaghan, David; Ondrej, Jan; Smolic, Aljosa, "Affordable Content Creation for Free-Viewpoint Video and VR/AR Applications", Journal of Visual Communication and Image Representation, Volume 53, pp. 192-201, 2018.

[Ref2] https://volograms.com
Proceeding SIGGRAPH '18, ACM SIGGRAPH ACM SIGGRAPH, New York, NY, USA, 2018, ISBN: 978-1-4503-5817-0 .

Credits:

Creative Director/Artist: Lubna Gem Arielle

Written & Narrated by: Lubna Gem Arielle

Production & Design: V-SENSE team – Matthew Moynihan, Iman Zolanvari, Rogerio Da Silva, Alan Cummins

Music: Evangelia Rigaki, Usher Associate Professor, Trinity Department of
Music performed by: parabasis (Percussion: Richard O'Donnell, Cello: Martin Johnson)

Music recorded by: Conall O'Maolan

Scenography: Neill O'Dwyer, V-SENSE & Trinity Department of Drama

Producer: Aljosa Smolic, SFI Research Professor of Creative Technologies

Fragile Equilibrium: An Action Game of Melancholic Balance[1]

Andrew Phelps

Introduction

Fragile Equilibrium is a highly emotive and carefully crafted game that evokes concepts and emotional states such as depression, anxiety, nostalgia, and melancholy entirely without the use of characters, dialogue, or narrative. It uses unique 'shmup'[2] elements in novel ways that are both carefully balanced and that help reinforce a unique metaphor for depression and anxiety. The game serves as a case-study for designed interaction that utilizes *experiential* gameplay—its game mechanics seek to relate emotions, feelings, and perhaps even empathy through played experience. To date, it is one of very few games that engage with mental health through experiential gameplay rather than narrative development and/or the depiction of characters experiencing the symptomatology associated with these conditions.

Instead, the design methodology centered around the concept of experiential, metaphorical games and sought to incorporate nuanced depictions of mental illness and a sense of 'emotional resonance' in order to engage the players with the aforementioned topics. It is unique in that it attempts to examine the concepts of depression and anxiety through an experiential lens—players must practice balance between internal repair and external defense in addition to operating within an environment that increasingly becomes more hostile and decayed. From a design perspective, whether or not the player makes the connection between *Fragile Equilibrium* and depression is not as important as the feelings elicited by the game. In this manner, the game gives the player the tools to empathize with depression without explicitly relating the theme to the player, thus allowing them to draw their own conclusions from within their own experiences.

The game was released on Steam, itch.io, and XBOX One in January of 2019 after a development period of nearly two years, and was shown at Miami@Play (Filmgate Miami, 2018) the ICA Games Studies Division "Ante-Conference" (International Communication Association, 2019), Adobe MAX (Adobe, 2018) in regards to its inventive use of Adobe XD during the design process, and at the Open World Arcade as a part of the Open Worlds:

Figure 1. Fragile Equilibrium in both 'repair mode' (above) and *Figure 2.* 'shmup facing mode' (pages 31-32)

[1] Portions of this discussion and manuscript are based on a larger, more expansive discussion of these themes presented in "Experiential Depression and Anxiety Through Proceduralized Play: A Case Study of Fragile Equilibrium" by A. Phelps, J. Wagner and A. Moger in the *Journal of Games, Self, and Society*, Volume 2, Issue 1, 2020.

[2] 'Shmup' is a slang term that is a contracted form of 'shoot-em-up,' and commonly refers to a particular kind of game in the arcade and early console era in which the player controls a ship or vehicle and faces waves of enemies and bullets in a game world that scrolls across the screen.

Video Games and Contemporary Art exhibit at the Akron Art Museum. It was the winner of the Award for Visual Excellence at the art showcase at the 2019 International Conference on Interactive Digital Storytelling (ICIDS).

The game is rated 'E for Everyone' by the Entertainment Software Ratings Board (ESRB) and is free to play on every platform for which it is available.

More information on the game and its development is available at www.fragileequilibrium.net.

It is through the use of mechanics within Fragile Equilibrium that the player participates actively in the metaphor and creates connections to their own lived experience.

A Metaphor of Balance And Self Awareness

Fragile Equilibrium is meant to portray a constant balancing act between self-reflection (through the mend mechanic) and active engagement with the present through traditional shmup elements as described below. Through this, the game provides a sense of power, agency, and control, and seeks to address depression via these mechanics and themes. Depression is often characterized as solely a negative experience, but some artists, musicians, and philosophers claim that their depression has informed their creativity and empathy. It is this sentiment of self-reflection as a tool for growth and healing that is pivotal not only to those with depression, but anyone who engages with the nuances and tribulations of life (Phelps, 2018b). It is through experiential metaphor that Fragile Equilibrium strives to tell its story: while the in-game mechanics serve to provide balance and challenge, it was important to the designers that they also served as a metaphor for depression. Andrew Phelps, designer of Fragile Equilibrium, notes in his (2018b) artist's statement that "[Fragile Equilibrium] is not a game that teaches someone about depression, it is not a game that aspires to educate someone or empower someone or God-forbid claim to cure someone...it intends instead to evoke a feeling, a nostalgia, a sense of something…" (Phelps, 2018b). It is through the use of mechanics within Fragile Equilibrium that the player participates actively in the metaphor and creates connections to their own lived experience.

These concepts are reinforced through the gameplay of Fragile Equilibrium, which is styled like a traditional shmup —the player controls a ship which makes its way from left to right through a scrolling world and faces an ever-increasing onslaught of enemies that fly at the player from the right. Survival depends on the ability of the player to dodge, weave, and return fire with a variety of weapons that accent their ship. If a player's ship is hit, the player loses health. Additionally, Fragile Equilibrium has an uncommon mechanic: enemies that get past the player crash into the left side of the screen, first shattering and then breaking off portions of the playable area. In a game that calls for constant movement, the detriment to the playable area greatly impacts play and the odds of a player's survival. To this end, Fragile Equilibrium has a "mend" mechanic, in which players can face 'backwards' and repair their world, slowly restoring the playable area and giving themselves room to maneuver again. Additionally, repairing the screen recharges the player's weapons, which then creates a strategic dilemma: players that have taken little damage to their screen must allow for some damage so that they can refresh their power levels. The balance to this mechanic is that players cannot mend the screen and continue to fire at enemies concurrently—they must focus their efforts on what is most pressing at the time and continually make judgment calls regarding the best tactic at any given point in the game.

An Experiential Form Of Digital Storytelling

The experiential gameplay model utilized by *Fragile Equilibrium* stems from a concept of experiential learning, which has been used as an effective teaching tool in education (Kiili, 2005). Traditionally, experiential learning models utilize four steps which help to cement concepts: concrete experience, reflective observation, abstract conceptualization, and active experimentation (Kolb, Boyatzis, & Mainemelis, 2001). This style of gameplay allows the learner to discover concepts on their own terms, rather than focusing on rote memorization or regurgitated theories. Additionally, the game seeks to utilize Cziksentmihalyi's concept of flow or *optimal experience*, such that one becomes singularly focused on a goal and the exhilaration which accompanies the pursuit of that goal (Kiili et al., 2012, Cziksentmihalyi, 1990). Flow is said to compound experiential learning exponentially in that it drives the learner to continually cycle through the four steps outlined above in order to reach their goal— it ensures that things do not become boring or too repetitive. Thus, *Fragile Equilibrium* introduces the mechanic of the broken screen to its traditional shmup roots in order to challenge players and their preconceived notions of shmups.

These four stages of experiential learning and game design were actively pursued and purposefully implemented during the development of *Fragile Equilibrium* in order to foster problem solving and "discovery learning" (Kiili, 2005), a concept in which ideas and procedures are uncovered through repeated effort. In order to fully engage the player and reinforce concepts within the game, games must directly provide clear feedback, well-defined goals, and challenges that are on par with a player's skill level at any given point (Kiili, 2005; Cziksentmihalyi, 1990). As experiential gameplay seeks to conjoin gameplay and experiential learning to foster flow, they must also seek to acknowledge both cognitive and behavioral exercises as they are applied to learning, a notion which acknowledges constructivist (Phillips, 1995) and pragmatist (Kivinen & Ristelä, 2003) theories (Kiili, 2005).

The more a player can become engaged with the game, from mechanical representation to the connection they have to the themes, the more meaning can be derived from the game itself. Games must intentionally establish what experience they wish to convey from the outset ro create a point of reference which informs all else from the beginning (Rusch, 2017). It is from this point of reference that meaning originates, and trickles down through the game, from code to mechanics, from art to worldbuilding, from individual elements to cohesive design. Games that are considered to be 'deep' rely on themes to create a resonance with the player, drawing on their experiences with culture, past experience, shared mythology, purpose, and humanism to create a context from which to experience the game world. The use of metaphor in gaming lends itself to the framework of experiential gameplay since it is meant to stimulate reflective observation and active conceptualization. Rusch directly cites mechanics as a vehicle for metaphor in games (2017, Chapter 4). The balance between external defense and internal focus and repair in *Fragile Equilibrium* is meant to challenge the player's expectations of constantly fighting incoming projectiles. It pointedly differs from the normal shmup practice of having enemies arrive from a single direction, and it provides a secondary survival mechanic that is ever-present and needs constant monitoring and attention. This mechanic, along with other elements of the game, is meant as an experiential metaphor for depression, mental health, and self-care. The player must at once both 'deal with' the normal 'shmup world'—i.e. the external enemies and projectiles that come at them wave by wave, but also with the need to (literally) turn around and focus on their own decaying view of the game world. In this sense the game invites players to reflect on external and internal conceptualizations of the world.

This 'balancing' mechanic, which is heavily repeated throughout the game, exemplifies the amplification of metaphor through repetition (Bogost, 2007). The game's shmup mechanics are contrasted by the calming color palette and serene (although still energetic) music. As the screen breaks away, the game effectively uses the navigation (and compression) of the environment to stage a dramatic, and repeatable, story, which has similarities to the way that space is often used in conjunction with more traditional game narratives (Fernández-Vara, 2011). The elements of the game work in concert to reinforce the parallel with depression and anxiety: the feeling of anxiety is heightened as, inevitably, more of the screen is eaten away and the player's movements are restricted over time. This metaphor and quest for balance are then repeated throughout the additional mechanics of each level of the game:

Visual Aesthetics And Nostalgia

The inspiration for the serene visual aesthetics of *Fragile Equilibrium* came from a number of seemingly disparate sources, and through these design elements attempt to create a post-apocalyptic nostalgia (Fuchs, 2016) for the time where shmups peaked in popularity. Artistically, the game draws heavily from 1980s fantasy art and music, shmups such as Treasure's *Ikaruga*, Kaihatsu's *Rai Den*, and Irem's *R-Type*, as well as the artistic style of Roger Dean album covers (Dean, 2008; Dean, 2009). Additionally, the game features a nod to the Wabi Sabi aesthetic (Koren, 2008), which is "loosely translated as 'the recognition of the beauty of the imperfect'" (Phelps, 2018b). The enemies and levels of the game itself become imperfect over time, in addition to the more literal decay of the screen itself. It is this passive sense of serenity, beauty, and nostalgia that positions *Fragile Equilibrium* as a vehicle for melancholic reflection: it is meant to evoke emotion and contemplation through every aspect of the world.

Nostalgia is a key component to *Fragile Equilibrium's* art and design. The game is intended to be reflective of the 1980s and "aspires to encompass

a nostalgia for that entire era" (Phelps, 2018b). Engagement with this yearning for past feelings and cultures is rather prevalent within game production. Maria Garda (2014), using terminology from Boym (2001), distinguishes between two forms of nostalgia: restorative, or that which involves practices that keep "the retro titles alive in the collective memory", and reflective (Garda, 2014, p. 3). *Fragile Equilibrium* takes a reflective approach to nostalgia, which "refers to an individual experience, [and] is linked to the process of cultural remembrance" (Garda, 2014, p. 4), and attempts to evoke collective feelings of a bygone era of gaming. This is exemplified throughout *Fragile Equilibrium* in its retro aesthetics and gameplay style, and through its incorporation of traditional mechanics such as enemy waves, power-ups, shields, etc.

Another aspect of *Fragile Equilibrium* that is significant are the ruins that permeate its game world. Ruins are always referential; they refer to a building, a time, a culture, and thoughts that have passed. They naturally tell stories of life and glory as well as of death and destruction (Fuchs, 2016, p. 8). Because of this, ruins are very much narrative elements. The game's engagement with them is nostalgic (Fuchs, 2016, p.3), and also makes a designed play on agency with regard to ruin, seeking to specifically extend a form of "'deconstruction mode' in which buildings or objects are turned into ruins 'on demand', so to speak, within the context of a game" (Lowe, 2012, p. 67). This form of 'active ruination' the player observes and is involved in causes them to bear witness to the creation of nostalgia. *Fragile Equilibrium* focuses on the longing aspect of nostalgia and its ties with depression, which can sometimes bring about feelings similar to the ache one feels with nostalgia. Through utilizing nostalgia, the designers have created the possibility of connecting players with this feeling of longing and created the possibility of cultivating empathy, as nostalgia in the game world evokes thoughts of nostalgia for the player's past life experiences and/or world view.

Conclusion

Ultimately, *Fragile Equilibrium* wonders as to whether more "traditional" game genres, tropes and mechanics could facilitate the expression of deep, meaningful experiences and potentially reach a wider audience. By building upon the forms and mechanics of a traditional genre, *Fragile Equilibrium* challenges the design space of what such games are capable of, and their extended, or existential, purpose. Additionally, the game attempts to showcase non-traditional ways to engage with and depict anxiety and depression. This is done without the use of characters or narratives and through experiential gameplay and metaphor—by using mechanics, replication, and a careful attention to aesthetic conditions, *Fragile Equilibrium* constructs a metaphor for depression and anxiety without ever naming them outright. The nostalgia of the 1980s and the decaying ruins in the game work to further impress these feelings onto the player. These conditions work to create an element of melancholic reflection, which serves to foster eudaimonic gratification within the player, prompting them to turn inwards and evaluate the core philosophical tenets of the game. Through this artistic representation of these themes, the game seeks to challenge our notions of existing design, and explore instead encoding meaning and message through experiential, metaphorical means.

Acknowledgements

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fred :-), A GESTURAL STORY

SERGE BOUCHARDON

To what extent can a story be based on the user's gestural interactions with a mobile phone? In the application *fred :-),* the smartphone speaks to the user as if he or she were its "friend", hoping to start a relationship. The experience relies on a smartphone's many sensors (touchscreen, front-facing camera, microphone, accelerometer, and gyroscope). The user has to perform different gestures (see figure 1): smile, talk, tickle, stroke, pinch, tap, shake, play with the light, and the volume. How do the different interactions contribute to the interactive narrative and the building of emotions?

Gesture And Meaning

Yves Jeanneret (2000) claims that the simple act of turning the page of a book "does not suppose a priori any particular interpretation of the text." However, "in an interactive work clicking on a hyperword or on an icon is, in itself, an act of interpretation" (Jeanneret, 2000, p.113). Jeanneret further suggests that the interactive gesture consists above all in "an interpretation realized through a gesture" (Jeanneret, 2000, p.121). However, the distinction that Jeanneret proposes between turning a page and clicking on a hyperlink is not necessarily obvious and could be criticized. Moreover, the limits of *interpretation* are stretched quite dramatically if any clicking is considered as interpretative. It can yet be pointed out that, in an interactive work, the gesture acquires a particular role, which fully contributes to the construction of meaning (Bouchardon, 2018). This is the case in the interactive narrative *fred :-).*

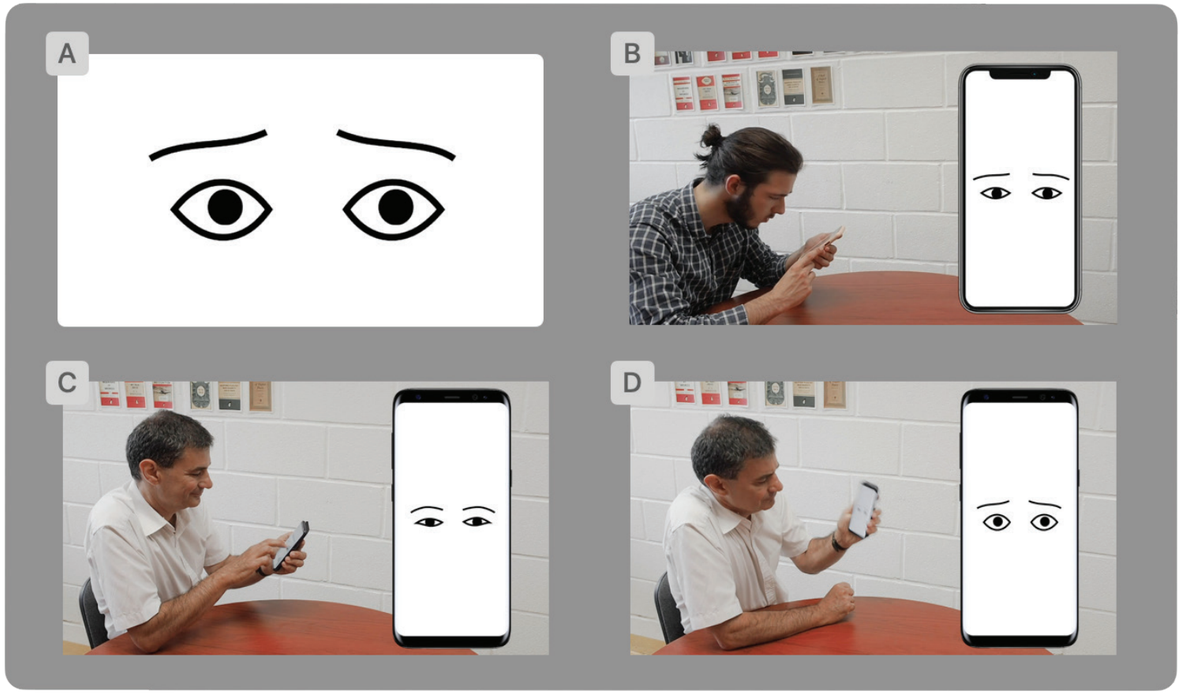

Figure 1. A) fred's eyes, B) talk, C) tickle, D) shake

Some typologies of gestures already exist (see for instance the gesture icons in figure 2 which are listed among others in (Andrew, 2020)), and the repertoire of these gestures is continually expanding. In *fred:-),* these gestures allow the story to

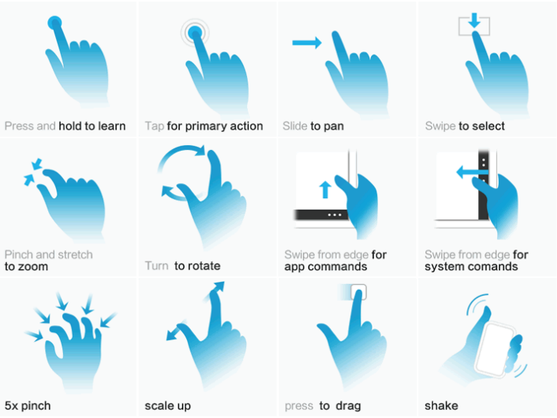

Figure 2. UX Gesture Icons by Gaoyounger

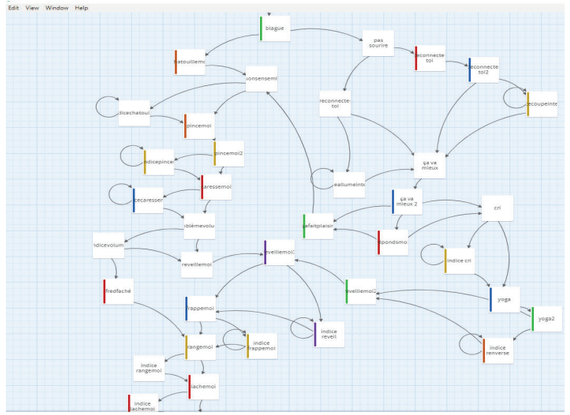

Figure 3. An excerpt from the scenario with Twine

unfold. The objective was to articulate these gestures with the emotions of the character.

A Twine-Based Gestural Story

fred :-) is based on a scenario written with the open source software, *Twine* (https://twinery.org/). *fred :-)* has a hypertextual structure (cf. figure 3), and its originality lies in the fact that the passage from one step to another can only be realized through different gestures (and not via a mouse click on a hyperlink, as in many Twine-based stories). There is no link or reactive element displayed on the interface. You can only see the eyes of fred. This

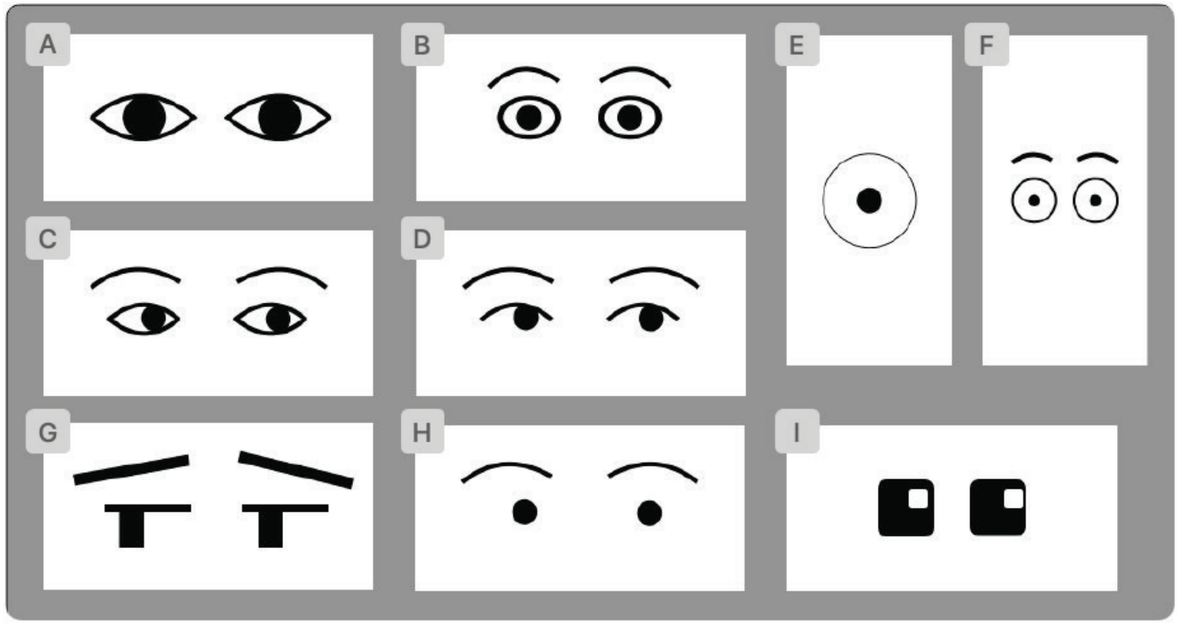

Figure 4. Visual exploration for fred by the graphic designer Alexandre Truong

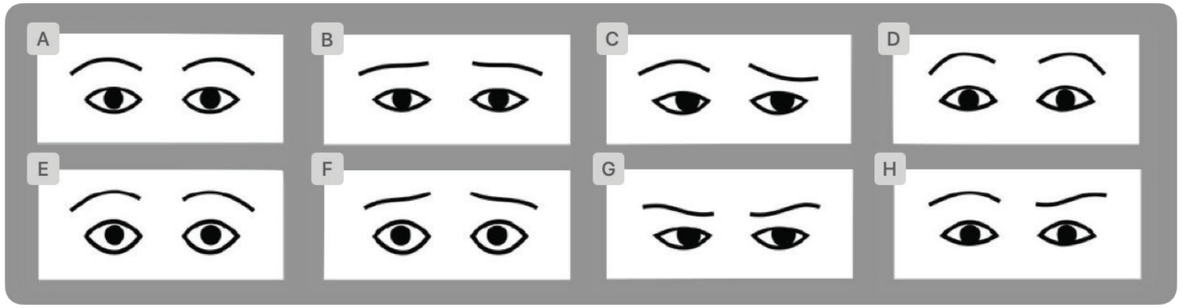

Figure 5. Expression of different emotions: A) neutral, B) sadness, C) contempt, D) joy, E) surprise, F) fear, G) anger, H) disgust

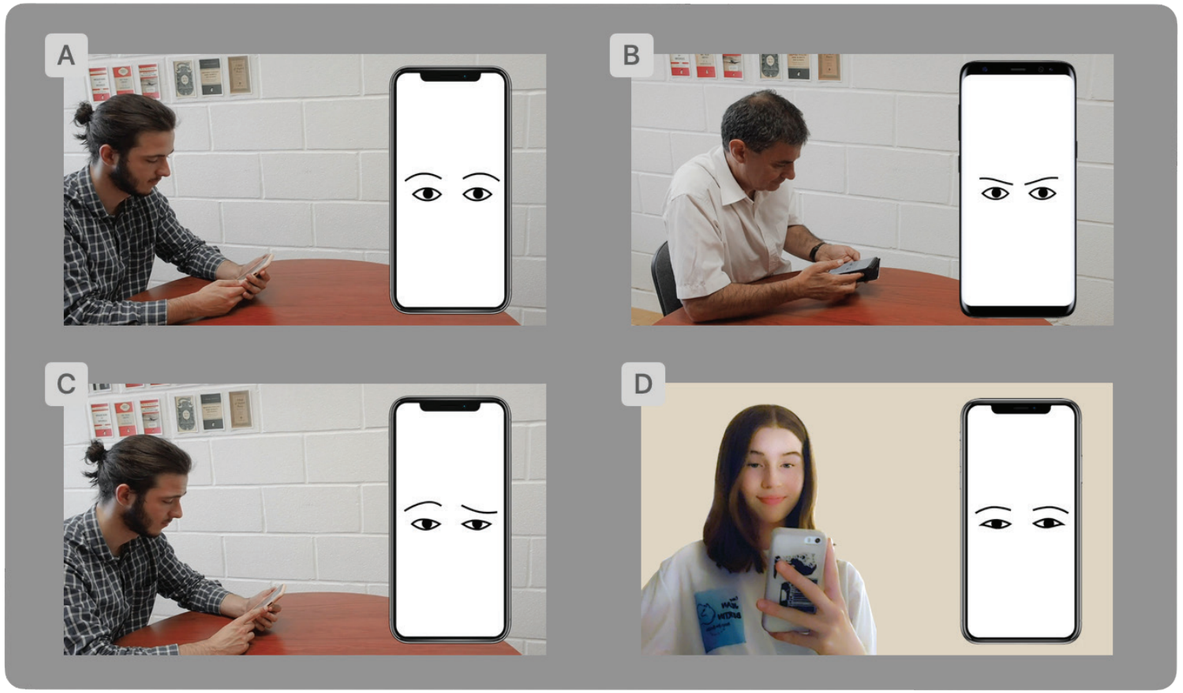

Figure 6. A) neutral, B) anger, C)contempt, D) joy


Musique
Recopie
de l'écran

increases the user's impression that he/she is interacting with the character.

The Emotions Projected Onto The Bot

Intimate relationships between bots and human beings may begin to form in the near future. Market forces, customer demand, and other factors may drive the creation of various forms of bots to which humans may form strong emotional attachments.

Which emotions can one project on a bot? Two eyes are enough to project many emotions. First we worked on the representation of the eyes. Several graphic sketches were created, designed to be easily animated (low geometric complexity) and simple enough to avoid the "uncanny valley" (cf. figure 4).

Intimate relationships between bots and human beings may begin to form in the near future. Market forces, customer demand, and other factors may drive the creation of various forms of bots to which humans may form strong emotional attachments.

Design C was eventually chosen, as it turned out that eyelids as well as eyebrows were required to clearly represent a wide range of emotions.

Then we worked on the representation of different emotions (cf. figures 5 and 6). The voice plays a very important role. When the user starts the application, there is a random choice between a male and a female voice (both for the English and for the French version). What do we feel for fred? Empathy or identification? Françoise Lavocat (2016) postulates that empathy is based on the hampered desire to help the character, to penetrate his/her world. Other authors consider that identification may be linked to passivity (in the sense of non-interactivity), passivity which would make it possible to absorb everything that the character experiences. And actually, fred tells us that in many aspects we bear a resemblance with him/her.

With *fred :-),* we might feel some empathy, but there is above all a reversal of situation. Fred plays with us, with our reactions and gestural manipulations, so that in the end, the feeling is mostly reflexive: how do we feel when we project emotions onto a bot?

Digital Literacy

Through a series of interactions, fred :-) enables users to become aware of the constraints and possibilities of smartphones and makes them reflect on the relationship they have with these devices. It is also a digital literacy challenge. For instance, in one branch of the scenario, the user is asked to disconnect from the internet. To do that, the user can activate the flight mode for instance (figure 7).

Figure 7. (pages 45-46) The user is asked to disconnect from the internet by activating the flight mode.

In the end, the users will hopefully become familiarized with the different possibilities of their smartphones, particularly in terms of gestures.

This story for smartphones is first and foremost a gestural and reflexive story.

The creation *fred :-)* may "touch" teenagers in particular and make them reflect on the emotional relationship they have with a smartphone, and more broadly on its use.

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Details

fred :-) is freely available on both stores, in English and French.

-Play Store: https://play.google.com/store/apps/details?id=com.utc.fred

-App Store: https://apps.apple.com/us/app/fred/id1466792875

Video capture of some interactions:

-https://youtu.be/iLg5dTQgcQI (English)

-https://youtu.be/keYj7bJEwd0 (French)

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CRITICAL GAMEPLAY: HEALER

Lindsay Grace

Introduction

Healer is a game designed around one of the oldest digital game mechanics – shooting. The goal of the project was to critique the assumptions around the shooting mechanic of historical games. While games as early as *Space War* offered shooting, it wasn't until such shooting was historicized that it really adopted a strong link to historical narratives. Games such as 1942 played to the then popular romanticization of World War II war actions and the destruction they caused as often portrayed in films (Pollard, 2002). It is one of several games in the Critical Gameplay game series.

The Critical Gameplay project (Grace, 2012) has always endeavored to critique the conventions of digital play as a counterpoint to the narratives of popular games. It aims not only to remind players of other ways to play, but also to the ways in which the meaning and meaningfulness of such play changes through the alternative design of what we practice and explore in games. The work draws heavily from the body of literature in psychology that evaluates the purpose and benefit of play (Brown, 2009). It also draws from the industrial design practice of critical design (Dunne and Raby, 2001).

Biologists, anthropologists, and psychologists have all asked the fundamental question – why do we play? The question is not merely a philosophical one, but it is a practical one. The research indicates that play is innate not only to humanity, but to much of the animal kingdom as well. This innate need to play, implies that play serves more purpose than society may credit it. It is not merely about the frivolous expense of energy or the need to escape. It is, from the research, a very functional need (Smith, 1982) which sometimes applies to video games as well (Bardzell & Bardzell, 2013).

Play offers the human animal several things. First, it serves as an opportunity to practice. Play fighting and role play are common play activities witnessed across many cultures with obvious benefit in the real world. Former U.S. National Institute of Mental Health program director Stuart Brown emphasizes the nature of such play through an anecdote. He describes a scene in which two predators meet and through the universal signs of play, engage in play (Brown. 2008). This anecdote is often his jumping off point for describing how universal play is. His perspective is informed by a lifetime of play research, heading the National Institutes of Play (Brown, 2009) and shared by game researchers like Brian Sutton-Smith (2009).

The universality of play is often ascribed to play's practice. Learning to hunt begins with learning to play hunt. Learning to protect one's self, is similarly learned through the play of play fighting. In the human world, the myriad of roleplay activities that children engage in, from playing doctor, tea party or dress up all serve a purpose. They are an opportunity to practice an element of the adult world. Such play offers the opportunity to understand through practicing social norms, or routines, or in the case of playing doctor, getting comfortable with the sometimes uncomfortable realities of living (e.g. preparing for an upcoming doctor's appointment involving an inoculation). Playing kitchen and cooking imaginary meals is role play for a very basic adult responsibility and eventuality, feeding oneself. Role play helps its players learn about social expectations, interactions and operations (Rogers and Evans, 2008).

But play is not solely about practice. Play is also about experimenting, the often acknowledged second benefit to the human animal. In role play in particular, the improvisational nature of the play allows the player to explore unscripted scenarios. It allows the player to explore in ways that the mind would do less effectively if it just thought about those scenarios

Ultimately, the difference between play and its real-world equivalents is safety. Just as sports have rules and borders to demarcate the start and end of play, so too does all play. Generally, play ends when it ceases to be safe. One does not play with knives typically because it is not a safe toy. The end of a session of jokes is sometimes concluded when the jokes reach into the unsafe space of something too personal, too real or too discomforting outside the real world.

This is where the primary opportunity for critical gameplay arises. Critical gameplay adopts the fundamental design and research assumptions about play and incorporates the discomfort that bridges play into the real. This has previously been described as discomfort design (Grace, 2014). Discomfort design aims to seize upon the moment in which the play abruptly asserts its relationship to the real world. When the play itself ceases to

be safe, less in terms of physical harm and more toward the moment that players realize that the play has more meaning than they had previously recognized. It is not safe for their previously held assumptions, aiming to instead make them uncomfortable with it. It is much like a metaphor that reveals itself in story, unfolding to become more apt than the reader expected.

This is also where the experiential design of games overlaps with the narrative experience of a game. As previously published (Grace, 2019), games are experienced by players as a kind of narrative. Players interrupt the events of their play as sequence. But unlike third person or omniscient narratives, digital game players in particular, often read the play experience as a first-person narrative. A player does not read the events of their play, nor do they watch them, they do them. Even in the case of 3rd person or other play perspectives, the player's direct relationship to the action in-game frames the experience as their doing. The player is less witness and more participant. So much so, that unlike some other narrative forms, the player's inaction means the narrative's inaction.

From a futurist perspective, a written book is a narrative that has at all times its future, past, and present. It is somewhat a representation of simultaneity, encoded in the convention of printed (or digital organized) pages. The narrative is encapsulated in the pages of a book, and viewing the book is like viewing its reported story's past, present, and future. A game on the other hand has a much more varied narrative. It may give the scaffold of other narratives, with a clear, middle, and end. But the variability each player adds to it changes the surety of that experienced narrative.

Of course context matters. Reading a book in two different decades can be a very different experience, as can the difference between reading it on a train and reading in a library. But what's novel about games is that they too have this variability and the variability of self-report. A reader rarely self reports the experience of a book to include the turning of the pages, the weight of the paper, the skipping of white space, the resting between chapters and so forth. A watcher of film does not choose to include the moment they fast forwarded past the credits or all the other things they may do as part of a movie theater experience. However, the player does.

In a platformer for example, a player articulates and recalls each step. While the core narrative of a digital game might be about the boss at the end of a level, the player's narrative includes the jumps they made to get there. The equivalent would be for the reader to perceive the narrative as the effort they made in reading each sentence as well as the sentence's meaning.

Ultimately, the difference between play and its real-world equivalents is safety. Just as sports have rules and borders to demarcate the start and end of play, so too does all play.

These unique properties of play provide a unique opportunity to provide experiences that are not only personally meaningful, but affective in ways that exploit play's natural ability to serve as a platform for practice and exploration. Players are not only experiencing the narrative of the game, they are practicing and exploring it. Coupled with the epiphany moments possible through discomfort design, the goal of critical gameplay is to turn such experiences into social impact experiences that change the way players perceive not only the games they play, but the world around them.

Healer Motivation

Healer continues the general motivation of the Critical Gameplay series. Drawing from the tenets of discomfort design, the primary motivation for the game centers on getting players to become more critical of war reenactment, recreation and re-creation. While the industry of war simulation abounds both in the real world, through historical reenactments (Turner, 1990), and through the myriad of exceedingly popular war games like Call of Duty WWII (Raven, 2017), it is evident that while play serves as practice, it's not always evident that we as players need to practice for war.

Philosophically, if players are always practicing for war, it implies that waging war is a future valuable experience. Just as children role play to be adults, it could be argued that playing war is a way to get ready for the wars they wage. What would happen if players were made uncomfortable with that assumption? What would happen if players were practicing healing from the scars of war, instead of recreating them?

Like many Critical Gameplay games these questions served as the foundation for design. The fundamental question is ultimately how to change the player's relationship to war while still allowing them to recognize the historical narratives. If play is practice, how can the player be encouraged to practice something other than war reenactment? Are there game verbs that are relatively unexplored that not only meet these objectives, but do so in a way that is equally satisfying?

Of all the many ways digital games represent war, they may help players reenact them, or prevent them, but they really help players undo them. Undoing war means recognizing it's mistake, acknowledging it, and seeking to correct it. It is not erasing, but instead correcting. In doing so, perhaps there is an opportunity for players to recognize both the wake and its effect. To see that war is more than merely reaching objectives and staying alive. That there is collateral damage, that there is dishonor, and that there is so much left behind that it reverberates generations into the future.

As part of the critique in Critical Gameplay, there's a perspective of war simulation as fundamentally naïve. It is sometimes an immature perspective on an exceptionally mature subject. War does not start with the launch of a flying ace from a carrier and end when your plane is downed. It is not anonymous, but instead immensely personal. The games of 1980's championed war and its soldiers, but rarely memorialized them. They failed to recognize that the trajectory of war is not just the

dead, but all the lives that participated (willingly or unwilling) in it. Why hadn't more games aimed to be a memorial to war, a kind of docugame offering the more developed perspective that war has heroes, villains, and a whole lot in-between? Why didn't the experience of these games leave players feeling more like they fixed a wrong, instead of encouraging them to do the same wrongs again?

Healer Subject

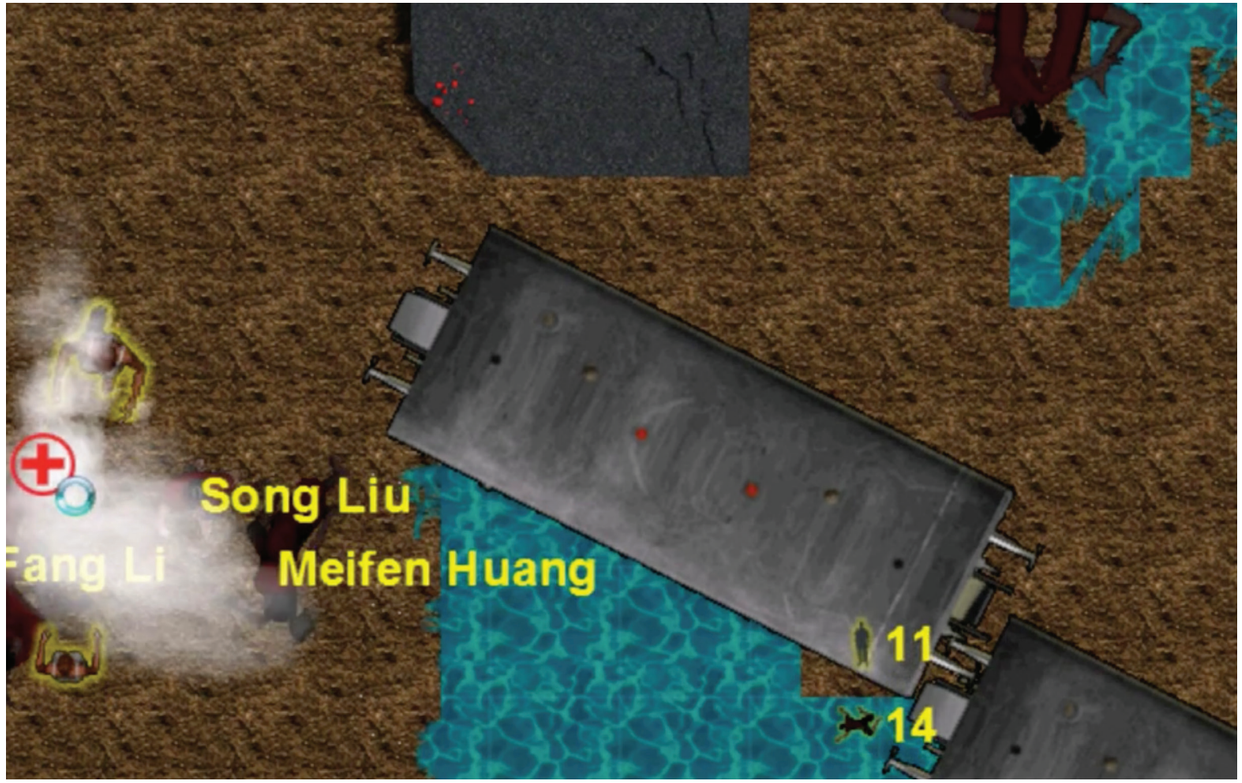
When looking at the history of war and atrocity, there are sadly, far too many subjects from which to choose. Both World Wars offer a plethora of unbelievable carnage and assault on humanity. Ancient history abounds and perhaps most upsetting, even with such history, atrocities on scale with some of the largest 2 millennia happen in the 20th and 21st century.

In choosing a subject for the game it seemed evident that World War II was an appropriate era from which to choose. In part because so many digital games titles have chosen it as a subject. In part because it has a history of romanticized narratives and later critique of that romanticisation.

Of all the atrocities from which to choose, the Nanjing massacre offers a subject aligned with the many World War II games while highlighting brutality to non-combatants. The massacre, also know as the rape of Nanjiing (or Nanking) occured over 6 weeks begining in December of 1937. The Japanese imperial military had captured the then capital city. The soldiers raped and killed between 50,000 and 300,000 victims, a number which has been contested for several decades. The event itself has been subject to the ebb and flow of denial, making its fact and fiction the center of debate.

This event is important in the context of games for several reasons. First, it was executed by one of the birthing nations of the video game industry, Japan. Second it, unlike many other atrocities, was the subject of much debate. It's fact and fiction have been the subject of tension between China and Japan for years. This border between fact and fiction seemed appropriate for a game, especially within the context of Baudrillard's Simulacra and the desert of the real (1994). Just as game recreations of war seem to blend reality with the fictive stories designers aim to tell, the game must rest between the few remaining documented elements of the masssacre's history and the stories of it. The game itself is based on a desert of the real. It's also an historical note that has seen limited media. Lastly, the events of the Nanjing massacre are among the most reprehensible of the World War II events. Of the many precipitates of World War II, the rules of engagement commonly referred to as general as the rules of engagement (ROE) outlined in the Geneva Convention, is perhaps most important to humanity's respect of self. In short, the events of Nanjing stand as one the worst attacks on a non-combatant population.

In short, Healer aimed to be the first game that provided some sort of critical design, memorializing the history of the Nanjing massacre in a kind of pseudo-docugame. It aimed to change the player's relationship to war through both depiction and action.



Healer Implementation

Healer's motivation and historical frame encapsulate a single goal – to create a game that changes a player's relationship to war. To do so the game was designed around an unshooting mechanic. Instead of putting bullets into non-player characters, players would take them out. The first prototype of the game was created in 5 days as part the conventional Critical Gameplay design practice. The goal in doing so was to optimize focus and commitment to an atypical design. The practice applies core design tenets from game jams into the personal creative practice. The original prototype was created by a single designer, developer and artist.

The most interesting element of implementation, the unshooting mechanic proved to highlight a bias in game making software. The original prototype was built with GameMaker, which like many game engines of its day used a target-source model for detecting object collision. In short, many game engines are built on a conceptual model that assumes the player will control an object and that

object will emit some other object to affect other elements in the game world. These elements have fundamental physics that detect collisions, or overlap between a source object and its destination. This is a completely logical model for shooting games for example, as a shooting game involves moving a character object, allowing other objects to emit from that character, and then detecting when those objects hit other objects. What this model doesn't afford is for an easy implementation of the opposite. That is, a source-target frame.

By analogy, it's similar to a game engine biasing away from supporting passive voice or perspective shift in a narrative. The game engines expect that the player object, the moveable object, is also the object the focal action object. As a result, the engine made it much harder to code, extracting bullets from non-player characters than it did sending them into non-player characters. Philosophically, it could be argued that game engines themselves bias toward specific game mechanics and affirm the conventions of existing gameplay. This is a subject on which I have published previously and framed as the philosophy of software (Grace, 2009). It's also within the domain of captology (Fogg, 1997). To thwart the biases of the engine, the game was implanted by shooting invisible bullets at the target to trigger extracting bullets. This made the trigonometry of calculating angles toward the player character significantly easier.

The game was converted from prototype to final implementation in 2018. The game was recreated for modern operating systems, with updating resolution (higher resolution graphics), game operating speed, controls and some content. It was also converted from prototype to full release as an arcade

Figure 1.

game, which involved manufacture and assembly of two distinct, arcade-style cabinets in which to play the game.

The two final versions of the game are depicted in Figure 1. (above) and Figure 2. (pages 53-54) These final versions use custom hardware to create an arcade version of the game that harkens back to the era of computer games it aims to critique. Much like a *1942* cabinet the game is implemented in a stand alone arcade and presented in 4:3 aspect ratio.

While the game itself is a small gesture it aims to help both players and designees see the propensities for such play. It, like the other Critical Gameplay games, is designed to plant a seed that inspires a further exploration, research and implementation.

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REMEMBERING THE DEAD

John F. Barber and Greg Philbrook

We Have Failed To Stop the Killings

Marcus G. Stokes . . . Lakeitha M. Stokes . . . Tera R. Agee . . . Teresa R. Thomas . . . Demetrius R. Thomas . . .. At the time of this writing, these are the latest mass shooting victims in America. Their names, and hundreds more, are displayed individually on a computer screen, along with age, place, and date of death.

The display of victims' names is an act of remembrance, intended to highlight the loss of human life by gunfire and promote the will to seek solutions to this and other forms of violence. Through its use of technology, *Remembering the Dead* replaces direct interaction, typical of traditional interactive storytelling, with internal, personal remembrance, and reflection, seeking to engage audiences in emotional stories of failed social and civic justice.

This discomfort, this disjunction, this departure is intentional, to make clear that people continue to be shot, and killed, by other people with guns. *Remembering the Dead* is visceral, a denial of ignorance, a reminder that, as a nation, we have failed to stop the killings.

FIGURE 1. Remembering the Dead is a digital storytelling installation, a memorial to victims of mass shootings across America,1880s to present.

Prevalence of Gun-based Violence

Gun Violence Archive (GVA), an independent data collection and research group, reports 15,208 gun-related deaths for 2019, excluding suicides. This number is slightly less than the air miles one would travel from Salt Lake City, Utah, to Paris, France, then on to Hong Kong, and finally, to Honolulu, Hawaii. All types of gun violence are included in this total: murder, homicide, accidental shootings, domestic violence, home invasions, drive by shootings, and mass shootings (Gun Violence Archive).

GVA defines mass shootings as incidents where four or more people are shot or killed at the same general time and location, not including the shooter. This numerical value is the only criteria for categorizing mass shootings. No subcategories, other definitions, or circumstances are used to alter the count. In this way, all those injured and/or killed in mass shooting incidents are considered.[1]

GVA reports 417 mass shooting incidents across America in 2019, more than the calendar days of the year (Gun Violence Archive). These mass shooting deaths are approximately 2.75 percent of the total gun related deaths for 2019. Despite this small percentage, the horror of mass shootings is not trivial. People as targets, shot and killed in private residences, places of business, entertainment venues, learning centers, and places of worship shatter belief that we can gather as a community

or as private citizens and conduct our lives without fear. One outcome is the unfortunate reality of children growing up while practicing active shooter drills in school.

Despite the horror, mass shootings seemingly register just above disinterest in the national consciousness. Media reports quickly shift from victims to the motivation, mental state, or ideology of the perpetrator(s). Attempts at gun safety, even research of gun violence, are quickly sidelined by powerful lobbies and their cadre of purchased politicians. Like our societal failures in addressing mental health, The United States has some of the weakest gun laws among developed nations around the world. So, perhaps we have grown calloused. Perhaps we just don't care. Or, perhaps we do care, but mass shootings are too chilling a reminder that life, and its many aspirations and activities, can end quickly, brutally. Perhaps the deaths of victims seem, somehow, surreal, distant, and impersonal. Perhaps it is better to keep our heads down, eyes averted, trusting others to keep us safe. For whatever reason, though desire and practicality, it is easy to ignore mass shootings, and the stories associated with those killed.

Call To Action

Remembering the Dead seeks to deny ignorance of mass shootings. The collaborators of this project, John Barber and Greg Philbrook, admit their own guilt in ignoring mass shootings. They were distant, removed from their lives. Something that happened to other people. People they did not know, with whom they did not share stories.

But, on 1 October 2015, ten people were shot and killed at Umpqua Community College in Roseburg, Oregon. Barber and Philbrook teach at a university in Washington state, close enough that the local news media sent reporters to the scene.

For whatever reason, though desire and practicality, it is easy to ignore mass shootings, and the stories associated with those killed.

Certainly it was close enough to make the collaborators think, "What if this happened on our campus and the people killed were people we knew, with whom our lives intersected?"

Following the mass shooting at Umpqua Community College, Barber and Philbrook felt compelled to respond, to recall those individuals killed, their life stories abruptly halted by bullets. They created *Remembering the Dead* as a physical, virtual, and conceptual memorial to lives and stories lost to gun violence.

Conceptual Framework

The conceptual framework for *Remembering the Dead* is inspired by Ray Bradbury, George Bush, Jr., Jacques Derrida, and two kinds of death, physical and memory.

In his novel *Fahrenheit 451,* Ray Bradbury describes a dystopian future where books are outlawed and burned. People memorize and recite entire books so that their ideas will not be lost.

A similar commitment was suggested in response to the ban by President George W. Bush's administration and the U.S. Department of Defense against photographing coffins of those killed in Operation Iraqi Freedom, The Iraq War, 2003-2010, in which more than 4,000 U.S. troops were killed. The ban on photographs of coffins was overturned in December 2009. An online movement encouraged citizens to memorize the names of three individuals killed in Iraq and use them whenever possible. Those killed would not be forgotten. Jacob H. Allcott...Alessandro Carbonaro...David J. Grames Sanchez.

French philosopher Jacques Derrida suggests there is perhaps no more fundamental self-affection than for one to speak his or her name, even through recordings. Through recordings, past events and people dead or radically absent are no longer spectral voices. They come to life, to presence, to the present, and affect those who will listen. "[Recording] is reproduction as *re-production* [emphasis in original], of life itself... [W]hen someone speaks he affects himself. I am...touched, presently, by the recorded speech of someone who is dead. I can, here and now, be affected by a voice from beyond the grave.... A miracle of technology" (Derrida 2001, 70-72). In absence of recordings, survivors can speak the names of the dead, re-producing connection and remembrance.

Remembering the Dead also draws from two concepts of death, physical and memory. With physical death the body ceases to function. The person is no longer among the living. With memory death, when survivors no longer remember the deceased, that person no longer exists. Respite from memory death is sought through community service, creative works, and family descendants, something to evoke the name of the dead among the living. Through such endeavors, the deceased goes forward in time. As long as we remember the names of the dead, we remember the stories attached to their life endeavors.

Memorial Manifested

Memorials can help us remember. Memorials, whether to victims of wars, natural disasters, accidents, or natural causes, have long been utilized to create conceptual and social spaces in which the living can recall and reflect upon the dead. Such memorials most often manifest as physical objects, located at significant sites. But, physical memorials must be visited in person. They may be difficult to update, may lack from regular maintenance, may present access challenges, and may be removed.

Figure 3. (pages 63-64) Remembering the Dead prompts outcry against what is lost to mass shootings in America: stories of humanity, lives, achievements, dreams, and aspirations


Dustin Houghton
31, Indianapolis, Indiana, 20 January 2015
View the artist statement.

Remembering the Dead seeks to skirt these issues by manifesting virtually, physically, and conceptually. At its heart, *Remembering the Dead* is a dedicated online program and database maintained by Barber and Philbrook. The database is updated with each mass shooting.

Virtually

As a virtual memorial, Remembering the Dead is a website available to anyone, anywhere with Internet access and display technology. Once evoked, this website displays names of gun violence victims. Each name is displayed individually, along with age, place and date of death. The most recent victims are displayed first, followed, randomly, by others from the work's database. As the name of each victim is displayed that name is spoken using text to speech technology. After its display, each name is added to a memorial list in the screen's background. This process continues, eternally. With each name displayed, the memorial list grows longer. With each name spoken, the loss of human life becomes more tangible.

Physically

As a physical, multimedia memorial, *Remembering the Dead* manifests as a computer screen atop a bespoke wooden cabinet, representative of both a bullet and a tombstone. A bed of empty bullet casings, hundreds of them, mostly 9mm, a common caliber used in gun violence, surrounds the screen. Inside the cabinet is a computer and sound system. As each name is displayed, it is spoken using text to speech technology.

Figure 2. Names of mass shooting victims are spoken before being added to the ever-growing memorial list in the screen's background.

Conceptually

Conceptually, *Remembering the Dead* manifests as an act of recall and remembrance of those killed by gun violence, their presence experienced by viewers of the work who, in seeing and hearing victims' names, are connected to the victims and their muted stories of ambition, aspiration, achievement, and accomplishment. This connection provides a liminal portal fostering emotional connection and affection.

Connection with Exhibition Theme

What then is the connection with interactive, digital storytelling? One might argue that the "norm" of interactive storytelling is for participants to evoke action using an interface, which then prompts response. This action-reaction moves the storytelling forward.

Remembering the Dead challenges this approach by exploring interactive storytelling internally, the victims and their stories remembered, immediate and present. Thus, the interaction becomes less a process of doing actions, and more an effort to engage the audience emotionally in a story about the loss of life to gun violence.

How does this effort relate to the exhibition theme 'The Expression of Emotion in Humans and Technology'? By showing and speaking the names of those killed in mass shootings across the United States, *Remembering the Dead* provides, through technology, a context for audiences to consider their emotional reactions and responses to this staggering and ongoing loss of human life.

Through its use of text to speech technology, *Remembering the Dead* returns to spoken voice as the basis for storytelling.

Purposes

In sharing its story, *Remembering the Dead* has two purposes. First, awareness. By combining sound, technology, and culture, with a focus on listening and reflection, *Remembering the Dead* foregrounds awareness of mass shooting victims as people with lives, dreams, aspirations, achievements, stories.

And, second, activism. Sharing this information in a responsible, respectful manner will, hopefully, prompt community outcry against what is lost to mass shootings in America: humanity, lives, achievements, dreams, aspirations, and stories of sons and daughters, mothers, fathers, wives, husbands, friends, sisters, brothers, cousins, aunts, uncles, nieces, nephews, grandsons and granddaughters, grandmothers and grandfathers.

Conclusion

Jeannie M. Ray...Helen Mason...Ellis Max Mansfield…. These names, and hundreds more, are part of *Remembering the Dead*, an experiment in expression of emotion in humans and technology, and a work of reflective interactive digital storytelling focused on people killed in mass shootings across America, 1800s to present.

Through its use of technology, *Remembering the Dead* replaces direct interaction, a primary component of interactive storytelling, with internal, personal remembrance and reflection on stories of lives cut short, of dreams unfulfilled. Following the exhibition theme, expression of emotion in humans and technology, *Remembering the Dead* provides, through technology, a context for audiences to

consider their emotional reactions and responses to the staggering and ongoing loss of human life to gun violence.

As both a memorial and interactive storytelling project, *Remembering the Dead* asks viewers to reflect on stories of lives cut short, of dreams unfulfilled. As an experiment in expression of emotion in humans and technology, *Remembering the Dead* promotes an autonomous zone that evokes a physical presence, and demands attention, interaction. Within this space new perceptual, phenomenological, and sensory engagements are prompted through the act of remembrance and reflection. Through engagement, viewers assert the humanity of the victims. Hopefully, by remembering the dead, we can stop future killings.

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Footnotes

1 Gun Violence Archive (GVA) is against gun violence, not guns or gun owners and strives to provide an unbiased, complete view of the subject. GVA gets and verifies its data daily from over 7,500 law enforcement and government sources, and news media outlets. See https://www.gunviolencearchive.org

AUGMENTING AFFECT: INTERACTION, MATERIALITY AND MIMETIC COMMUNICATION IN AUGMENTED REALITY MOVABLE BOOKS

Lissa Holloway-Attaway and Rebecca Rouse

"[...] so the child composes into the picture."
-A glimpse into the world of children's books, Walter Benjamin (1926)

Bloom spaces are everywhere. You can start anywhere. The etching of the refrain can show up in the mundane and the material process of solving problems. The hinge between the actual and the potential can pop up as an object out of place, the sense of an absent-presence, a road block, a sticking point, or a barely audible whispering that something's up in the neighborhood. -"Afterword: Worlding refrains," Kathleen Stewart (2010)

Introduction

While many have predicted the death of the book in the digital age, such a demise has yet to occur. Instead, we see inventive new fusions of the digital and physical, as with interactive Augmented Reality (AR) books. Walter Benjamin's essay "A Glimpse into the World of Children's Books" can be seen as a prescient description of the interactive AR reader in the postdigital age (Holloway-Attaway & Rouse, 2018). Benjamin describes the alchemical, relationship between image, text, story, and the child reader who "overcomes the illusory barrier of the book's surface and passes through colored textures and brightly painted partitions to enter a stage on which the fairy tale lives" (p. 226). This performative and affective relationship between the reader and multi-sensory text casts the reader as a "theatre director" who repeatedly pores over the pictures of the book, until she knows them "like [her] own pockets," marking out a "personal place" for herself (p. 227). This kind of role-playing, where the reader and text come together as allies in deep communication may be characterized as that which Anna Gibbs calls a kind of a-subjective 'mimetic communication' (Gibbs, 2010). Not limited to human form, or even animal, this non-human kind of layered, cross-mimicry (reader as receptive performer of book content/book as performer of reader and reader's desires) creates a state of deep emotional affect, beyond pure human cognition or understanding. For Gibbs, this kind of intra-active 'mimesis' that passes between and among bodies and media (like books, but not limited to them alone) is founded on "corporeally based forms of imitation, both voluntary and involuntary and upon which literary representation depends" (p. 186). Here the book may live as the reader, and the reader as the book. Surpassing a state of emotional connection, where a reader feels stimulated to feel something by the book's content, instead the reader and book can be viscerally bonded in a more complex "plurality of domains" (p. 187). This state, Gibbs claims, may allow us to see beyond subject/object, reader/book intra-subjectivities and offers new sites for new theoretical considerations: "[R]ather than privileging one view over another, the task of [affect] theory may then be to know through which optic it is most productive to look at any given moment. Or—perhaps more difficult—to learn how to oscillate between these views" (p. 187).

This state of oscillation is at the heart of our work in *Simmer*, our Augmented Reality (AR) artist book that uses a host of material and visceral affordances to engage readers in an affective relationship with its readership. Beyond creating a state of emotional connection with the characters and situations we include in the media (technical and material), in *Simmer* we work to create an experience that shifts 'optical' perspectives and keeps the reader/body and media/body in oscillation in a shared and cooperative performance space. This is an organic space where something might grow--a potentiality for connection, if it can be activated. Kathleen Stewart defines this as a 'bloom space,' an affect-filled site full of now and future possibilities, a promissory note" (p. 402) and a world where one sits poised for something to happen, or hopes that it won't. For us, this is a site of simmering worlding, a place where connections form between a host of

bodies and materialities. In this space of promise, *Simmer* draws on a long tradition of readers doing other things with books that spans from medieval maniculae to the contemporary artist book tradition (Drucker, 2004). These flexible and dynamic forms include hybrid digital/physical books that push the boundaries between book as text, object, game, theatre, and technology. Extending the analysis of the first AR books (Billinghurst et al., 2001) and contemporary handwritten inscriptions in e-books (Hamilton et al., 2019), in this reflection, we foreground our experience as designers creating/exhibiting *Simmer* as a kind of intra-subjective bloom space for initiating mimetic connections between readers and media. As such we deepen the possibilities for emotional connections to book technologies and mix forms, genres, history, and agency as we explore the complex, negotiated, affective relationships between book, text, technology, and reader in the postdigital age.

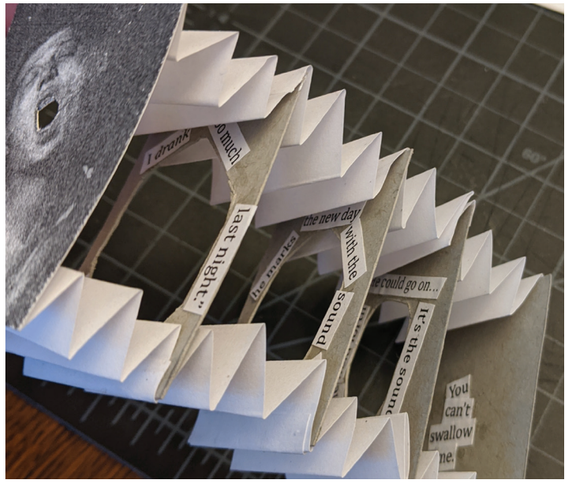
Simmer: Designing and Augmenting Affective Reading Experiences

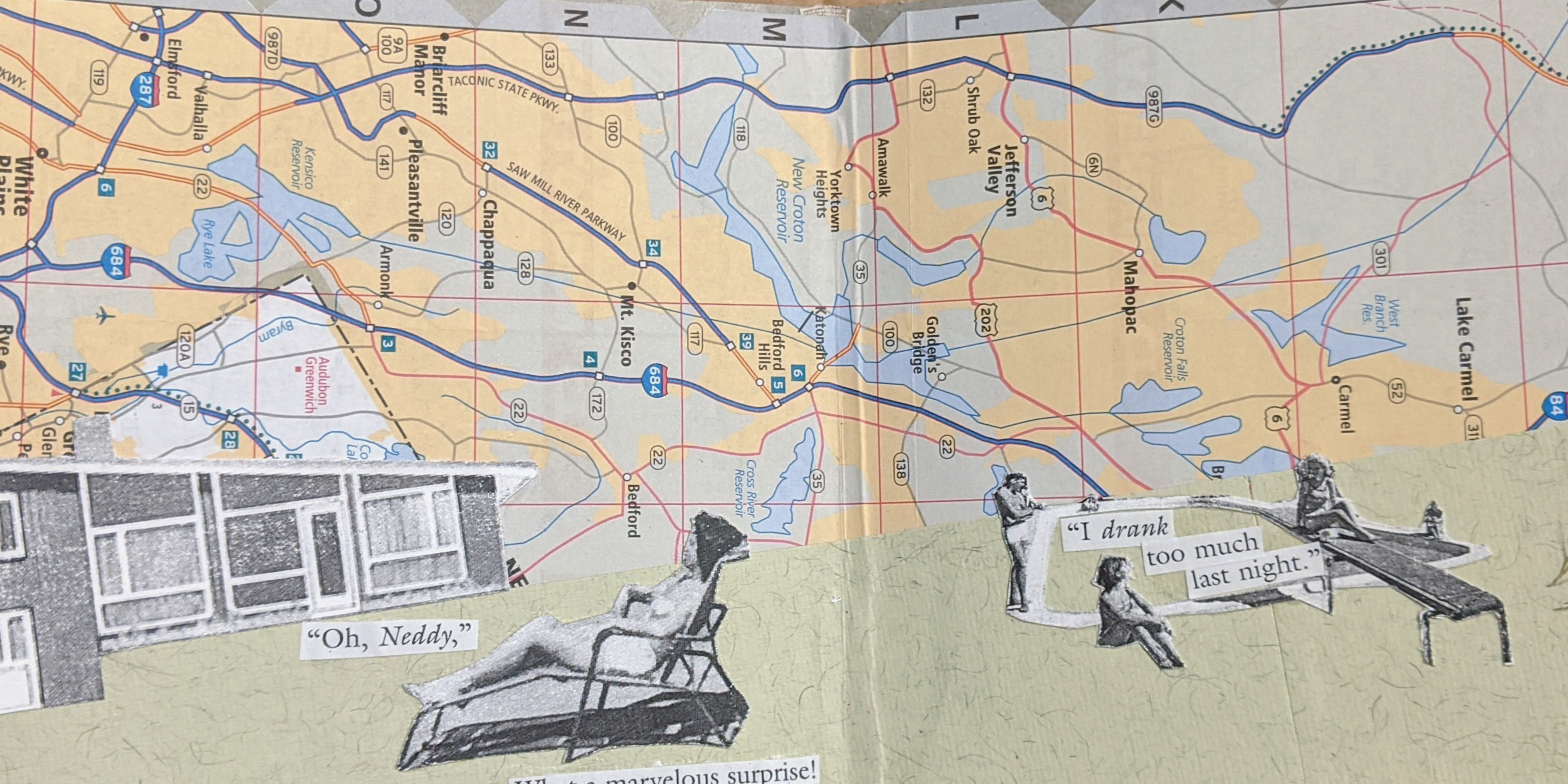
Simmer (2019), is an entirely handmade two-sided artist book and AR (augmented reality) application created in collaboration with composer Brendan Padgett. Working as a form of intra-textual and intra-subjective negotiation *Simmer* explores and expands John Cheever's classic short story, "The Swimmer" (1964) and the 1968 surreal dramatic film (*The Swimmer,* Dir. Perry) based on the Cheever story. While Cheever's landmark story and the Perry film craft an expert and detailed portrayal of its narcissistic protagonist Ned Merrill, comparatively Ned's wife (Lucinda) and four unnamed daughters are left unexplored. The women serve only as a backdrop for Ned's dark reflections on 1960's suburban marriage and family, and they are literally streamed through his consciousness and memory in a series of surreal flashbacks. Although this narrow focus on Ned's experience is arguably appropriate for Cheever's dark, psychological text, the absence of women and female perspectives also serve as an invitation to explore the ways in which the emotional violence and pain wrought by a dominating and narcissistic husband and father (Ned) resonate through the family. Filtered through the male gaze in the book and film, the women are silenced and frozen, and in our work we enervate and animate them through a process of mimetic synchrony: That is we communicate their presence through the layers of storied materials and technical affordances: through 2D linear maps and 3D domestic (Dollhouse) space, through paper doll representations, musical and audio overlays,

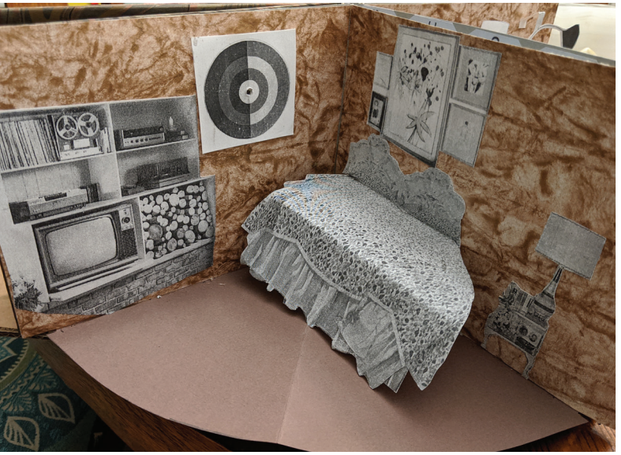
More than a re-telling of the story in an AR 'pop-up' book form, our aim is to create disruptive surfaces that communicate human emotional complexity by the multiplication for potential encounters.

and paper engineered objects, like flip books and tunnel books. Our book papers are textured, asking to be touched, the audio is sometimes whispered and confessional, meant to be overheard by a complicit listener through a mobile phone held close to the ear, and the book is then a place of invitation and exploration for the reader whom we want to engage in a multisensory 'reading' experience. In sum, *Simmer's* malleable and dynamic textual forms, moving between codex structure and many other readerly/writerly configurations (Barthes,1974), attempts to capture a host of voices and affective resonances to actively engage the reader through its varied material and immaterial (digital, psychological, emotional, acoustic, musical) surfaces. More than a re-telling of the story in an AR 'pop-up' book form, our aim is to create disruptive surfaces that communicate human emotional complexity by the multiplication for potential encounters.

Simmer opens as a linear accordion fold book or panorama that presents a re-telling of Ned's story from his perspective based most directly on the inspirational materials from the original Cheever story and the film. The long, narrow surface of the panorama, both a psychological and a physical map of Westchester County in upstate New York (where the Cheever novel and film were set) reflects Ned's long-winded, narcissistic musings connected to his suburban neighborhood, so central to his feelings of dissonance and despair. Cut-up quotations from Cheever's original text appear across the full panorama. Reflective of experimental Dadaist poetry, meant to *make something new* from the deformation of an old text, the fragments are meant to haunt the *Simmer* text and show its *almost* relation to the source materials. The cut-ups are woven into the panorama imagery, often filling the empty swimming pools that dot the landscape and which are central to the original social landscape of the novel and film, a vehicle for Ned's swimming through the neighborhood. An audio that tracks off of the panorama images presents radio-play style dialogue and atmospheric music from Ned's fantasy world, where other characters



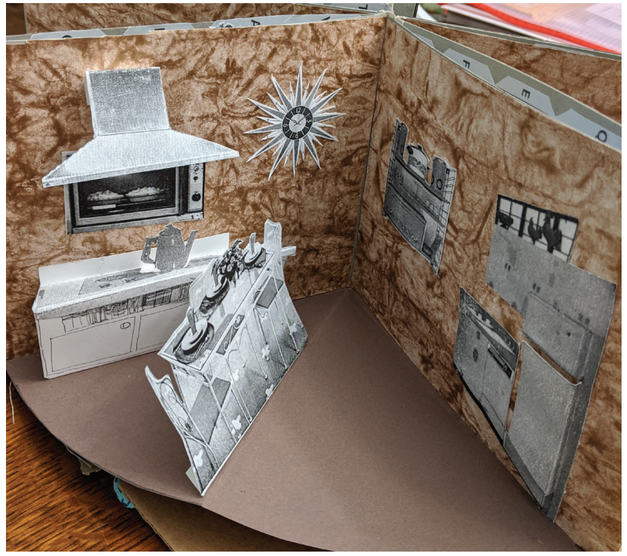

TACONIC STATE PKWY.
SAW MILL RIVER PARKWAY
Elmsford
Valhalla
White Plains
Briarcliff Manor
Pleasantville
Chappaqua
Armonk
Mt. Kisco
Kensico Reservoir
Rye Lake
Byram
Audubon Greenwich
Bedford Hills
Katonah
Bedford
Cross River Reservoir
New Croton Reservoir
Yorktown Heights
Amawalk
Shrub Oak
Jefferson Valley
Golden's Bridge
Mahopac
Croton Falls Reservoir
West Branch Res.
Lake Carmel
Carmel
"Oh, *Neddy*,"
"I *drank* too much last night."
marvelous surprise!

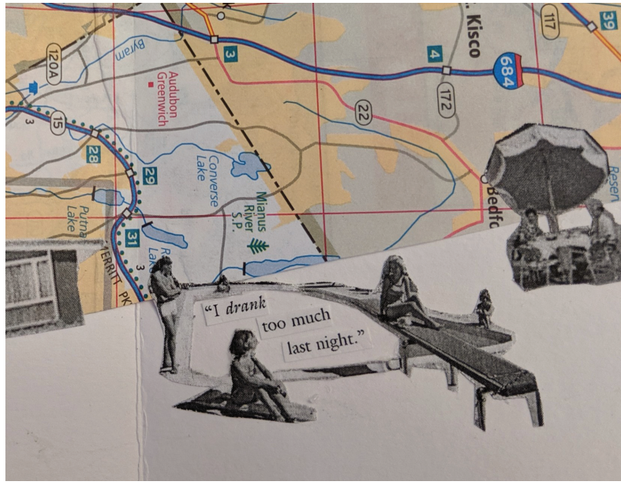


(seemingly) revere him, reflecting him as larger than life, legendary, and god-like. To show dynamic movement, even on the linear side of the book, collage elements shift as the reader moves across, and so the panorama is comprised of more naturalistic representations at the left, but then they transition to more surreal representations on the right. Even the dialogue, activated by AR trigger images from a mobile phone, shifts as Ned's fawning friends eventually sound more critical and threatening, hinting they might know and reveal his dark secrets. The *chill* bossa nova soundtrack that underscores the dialogue also changes and becomes more pensive as the reader progresses to the right. Visible across the panorama, a red thread is sewn through the book, drawing suggestive connections between houses and people in the Westchester county suburb, all lounging in a seemingly eternal cocktail hour, poolside.

But even this linear connection will eventually reveal itself as an illusion, as it crosses the book over to the other side and reveals connections to Lucinda's domestic story space, unknown in the Cheever work. The red thread, then, also makes more abstract metaphorical connections between linear and non-linear writing forms, and this dual meaning is revealed as the accordion book is turned inside-out and transformed into a dollhouse structure. As seen in the dollhouse, the red thread offers a tenuous connection between the two sides of the book, the two sides of the story. The non-linear narrative of the domestic house space, Lucinda's world, is pieced together through the reader's exploration of its objects and by manipulating a variety of traditional pop-up and movable elements (paper dolls, animated flip book, miniature book, tunnel book, flaps, a fold-out map painted with thermo-chromic paint that responds to heat, in our case, to breath and to touch, revealing hidden text when activated by the reader). These interactions are often hidden, waiting for the reader to uncover, and they present fragments of narrative to piece together, with the book acting as a form of secret keeper, and secret giver. As the book-performance escalates through reader interaction, the house is populated with a variety of historical resonances from the long history of the book through this accretion of objects for the reader to discover (e.g. tunnel books, flip books). Each of these elements is also tracked by the AR app to reveal dialogue and music. Through the interaction with objects in the domestic space, we hear Lucinda's voice for the first time, describing her experience in first-person, offered as a type of confessional audio diary. Miniature LPs also play musical themes for several of the female characters (Lucinda, her mother, Ned's mistress). These themes are created as deconstructed and introspective inversions of the cheery music from the pool party side of the book, like Ned's story, a dark companion for Lucinda.

The red thread sewn through the other side of the book finally emerges in the house through Lucinda's writing desk, ending as the thread found in the hand-sewn binding of a miniature book of poetry. The poetry is written by Emily Dickinson, calling back to another experimental writer, but also claimed as her own by Lucinda who tells of her kinship with Dickinson, with another secret 19th century storyteller. Here once again, the red thread reveals a connection to two different worlds and histories, drawn together through book matters to show their similarities, but also to refute the newness of this form of moveable AR book, as well as this kind of *hidden* story. As Lucinda's experience is revealed, we learn the devastating impact that Ned's narcissism has had on her and the family, especially the girls. These four daughters are represented by paper dolls and voiced by restored audio recordings of Thomas Edison's mechanical dolls, a (failed) experiment in technical innovation





for material storytelling that bypassed the simplicity of a printed page but reified simplistic notions of woman, machine, and girlhood (Wood 2003). Following instructions from Lucinda, the reader is invited to interact with these daughters as dolls, flat, and in the end, still voiceless This action brings the reader into a performative complicity with Lucinda and Ned, as both parents play out the pain of their relationship by objectifying their children, a sad point of intersection for the otherwise distant couple. This aspect of the storytelling pulls the reader into the story in a defamiliarizing way, to invite reflection.

Conclusion

In the introduction of Lisa Gitelman's book *Paper Knowledge: Toward a Media History of Document,* Gitelman reveals her interest in the history of the document, as both object and as evidence, as personalized knowledge. She opens by describing a

contemporary death certificate from New York City. She first describes the front of the form and then reverses it, moving to a description of the back, which is seemingly left blank, but in truth revealing evidence to be discovered if you come closer:

The back of each death certificate is blank -- or it would be, except for a list of security features to look for should you wish to reassure yourself that the truth-claiming document you hold is genuine. The seals and borders have raised intaglio printing. (Run your finger over them to check.) The bottom of the document contains a microprinted legend. (Hold the document very close or use a magnifier.) The paper has an elaborate watermark. (Hold it up at arm's length with a light behind it.) And there's a logo printed with thermochromic ink. (Warm it by rubbing your finger over it quickly to make sure it will change color.) One doesn't so much *read* a death certificate, it would seem, as perform calisthenics with one, holding it out and then holding it close, flipping it one way and fingering it another. (p. ix)

In our book, we too want to create an embodied reading experience that brings the reader and media together, to *document* an experience that may at first seem blank and silent, but which can be discovered and communicated through intimate (mimetic) connection. In this way, even in death (the inspirational Cheever text), hyper-personal experiences can be resurrected through sensory and corporeal engagement with technical and material affordances to extend (only) one emotional narrative history into many. To touch is to stimulate a process of plurality that moves beyond 'pure' abstract reading and into a reader's embodied registers of reception. In this way within *Simmer*, we address the theme of the ICIDS 2019 exhibition, "The Expression of Emotion in Humans and Technology," navigating material, technical, and emotional reading to illustrate the necessary connections among them—and beyond.

What simmers also bubbles up, and our mixed media work invites the reader to explore the raw edges of storytelling and humanity within us all, using the many affordances found in the multiple histories of the book.

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STORYFACE: PLAYING WITH THE NORMALIZATION OF FACIAL EMOTIONS

Serge Bouchardon

Log onto a dating website and find love! Make sure your face shows your true feelings. You're being watched…

StoryFace (http://www.storyface.space/, see figure 1) is a digital creation based on the capture and recognition of facial emotions. The user logs onto a dating website. They are asked to display, in front of the webcam, the emotion that seems to best characterize them (figure 2).

After this the website proposes profiles of partners. The user can choose one (figures 3 and 4) and exchange with a fictional partner (figure 5).

StoryFace

http://storyface.space

utc SORBONNE UNIVERSITES

Visage Technologies

Figure 1. The online interactive creation StoryFace

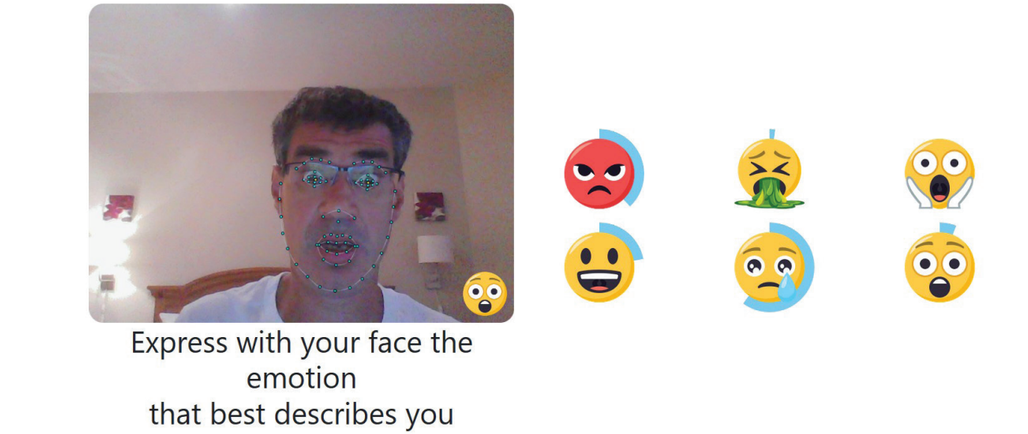

Figure 2. The user expresses the emotion that seems to best characterize them

Figure 3. A fictional partner

Figure 4. Another fictional partner

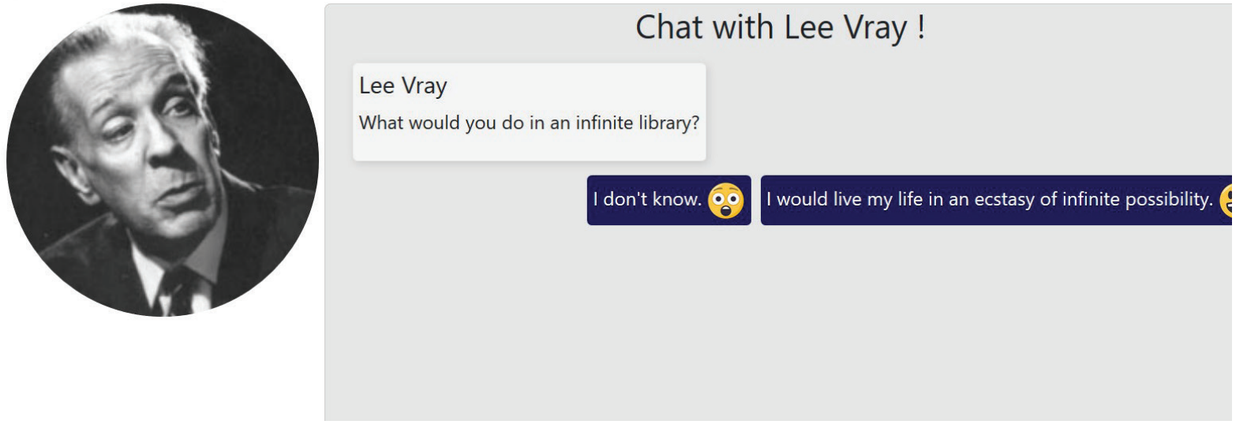

Figure 5. The chat with the fictional partner starts

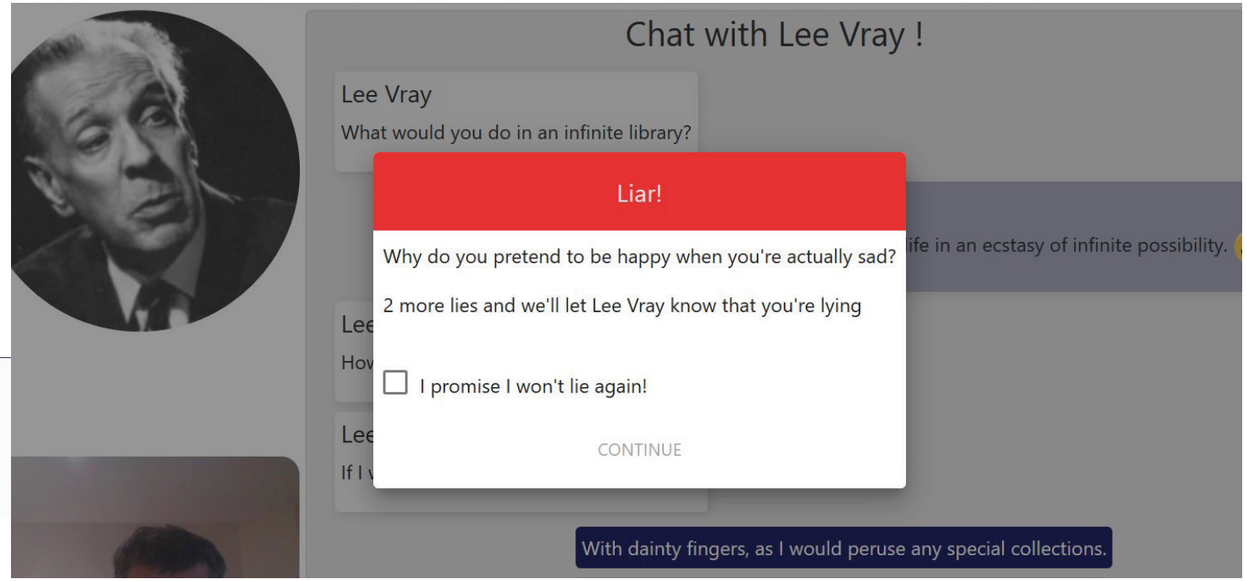

Figure 6. The user's facial expressions continue to be tracked

The user is now expected to focus on the content of the messages. However, the user's facial expressions continue to be tracked and analyzed (figure 6) and the user is compelled to adjust his or her emotions artificially so that the narrative can continue.

The Normalization Of Emotions

What is highlighted here is the tendency of emotion recognition devices to normalize emotions. Which emotion does the device expect? We go from the measurement of emotions to the standardization of emotions. More broadly, this creation deals with issues of emotional surveillance and industrialization of emotions. Some researchers put forward the notion of "emotional capitalism" to refer to the economic logics of the exploitation of affects by online platforms (Alloing and Pierre, 2017). The new approaches to the measurement of emotions through facial recognition question the privacy of the individuals analyzed, as much as the risks if these methods become a means of governance. However, among the designers of emotion capturing devices, the question of exploiting the results is not really perceived. What is striking in these devices is a command to be oneself (express your emotions) in a world of standards and norms (emotions are standardized, based on a universalist approach according to which there is a determined number of emotions common to all human

Pikachu
Pokemon looking for trainer

Published : ●
Author : markcmarino3 (Mark Marino)

CHAT EDIT REMOVE

Donald Trump
"Big League"

Published : ●
Author : cospina (Chris Ospina)

CHAT EDIT REMOVE

Edward
Teen Vamp Searching for Love

Published : ●
Author : faithbonds1 (Faith Bonds)

CHAT EDIT REMOVE

Lucy
Ad

Published : ●
Author : mvarchetto22 (Megan Varchetto)

CHAT EDIT REMOVE

sheila
sheila

Published : ●
Author : emilyduijser (emily duijser)

CHAT EDIT REMOVE

Logan Garfield
Mr.

Published : ●
Author : aaronmelverns (Aaron Sulaiman)

CHAT EDIT REMOVE

Spencer Reid
Spencer Reid

Published : ●
Author : gabbybiersach (gabby biersach)

CHAT EDIT REMOVE

Pam Beesly
Miss.

Published : ●
Author : Sakshi.0118 (Sakshi Thakkar Thakkar)

CHAT EDIT REMOVE

Chase
Mr.

Published : ●
Author : Alex.bolanos2194 (Alexis Bolanos Ramirez)

CHAT EDIT REMOVE

David Arment
Web Dev

Published : ●
Author : Username (Elijah Yap)

CHAT EDIT REMOVE

Andrew Ferrera
Sir

Published : ●
Author : sim011001 (Simon Gallas)

CHAT EDIT REMOVE

Zimon
StoryFace Character

Published : ●
Author : anferrer (Andrew F)

CHAT EDIT REMOVE

Figure 7. (pages 83-84) Any user can create fictional partners : some characters created by internet users.

beings). The recurrent reference to Paul Ekman, who promoted the universality and discreteness of emotions in a Darwinian approach (Ekman, 1970), is remarkable. In 1982 (Ekman and Frisen, 1982), Ekman postulated six basic emotions: anger, disgust, fear, happiness, sadness, and surprise (on which emotion recognition devices are mostly based), and supplemented these in the 1990s with eleven additional emotions. He thus identified the types of emotions that he considered universal, that is to say observable basic emotional expressions in unconnected cultures. This universalist and acultural approach is reinforced by emotion recognition devices, which in return tend to normalize emotions.

The Digital: *A Pharmakon*

Based on the notion of *pharmakon* of the ancient Greeks, Bernard Stiegler underlines that the Digital, like any technology, is both cure and poison (Stiegler, 2013). Techniques are ambivalent. So, there is an interesting tension between a generalized form of surveillance and exploitation of our emotions that can be done without us being aware of it (it is a form of alienation by devices, which requires a critical approach), and the possibility given by these devices to perceive our affective expressions in order to better analyze our *self-writing* and our interpersonal communications (this is the reflexive dimension of the devices, which can be perceived as positive). Emotion recognition tools can thus be useful to confront our own emotions (why not imagine such a device to help us control our emotions when we talk with someone online). By playing with the emotion capturing device, *StoryFace* highlights this tension. Being aware of this tension is part of digital literacy.

Based on the notion of pharmakon of the ancient Greeks, Bernard Stiegler underlines that the Digital, like any technology, is both cure and poison (Stiegler, 2013).

A Contributive Narrative

This digital literacy dimension (being aware of the ideology encoded in the devices) is reinforced in *StoryFace* by the contributive dimension of the piece. Anyone can create fictional partners (figure 7).

Thanks to an interface, the user can create a profile easily (figure 8), which encourages creative writing practices. This piece is also an example of contributive digital narrative insofar as it gives the user the possibility to create a character which other users will interact with. The user reads and plays

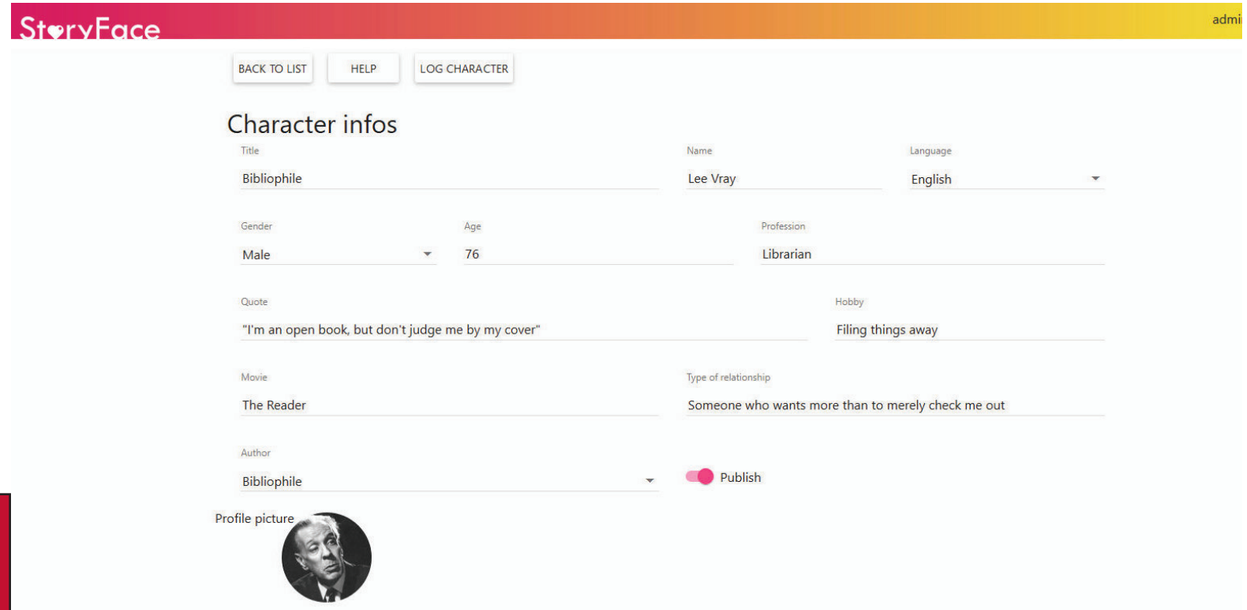

Figure 8. The contributive dimension : the interface is used to create the profile and the chat with a fictional partner.

in order to understand the underlying issues, but they can also create in order to understand them. The user can create questions and answers, and associate emojis with every question and every answer (figure 9). This gives the user the opportunity of a practice-based reflection on the relationship between the written language with words, the emojis and the facial emotions, and the way they can be interpreted.

An Interactive Narrative Based On Reflexivity

The narrative is constructed as a potentially endless series of exchanges between the reader and different characters. The narrative unfolds through the user's play with his/her own image and facial expressions. The user can play with the way they express or hide their feelings, and the way emotions that are oversimplified into emojis can be misread. The exchanges with the fictional characters are thus based on the emotions and facial expressions that the user conveys consciously or unconsciously.

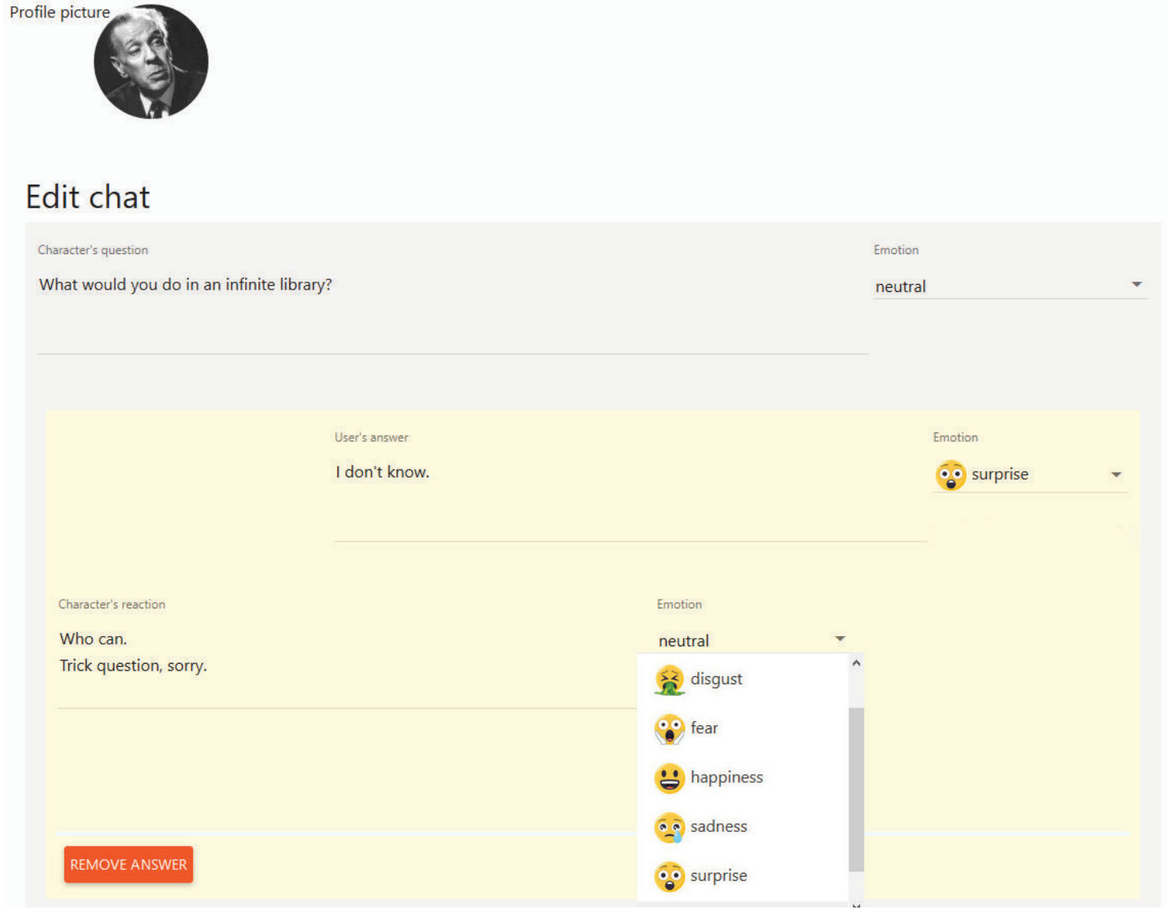

Figure 9. Anyone can write questions and answers for the chat with the fictional partner, and associate emojis with any of these.

This piece is an example of interactive digital narrative in which the user can not only interact with his/her own face but also through his/her own face. The narrative is based on reflexivity via reflection (like the reflection of oneself in a mirror), on a reflexive interaction with the technical device.

Conclusion

StoryFace could be considered as a *reflexive narrative.* With the reflection of our own image and facial expressions, and the way we can play with them, we are invited to have a reflexive attitude towards dating websites ("love of self or love of others", cf. Kessous, 2011). We are also invited to have a reflexive attitude towards emotion capturing devices and to deconstruct the ideology underlying the algorithms. In a supposedly homogenous global digital culture, do we need and want our emotions to be normalized when we communicate with machines, and with others ?

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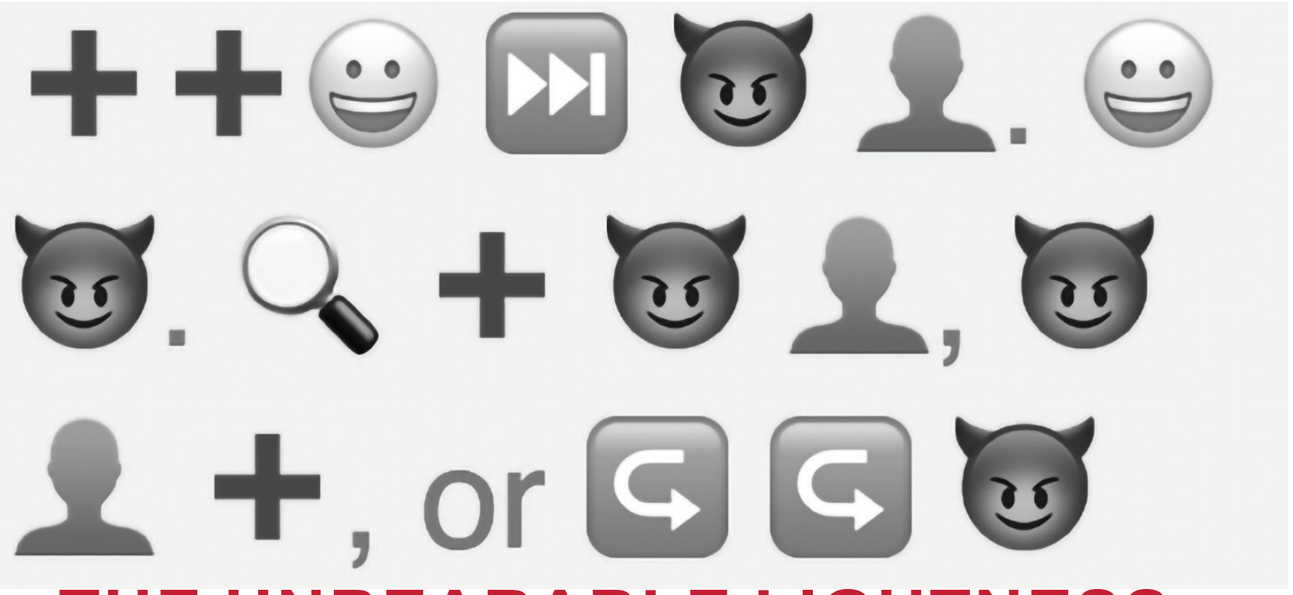
Versions

StoryFace offers two versions, one in French and one in English. *StoryFace* is also available as a free app on the Play Store. Video capture on Youtube: https://youtu.be/H0xfMmJf2wk

Acknowledgements

Based on an original idea by Serge Bouchardon, *Storyface* has been developed with the collaboration of Alexandra Saemmer, Franck Davoine and engineering students of the *Université de technologie de Compiègne.*

It is also the fruit of a collaboration with *Visage Technologies* (http://visagetechnologies.com/) for the precise recognition of facial emotions.



THE UNBEARABLE LIGHTNESS OF MEANING GAME

Lindsay Grace

Introduction

The fundamental question is – are emoji an effective way to communicate? Moreover do they help or hurt the conveyance of narrative. Can telling a story through emoji improve its universal understanding or deteriorate the clarity of such work? Drawing from other projects that aimed to convert classic literature into emoji, *The Unbearable Lightness of Meaning* flirts with such translations by making a playable experience offered as a kind of choose your own adventure. The narrative is based on Kundera's novel, The Unbearable Lightness of Being (1984). The playable experience aims to translate the work both in general plot and theme.

The history of digital games has often included an effort to create more meaningful play. This perspective is in part inspired by the fundamental understanding of play's value. That play serves as both practice and as a means of exploration (Grace, 2019). Digital play in this frame is no different. Some perceive play mediated through the digital as an opportunity to amplify such value.

The Unbearable Lightness of Meaning game is designed around a set of core observations about the current state of storytelling in the digital space. It draws from a few patterns in modern communication culture that at their intersection reveal an opportunity for critical reflection. These are pictographic communication, emphasis on brevity, and the propensities of digital communication.

The continued growth of pictographic communication in the digital domain could be attributed to a variety of sources and can be used to distinct benefit. Bresnaha outlines a World War 2 linked pictographic history who's rise was related to a desire for a universal language across cultures (2015). Others see opportunity in pictographs for multiculturalism in the future, as augmented reality requires more universal communication (Nawar and Gabr, 2013). Others might emphasize the ubiquity of image capture technology, with more people having direct access to smartphone cameras than toilets in the world (Wang, 2013). The evident truth is that much of the story, whether the fictions social media promotes through Instagram or the streaming content of services like Netflix, are communicated through image.

Image provides some really unique opportunities in an increasing global world. While the overused adage, a picture is worth a thousand words may read as trite, the reality is that when communicating across languages, a picture is an extraordinarily effective means of articulating a story.

The efficiency of image for communicating is in part supported by the ubiquity of the Internet. An Internet that is increasingly becoming an image rich environment, from its more humble text origins. While the lingua franca of the web is HTML, an English derived markup language, the universally understood image standards of JPG or GIF are binary (but not so for the scalable vector graphics). One could argue that if someone wants something to be better understood across a variety of language speakers, images are a safer bet than text.

But this dichotomy is one of convenience, not necessarily truth. The shortcomings of image are evident. Images, whether moving or still, require fluency in both visual communication by the image maker and the perceiver. This is why, as humanity evolves to interpret images, it develops new visual language. The famed examples of audiences becoming discomforted by a locomotive rushing toward the camera in early movie houses hints at how society adapts to the evolving language of image. It also reminds us how much of the way the image producer communicates is subject to interpretation. The entire world of visual illusion is about the effects produced in human perception around the elements of an image. Such tricks eventually find their way into the everyday visual language of even the newest of visual communicators, as they use perspective to frame the Eiffel Tower between their fingers or drop a finger on the Louvre. These are all part of the ever-evolving language of image.

Image also meets a contemporary need to communicate quickly. As the Internet has created a media rich environment with far more content than viewers have time, the interest in brevity becomes even more important. If email truncated the written letter and removed it's formality, Twitter further reduced it to a communiqué with more in common with a telegraph than the prose that word processors had made so much easier to create (in comparison to a typewriter). In all these examples there is a clear link to the technology. The tele-

graph shortened messages and offered a specific protocol (i.e. telegram style or cabalese). Later the telephone required new changes to human communication, turning the dynamic of human conversation to a single duplex interaction until full duplex phones allowed two or more people to speak at once. Email's structure abstracted much of the envelope's content of written letters, reducing them to what seemed a mere to and from (although send mail transfer protocols, or SMTP, include far more information). Early Twitter users were limited to 144 characters, but unlike a telegraph, the world could be their audience. The format, tone, and kinds of stories told changed as a product of the technology's affordances and limitations. The result is framing of the way we communicate that is affected by the technology.

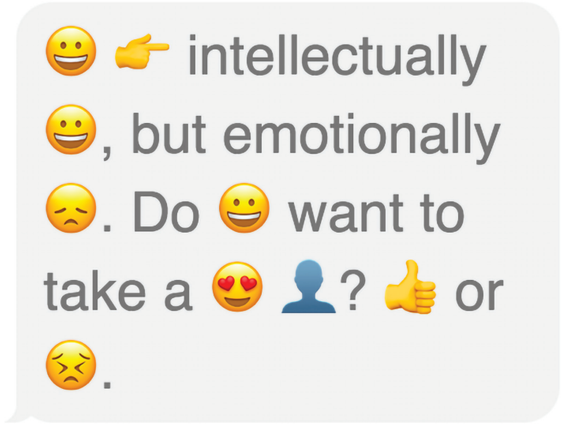
Into this melee of widely available messages comes the low cost of delivering images. This is an environment where brevity is the responsibility of a technology communicator vying for the attention of an audience among clamoring ads, social media, and more. In this context, text may be great, but the image is better, at least initially. First impressions of images are quick and easily perceived across language barriers. A joke in an image is far more easily translated than text language, despite the ubiquity of automated translation. Whether good or bad, the reality is that often to be heard in such an environment, a story is aided by an image. The proof of this is in professional newsfeeds that include stock imagery simply to attract readers to their text content. It's in the dominance of image driven web products like Instagram, SnapChat, and TikTok.

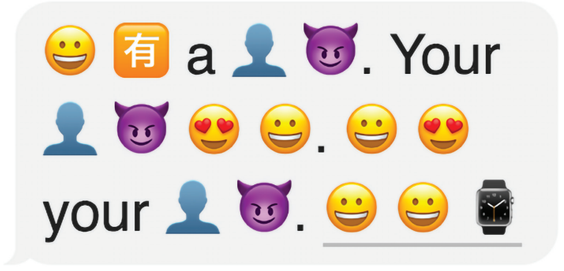
It is no surprise then that Internet culture and smartphone users adopt a pictographic language as part of their communication. Communicating with emoji, shorthand representations of emotions, objects or people, is commonplace. Originally a product of Japanese culture, there is a wide array of emoji users that run a wide demographic. A pinnacle achievement in the world of emoji translation is *Emoji Dick* (Hollander, 2015) , a crowdsourced translation of *Moby Dick* told solely through emoji.

Visual literacy is linked to fundamental human needs, like knowing how to tell a threat in the real world from a non-threat.

Ludoliteracy

One of the core themes among designs of meaningful play is the notion of ludoliteracy. Visual literacy is linked to fundamental human needs, like knowing how to tell a threat in the real world from a non-threat (e.g. is that a lion or a hamster) or simply being able to navigate the real world (e.g. wayfinding). Ludoliteracy has similarly been linked to some elements of human psychological development, with those who do not play possessing substantial mental deficits that may result in antisocial behavior (Brown, 2009). The case for ludo-literacy is based on the notion that people understand the fundamentals of play because play itself is fundamental to human and animal behavior. Children learn through play and in designing meaningful play, there's an opportunity to exploit that experience toward further learning. This obviously is aimed not only at children but also adults who practice play in the digital space.



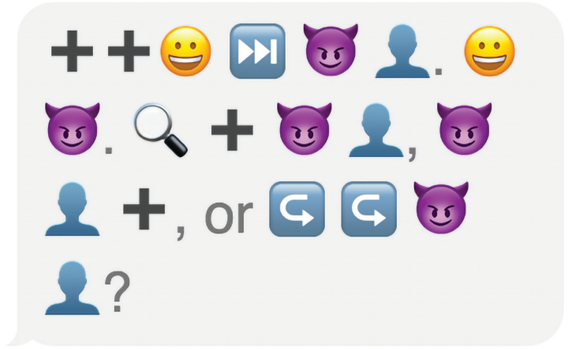


The early projects in meaningful play aimed at telling stories that would inspire their players. They offered rough translations of 'The Hobbit in Zork (Anderson and Galley, 1985), or took HP Lovecraft as motivation in *Alone in the Dark* (Infogrames, 1992). These efforts were kinds of translations of existing texts. Likewise others, more commonly, wrote their own narratives, succeeding in meaningful play with games like *Oregon Trail* (Minnesota Educational Computing Consortium, 1971). Such narratives were not without their own problems which Elizabeth LaPensee and others have highlighted in the past. The result is new stories supported by play like *When the Rivers were Trails* (LaPensee & Emmens, 2019). Such examples aimed to tell distinct stories.

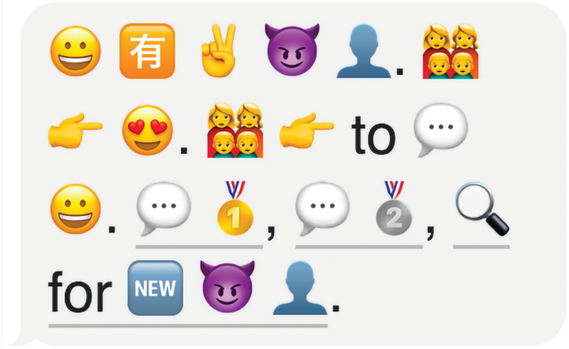
The aim of this small project was to explore how ludoliteracy in the contemporary can be combined with the visual literacy of emoji to tell a story. But the work also aims to do more than that. It also aims to show how quickly meaning is made ambiguous in all of these translations. While image

is often translated as an unambiguous means of communication, masters of illusion and masters of the writing craft recognize the strength of text and image (both imagined and rendered). More importantly, the project aims to explore how a relatively impoverished pictographic language like emoji can be adapted toward meaning.

Other work in this space has endeavored to show some of the biases of meaningful play. My prior work, *A Very Meaningful Game* (2014), for example, provides a tongue in cheek view of how much of meaningful play is all about you – the player. In the game, the player must complete a set of phrases from a poem that is about the player. The player character is a cartoon style set of legs with the word You. You, the player character, must be controlled in a series of fill in the blank styled platform puzzles. In each level the player is tasked with finding the right place to put you, and later nudging I as a secondary subject into its own place. The result is a clunky storytelling experience that sits somewhere between the tradition of educational game design (determining sentence structure) and a poetic creative experience.



As another example, the artist also worked with a group of students to produce a game adaption of another significant literary work. In the *Tell Tale Heart Game* (Grace, 2014), the narrative events of Edgar Allan Poe's short story *Tell Tale Heart* are adapted from read elements to played elements. The player employs one of 6 of the game's verbs through accelerometer and touch based actions on a mobile device. The culmination of these actions of an erratic and awkward shaking and tapping embodied by the player and intended to leave the player in the same fitted and tormented state as the protagonist in Poe's story. In short, the game



aimed to tell the story through action instead of words and to embody the first-person narrative in the player. All of this work is based on prior game design theory proposed as the poetics of game design (Grace, 2012). The identification of poetic potentials for computers, well before natural language processing had become so mainstream, was on artist's minds in the 80's (Pinsky, 1985), but has yet to have enough substantial work completed to demonstrate it's propensities as a design frame, practice, and implementation.

By producing *The Unbearable Lightness of Meaning* the goal was simply to give experiential evidence to the ephemeral qualities of telling a story through requiring both visual literacy and ludoliteracy. The story is told through emoji, but the player must translate those emoji to understand the content of the game.

The Game

The Unbearable Lightness of Meaning is a playful adaptation of Milan Kundera's *The Unbearable Lightness of Being* (1984). The game plays with the ambiguity of emoji as a unit of meaning and operation, touching on the conference themes of understanding the impacts of online interaction and interpreting the basis for conveying emotional understanding. The player traverses one of two narratives, one about war and the other about love. Each is designed as an adaptation of Kundera's own themes.

The ambiguity of meaning resulting from abstracting the depth of Kundera's work to simple, 140 character (or less messages) in emoji is designed to remind players of the impoverished ways that we can communicate via technology. The death of a lover is minimized to a knife, coffin, and skull. The poetry of the novel, which is embedded in the game as quotes through emoji, is diminished into vagaries that have a certain lightness to them. Once the player accepts this lightness, lack of ultimate meaning as a thematic element in the novel, the Lightness of Meaning emoji becomes a more natural experience. It is when we try to determine exactly what they mean, that the tensions in efficacy and action become strongest.

In concert with a theme in the book, there are several paths to be traversed, but they function less as a rehearsal and more as an expense. There are, as the first lines of the book allude, moments eternal return which like an infinite loop repeat ad infinitum. There are moments, as well, when such returns seem like infinite loops, when in reality they are recursive, revealing that the seemingly infinite pattern is the only way to move forward.

As the player is successful at moving the path forward, the emoji retreat to the clearer meaning of the language itself (at least for English speakers). But, rewarding players for the lightness of being, the emoji are the only way to take action in this small, narrative game. In the end the game is an effort in thematic reference to a deeply philosophical novel, designed as a text-messaging game who's adventures orbit finding a way to philosophize in times of war, balancing the needs of lovers, and managing the unbearable lightness of being.

Conclusion

Ultimately the goal was to highlight how the innovations in technology sometimes limit the qualities

of the stories we tell. Just as a film adaptation of a book often loses nuance, the translation of a relatively complex work into the simplicity of emoji reduces some of its most defining qualities.

By analogy, the game serves as an example of an ASCII art render of the Mona Lisa. It falls far short of the aesthetic qualities, adapts its very limited propensities to the medium, and demonstrates how much more needs to be done. At the same time it hints at some potential for creating a ludoliterate narrative informed by automated translation. The transcription of text to emoji through natural language processing is in concept, practicality. In reality, themes are far harder to translate than narrative plot. In the least, what this small creative research demonstrates is the long road ahead in achieving translation of literature to ludo-literature.

In so doing, it references the theme of exhibition. As an example of the expression of emotion in humans and technology, it demonstrates both the opportunity and the shortfallings. It is a playable experience requiring domain-spanning literacies through the pictographs of emoji, ludoliteracy and the translation of emotion from literary work to played experience. This is not meant to be an easy translation, and much of the experience is problematized by the medium's real and interpreted ambiguity.

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WHO IS AMERICAN TODAY?

Flávia Bastos and James Rees

Promoting Critical Digital Citizenship With High School Students

The prevalence of digital media in students' lives poses an opportunity for integrating it with classroom learning and exploration (Johnson, et al., 2014, Ritzer & Jurgenson, 2010). "Who is American Today?" leverages the potential of digital storytelling as a tool for critical reflection, dialogue, and creativity among high school students. With the goals of raising consciousness and promoting skills necessary in a democratic society, this study explores how digital storytelling can promote the complementary abilities of autonomously articulating one's own perspectives as well as responding to others.' Starting in a Utah high school and reaching to students across the country, in this project students will share original digital stories that embody their perspectives and experiences and aim at facilitating dialogue and understanding. Our ***central questions*** are: (a) How can digital making experiences promote more enlightened and engaged citizens? (b) How can contemporary education help students articulate their own experiences, and therefore contribute to democracy? And, (c) How can digital storytelling, in particular, promote critical digital citizenship? Our project connects education, creativity, and technology in timely and innovative ways. It relies on the potential of digital storytelling to foment meaningful dialogue by transcending high school students individualized perspectives, towards greater collective awareness and shared understandings. We expect to provide frameworks for reconceptualizing the potential role of art and media in education and in promoting critical digital citizenship.

Rationale

Global migration, the rise of populist nationalism, and the quest for legal recognition, visibility, civic equality, and structural inclusion of diverse racial, ethnic, cultural, linguistic, and religious groups have complicated the attainment of citizenship in countries around the world (Banks, 2017). Western nations face increasing challenges to civic values illustrated by violent conflicts between police and communities of color (Taylor, 2016), growing numbers of immigrants, and terrorist attacks worldwide. These developments have renewed contentious political discussions about the extent to which Western nations can and should integrate diverse groups and provide opportunities for them to become fully integrated, participatory citizens in society (Bawer, 2006; Murray, 2017). This increasingly polarized context directly impacts contemporary education, shaping policies and practices that disrupt the legacy of public schools of sustaining democracy by preparing all citizens to make informed decisions leading to the public good (Dewey, 1966). Contemporary critiques of schooling (Bindewald, 2015; Cuban, 2015; Saltman, 2009) affirm the need for equitable educational policies and practices, responsive to, among others, the increasing demographic diversity of schools (Kinlock, 2011). Therefore, one of the key concerns for today's educators is how to support students in articulating their own voices to promote democratic dialogue. Therefore, this study capitalizes on the potential of media production to politicize youth by activating citizenship and resulting in expanding digital narratives from the perspective of each unique participant.

Three Key Concepts Frame This Study

(a) *Critical Digital Making* is the ability to use digital tools to express original ideas and lived experiences, and to analyze and make interpretations about digital texts produced by others. *Critical digital making* is a transformative, creative, and political act, whereby students can author and distribute their own creations, transcending their previous status of mere consumers by developing autonomy, articulating meaning, and personal voice (Jenkins, Ford, & Green, 2013). *Critical digital making* builds upon everyday uses of technology and provides opportunities to reflect upon the possibilities and impact of digital media, disrupting conventional narratives and creating spaces to hear and consider alternative voices and counter-stories.

(b) *Digital Storytelling* is a creative practice that draws upon the affinity between art and technology (Long, 2001; Rifa-Valls, 2011; Stanley, 2007) and the impact of narrative to promote human connection. As illustrated in its use by contemporary artists (Muniz, 2008; Bicknaver, n.d), *digital storytelling* capitalizes on artistic approaches to facilitate more nuanced and critical portrayals of lived experiences, sometimes disrupting conventional narratives and expectations. *Digital storytelling* specifically can advance citizenship by connecting cultural and creative activities with social, political, or civic goals (Locktoon, Greene, Casey, Raby, & Vickress, 2014).

(c) *Critical Digital Citizenship* is relevant to many of today's students, especially those who come from non-mainstream backgrounds, other countries, or speak different languages (Morrell, Duenas, Garcia, & Lopez, 2013). Young people are often alienated and disenfranchised from politics because they "are not defined in our society as political subjects, let alone as political agents" (Buckingham, 2000, p.219). Students can exercise their citizenship (Calhoun, 1992) in classrooms where culturally responsive teachers (Guttman, 2004) promote structural inclusion through experiences of recognition and civic equality that connect "the 'micro-politics' of personal experience with the 'macro-politics' of the public sphere" (p. 221). *Critical digital citizenship* refers to the capability of students (and more largely, individuals) to articulate their experiences and perceived locations as citizens using digital media tools creatively, responsibly, and sometimes disruptively.

Supporting educators' desire to sustain democracy, this study explores the interrelationship among critical digital making, digital storytelling, and critical digital citizenship. Positioning media analysis and production in education as a "prerequisite for self-representation and autonomous citizenship" (Goodman, 2003, p.3.), we expect this study will have an impact on how teachers may encourage and equip high school youths to critically participate in their communities as cultural producers in their own right.

Our Project

The project started by working with a high school educator (James) in a district with a significant immigrant population in Provo, Utah and a higher education researcher who is an immigrant herself (Flavia) who sought to empower a diverse body of young students to participate in digital making. Recognizing the unprecedented role digital tools play in spaces of both learning and leisure for students. This study is inspired by an European project that facilitated representations of identity and belonging through a range of media to unveil the effects of recent economic and political decisions in challenging a sense of shared European citizenship (Richardson, 2016). Current political and social changes in the United States parallel those taking place in Europe and raise questions about the role of education in promoting citizenship. A pilot-phase for the study (2017-20) started at Provo High School, Utah, where one high school teacher worked with two cohorts of high school students, 70 in total, using a lesson about "Who is American Today?" The digital stories created are exhibited in the project's website (www.whoisameirican.com).

Current political and social changes in the United States parallel those taking place in Europe and raise questions about the role of education in promoting citizenship.

Digital Stories

We examined the students' digital stories in terms of their content and form. The content analysis sought to interpret students' self-identified positions within American life, offering insights about their understandings of citizenship. To clearly articulate our expectations for the student's works we adapted a media rubric addressing criteria around creating, presenting, connecting and responding to works of art (MediaArtsEducation.org, 2014), with three categories: emerging, proficient, and advanced. A citizenship typology (Banks, 2017) provided a lens to further articulate the distinctions in students' perspectives because it encompassed the range of positions we encountered, ranging from students who reported feelings of recognition and integration into American life to students who felt alienated and excluded from the democratic process. According to Banks, citizens have rights and privileges within a nation-state and are, therefore, entitled to protection by the nation-state. However, increasingly today we witness how many racial, ethnic, cultural, linguistic, and religious groups are denied structural inclusion into their nation-state. Consequently, they do not fully internalize the values and symbols of the nation-state, develop a strong identity with it, or acquire political efficacy. They focus primarily on specific group needs and goals rather than the overarching goals of the nation-state. This process is described as failed citizenship. Banks proposes four approximate overlapping categories useful to think about citizenship socialization and citizenship education:

1. *Failed citizenship* relates to persons who do not internalize the values and ethos of the nation-state, feel structurally excluded within it, and have highly ambivalent feelings toward it.

2. *Recognized citizenship* exists when the nation-state publicly recognizes an individual or group as a legitimate, legal, and valued member of the polity.

3. *Participatory citizenship* involves individuals with citizenship rights taking actions as minimal as voting to influence political decisions in their communities, nations, and the world to actualize existing laws and conventions.

4. *Transformative citizenship* requires citizens to take action to implement and promote policies, actions, and changes that are consistent with values such as human rights, social justice, and equality. The actions that transformative citizens take might—and sometimes do—violate existing local, state, and national laws.


GOALS
QUESTIONS

Although these categories are distinct, in reality they overlap and intersect dynamically. For example, individuals must be recognized by the nation-state as legal and legitimate citizens before they can become participatory citizens who can take actions such as voting. However, failed, recognized, and participatory citizens can all take transformative actions to make fundamental changes aimed at promoting social justice and equality.

In applying these criteria to interpreting students' digital stories, we underscore that a primary goal is to understand how developing digital media literacy skills can enable students to better reflect upon their everyday experiences, personal and community values, and current events. Further, we seek to understand the relationship between authoring digital stories and fomenting democratic participation.

To offer a glimpse of the types of digital stories created and what we can learn from them as educators; we will showcase the work of three students—Tania, Erick, and Cameron—who illustrate a range of possibilities regarding digital making and conceptualizations of citizenship. These students' backgrounds also represent the diversity of American classrooms, ranging in terms of age, gender identity, socio-economic status, and ethnicity.

Nobody is the same, we all have a story to tell. According to 17-year old Tania, Americans are caring and independent, and aspire for better opportunities. Her position illustrates the stance of a *recognized citizen,* and she talks about her parents coming to the United States from Mexico 25 years ago and traveling between the two countries. Born in Mexico and raised in the United States, she considers herself an American. Her digital story was created *proficiently,* utilizing primarily family images depicting landmarks of her personal history—celebrations, graduations, sports events, family gatherings—and conveyed a sense of connection and pride. She concludes by saying, "it doesn't matter where you are from, or how you look, you can be an American just as everybody else. Be the person you are meant to be."

To have a dream and to make that dream come true. Erick's digital story is created with evocative imagery that underscores the ideals of personal effort and hard work in the pursuit of one's fulfillment. From his 16-year-old's perspective, Americans are free to be whoever they want. Americans are diverse and equally accepted, regardless of their background. He identifies with a *participatory* citizenship perspective, rooted in a view of society as inclusive to all. His digital story combined *proficient and advanced* making skills, employing powerful

imagery, music, and visual effects to convey the freedoms Americans enjoy are achieved through creativity, ideals, and hard work. In the first portion of his digital story, we hear Erick's voice articulating these ideas, and in the second portion the story is told exclusively through moving images and music. This more open-ended and poetic approach is very effective, inviting the viewer to reflect upon our own dreams and ideals.

They are born with wealth; they will die with wealth. Cameron's digital story powerfully expresses his feelings of a citizen who does not fit in. As a transgender 18-year old, Cameron voices the experience of not feeling recognized. His hand-drawn animated story combines the narrative of a *failed* citizen with *advanced* digital making skills moves the viewer to carefully and thoroughly consider what is being said. As a counter-storyteller, Cameron defies mainstream narratives of America, inviting us to consider the problems of not embracing diversity, and the implications of narrowly conceived policies resulting in closing social opportunities and civic participation.

Discussion

Each student example demonstrates their positions across the spectrum of citizenship types, from failed to participatory citizens. The level of skill, sophistication, and critical analysis shaping how each story was created has an impact in moving the needle toward transformative citizenship. According to Banks (2017), "failed, recognized, and participatory citizens can all take transforma-

tive actions to make fundamental changes within the nation that promote social justice and equality" (p.368). These three selected stories illustrate how student's critical making skills play a determining factor in enabling transformation. For example, in the case of Cameron's story, he describes his views about those who are excluded from commonplace assumptions of being an American in compelling, creative, and moving ways. The sophistication of his story enables the viewer to experience compassion and empathy, achieving deeper levels of understanding. Cameron's successful counter-story challenges prevalent sexist, racist, and exclusionist views through a narrative of experiences not often told.

Conclusion

Who is American Today? seeks to understand how critical digital making can advance notions of citizenship in visual art classrooms. Ultimately, our research interests sit at the intersection of creativity and democracy, investigating possibilities for advancing citizenship through digital storytelling and other critical digital making practices. A critical media pedagogy rooted in the arts provides students and teachers with opportunities to embrace changes in society and technology. We consider that digital storytelling can be highly responsive and adaptable to the realities and needs of today's students, providing a means to connect contemporary digital technologies and education in meaningful ways. One student described the experience of participating in this project as a 3-step process: "first you see it then you understand it, and later you do it at a deeper level" (Student interview, October 11, 2017).

In the words of another student, digital stories are "a great way to express one's perspective and avoid the white noise that conversations tend to become" (Student interview, October 11, 2017). We observed, regardless of their standing in society, from identifying as a failed, recognized, or participatory citizen, accessing and developing digital making skills, had an impact in enabling communication and reflection. Critical approaches to digital making connect media analysis and production, so learning about the world is directly linked to the possibility of changing it, and becomes a "prerequisite for self-representation and autonomous citizenship" (Goodman, 2003, p.3.).

We encountered strong evidence that engagement in critical digital making can engender productive, creative, even political acts, enabling students to locate and express their own voices. In a genuine democracy, schools provide places for deliberation, consideration for bolstering the common good, and democratic decision making. This project affirms the potential of critical digital making in achieving these goals.

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Ryan Bown, MFA is an Associate Professor of Entertainment Arts and Engineering at the University of Utah. Prior to working in the games Industry he devoted a decade (1998-2008) to creating and showing Fine Art works at Galleries and Museums through-out the United States and abroad. Having a love for art and video games, he decided to fuse the two passions together. Over the last 10 years he has worked on a number of popular titles which include: ERIE, Disney Infinity 1.0, & Disney Infinity 2.0. As an educator, he aims to increase accessibility to information, learning, and community by blurring the boundaries of traditional education by streaming creative content for Games on Twitch. (https://www.twitch.tv/3DMentor)

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Brian Salisbury, MFA is an Associate Professor of Entertainment Arts and Engineering at the University of Utah. Salisbury began his teaching career in 2005 at the University of Central Florida as the Art Track Director for the Florida Interactive Entertainment Academy graduate program. Prior to academic service, Brian worked in the computer graphics industry for 15 years. Notable film credits include: Antz, Face Off, Godzilla, and Space Jam. As a lead character artist he worked a variety of high profile games which include the following: WCW series, Monsters, Inc, Top Spin, Links' 04 and Amped 3.

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Jessica Bedingfield is the Program Coordinator at the Davis Arts Council. Jessica believes that art is an incredible, moving and necessary form of communication. Jessica works to make performing and visual art available to the community through film competitions, literary walks, art galleries and concerts. Jessica studied Art History and Political Science at Utah State University researching political propaganda in films.

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Suzanne Freyjadis, MA, is the Chair of the IGDA GameED SIG and Founder of SHIFT Education & Games. As the Chair of the IGDA GameED SIG, she is currently leading the update of the 2020 IGDA Curriculum Framework. The updated Framework is a globally adaptive set of Building Blocks that a post-secondary program can use to create or update a video game program for their institution. She is currently working on a conference on Game Education, Serious & Policy Games to take place in 2020. This conference is geared toward universities, governments and NGOs of countries usually left out of video game conversations due to visa and travel issues associated with the countries that hold the main video game conferences. The goal is to create a forum where countries can unite and work together to continue to develop their own video game communities.

Alex Johnstone

Alex Johnstone, MFA, is a digital creator and University instructor working in Salt Lake City, Utah. His career was born in film with his short narrative film The Deep premiering at the 2008 Sundance Film Festival. His narrative and documentary films have screened at national festivals and internationally on broadcast television. In 2011, Alex brought his passion for creation to The Leonardo, creating original content and overseeing large-scale traveling exhibits as the Exhibits and Programs Manager for the Art, Technology and Science Museum. Since 2014, Alex has taught undergraduate game development at the University of Utah. The following year he co-founded his second company Octothorpe, an interactive digital entertainment studio. Octothorpe was selected as one of five participants in 2017 for the Department of Education's EdSim Challenge. Octothorpe has gone on to produce virtual reality experiences for clients such as Stanford University School of Medicine.

Lubna Gem Arielle

Lubna Gem Arielle is an interdisciplinary practitioner with a focus on workplace mental health and wellbeing. Her work includes challenging prevalent relational strategies primarily through investigating default and alternative modes of listening and their comparative ability in dissolving the carapace of silence born from stigma and unintentional misalignment of empathy or support. Bridging the Blue investigates the potential of Virtual Reality to offer a recalibration of listening tendencies. She has created a conversational model (NILE) to elicit open and effective workplace communication about mental health and is a co-author of Lawyer health of wellbeing: How the legal profession is tackling stress and creating resiliency, A. Davies (ed), 2020, Ark.

Lissa Holloway-Attaway

Lissa Holloway-Attaway, PhD, is an Associate Professor in Media Arts, Aesthetics, and Narration in the Division of Game Development within the School of Informatics at the University of Skövde, Sweden. She teaches game education (undergraduate and graduate levels), and is the leader of the Media, Technology and Culture (MTEC) Research Group at the university. In MTEC, she is involved in developing projects at the intersection of arts, humanities, and digital technology and exploring technological interventions in socio-cultural contexts. Her academic background is in theatre performance, literature, and digital media, and she works across many media forms where her aim is to explore the relationships among these intra-disciplinary interests.

Her current research is focused on emergent media (AR/VR/MR), experimental digital narrative forms, digital cultural heritage games, and feminist posthumanities. Her research on gender, technology, and diversity is reflected in a number of initiatives and collaborations, including through her association with the Posthumanities Hub in the Gender Studies Department at Linköping University and the GEXcel International Collegium for Advanced Transdisciplinary Gender Research, a multi-university Swedish consortium. At the University of Skövde, she serves as a research leader for DONNA, an organization to support girls and women in games in education and in industry.

She has participated in a number of International, National, and Regionally funded research projects exploring topics such as: digital arts and culture exchange across the Baltic Sea Region; gaming, youth and the co-creation of heritage

sites; city planning through cultural expression and citizen engagement; and exploring climate change through digital interventions. Working as a research leader in the KASTiS project ("Cultural Heritage in Skaraborg with Game Technologies" in English) funded in two phases by the Västra Götaland Region in western Sweden (2015-2018 and 2019-2021), she has supported work to create an Augmented Reality children's book series, called KLUB (Kira and Luppe's Bestiarium), that promotes tangible and intangible cultural heritage across the municipalities in the region and in collaboration with local museums, schools and heritage sites. To date, 15 books in the series have been published, a number of workshops and exhibitions have been created for local communities, and a related KLUB board game is in development.

Her creative and critical work has been published, performed, and exhibited in a number of International venues and contexts across Europe and the USA.

John F. Barber

John F. Barber convenes with The Creative Media & Digital Culture Program at Washington State University, Vancouver. His scholarship, teaching, and creative endeavors rise from the intersections of art, humanities, and technology and manifest as literary media art where he feels that practice-based research discovers and puts into action new knowledge. His radio and sound art are broadcast and exhibited internationally. His work with digital humanities is showcased by American Dust (www.brautigan.net), an online resource he developed and curates, known as the preeminent resource for the life and writing of American author Richard Brautigan. As a featured guest on This American Life, Barber talked about his The Brautigan Library project (www.thebrautiganlibrary.org) which curates unpublished manuscripts by everyday authors. His Re-Imagined Radio project (www.reimaginedradio.org) re-imagines retro-radio dramas, from the 1930s-1950s, as contemporary storytelling performances. His publications appear in Digital Humanities Quarterly, Digital Studies, ebr, Hyperrhiz: New Media Cultures, Leonardo, MATLIT (Materialities of Literature), Scholarly Research and Communication, and other journals. Barber's website (www.nouspace.net/john) provides more details and examples of his endeavors.

Flávia Bastos

Flávia Bastos, Ph.D. is a Professor in the School of Art, in the College of Design, Architecture, Art and Planning at the University of Cincinnati. Her research and scholarship are indebted to her Brazilian roots, experiences with social and cultural diversity, and inspired by the educational philosophy of educator Paulo Freire. Her research and teaching honor diverse communities and celebrate the creative potential of all people. Flávia is a Distinguished Fellow of the National Art Education Association, a Distinguished Research Professor at the University of Cincinnati, the chairperson for the Council of Policy Studies in Art Education, and former Director of the Higher Education Division of the National Art Education Association. She received the 2009 Ziegfeld Award of the International Society for Education through Art (InSEA) for her distinguished service in international art education and the Mary J. House Award of the National Art Education Association Women's Caucus in 2007. She is a past senior editor of the Journal of Art Education and has published and lectured extensively in the United States and other countries such as South Africa, Brazil, Chile, Indonesia, Spain, Portugal, and Canada. Her books include Transforming City Schools through Art: Approaches to Meaningful K-12 Learning, a co-edited volume published by Teachers College Press (2012), and the anthology Connecting Creativity Research and Practice in Art Education: Foundations, Pedagogies, and Contemporary Issues (2014) released by the National Art Education Association.

Serge Bouchardon

Serge Bouchardon is a Professor at the University of Technology of Compiegne (France), where he teaches interactive writing. His research focuses on digital creation, and in particular, digital literature.

As an author, he is interested in the way the gestures specific to the Digital contribute to the construction of meaning. His creations have been exhibited in many venues in Europe, America, Africa and the Middle East. They have been selected in various online reviews (bleuOrange, Hyperrhiz, SpringGun, The New River). The creation Loss of Grasp (http://lossofgrasp.com/) won the New Media Writing Prize 2011.

Research: http://www.utc.fr/~bouchard/
Creation: http://www.sergebouchardon.com/

Lindsay Grace

Lindsay Grace is Knight Chair of Interactive Media and an associate professor at the University of Miami School of Communication. He is Vice President for the Higher Education Video Game Alliance and was the 2019 recipient of the Games for Change Vanguard award. Lindsay's book, Doing Things with Games, Social Impact through Design, is a well-received guide to game design.

His work has received awards and recognition from the Games for Change Festival, the Digital Diversity Network, the Association of Computing Machinery's digital arts community, Black Enterprise and others. He authored or co-authored more than 50 papers, articles and book chapters on games since 2009. His creative work has been selected for showcases internationally including New York, Paris, São Paulo, Singapore, Chicago, Vancouver, Istanbul, and others. Lindsay curated or co-curated Blank Arcade, the Smithsonian American Art Museum's SAAM Arcade, the Games for Change Civic and Social Impact and others.

He has given talks at the Game Developers Conference, SXSW, Games for Change Festival, the Online News Association, the Society for News Design, and many other industry events.

Between 2013 and 2018 he was the founding director of the American University Game Lab and Studio. He served as Vice President and was on the board of directors for the Global Game Jam™ non-profit between 2014-2019. From 2009 to 2013 he was the Armstrong Professor at Miami University's School of Art. Lindsay also served on the board for the Digital Games Research Association (DiGRA) between 2013-2015.

Andrew Phelps

Andrew "Andy" Phelps is a professor at the Human Interface Technologies Laboratory NZ (HITLabNZ) within the College of Engineering at the University of Canterbury. His work there is focused on virtual and augmented reality, games and education, and art and interactive media experiences of several varieties. In addition to his individual research and creative practice, supervision of students, and teaching activities, he is heavily engaged in building a new effort within the university, the Applied Immersive Gaming Initiative (AIGI).

Phelps also serves as a Professor in the Film & Media Arts division of the School of Communication at American University, and as Director of the AU Game Lab.

Prior to July of 2019, Phelps served as a Professor of Art & Design in the College of Art & Design at the Rochester Institute of Technology (RIT), and before that as a Professor in the B. Thomas Golisano College of Computing & Information Sciences at RIT, for nearly 20 years. He is the founder of the RIT School of Interactive Games & Media, the founder of the RIT Center for Media, Arts, Games, Interaction & Creativity (MAGIC). He led the design and establishment of the RIT Master of Science in Game Design & Development, as well as the Bachelor of Science degree of the same name, both of which are internationally recognized for their excellence in game design curricula.

His work in game design, game development, game art and game education is recognized internationally, has regularly been presented at numerous academic conferences and relevant journals, and has been supported by grants from multiple federal agencies, numerous state and local agencies, and research labs at private corporations. These include the US Library of Congress, the US National Science Foundation, the US Department of Education, the New Zealand Tertiary Education Commission, Microsoft Research, Adobe, and more. His work has also been extensively covered in the popular press and trade literature, including USA Today, CNN, the New York Times, the Wall Street Journal, Polygon, Gamasutra, Inside HigherEd, the Chronicle, Campus Technology, etc.

In addition to his roles at American and Canterbury in research, administration and education, he currently serves as president of the Higher Education Video Game Alliance (HEVGA), which he co-founded with colleagues in 2014, and which now represents over 310 colleges and universities with games curricula world-wide

Greg Phillbrook

Greg Philbrook is a graduate of the Creative Media & Digital Culture Program and now works as the program's technical and instructional technician. In this position, he manages the program’s computer labs and web server, heads student workshops, and collaborates with faculty on numerous projects. As a developer, he has built both the preservation catalog for the Electronic Literature Lab and the program’s inventory system, worked with Dene Grigar on “Curlew,” and created the interface for “Sound Spheres” with John Barber. He has also served as the technical support at exhibits curated by Dene Grigar at the Library of Congress, Electronic Literature Organization conferences, and the Digital Humanities Summer Institute in Victoria, B.C.

James Rees

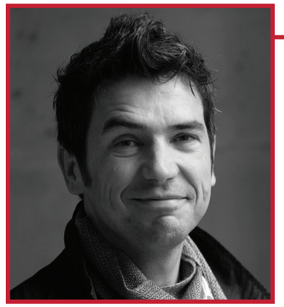
A widely-known champion of the arts, James Rees is a passionate advocate for art education that balances theory, research, and practice. He is a Fulbright Memorial Scholar, a Teachers Institute of Contemporary Art Fellow, and an Art21 Fellow. James has served as reviewer for the President’s Committee on the Arts and the Humanities as well as the National Endowment for the Arts.
His studio practice embraces the immediacy of drawing with the processes of printmaking. He earned an MFA at the University of Arizona and a BFA from Brigham Young University.
James currently serves on the board of the National Art Education Association as Vice President (Pacific Region Region). His awards include the Sorenson Legacy Foundation Award for Excellence in Arts Education, Pacific Region Art Educator of the Year, Governors Leadership in the Arts Award, National Art Education Secondary Educator of the Year, and the UAEA’s Lifetime Achievement Award.

Rebecca Rouse

Rebecca Rouse, PhD is a Senior Lecturer in Media Arts, Aesthetics and Narration in the School of Informatics at the University of Skövde, Sweden, where Rouse is a member of the research group MTEC: Media, Aesthetics, and Culture. Rouse holds a PhD in Digital Media from the Georgia Institute of Technology (Atlanta, GA), an MA in Communication & Culture from the joint program at York University and Ryerson University (Toronto, Canada), and a BA in Theatre Studies and German Studies from Brown University (Providence, RI).

With over a decade of experience working with Augmented Reality (AR) and other interactive media, Rouse's research focuses on theoretical, critical, and design production work with storytelling for new technologies. Rouse designs and develops projects across museums, cultural heritage sites, interactive installations, and theatrical performance, all with the thread of investigating and inventing new modes of storytelling. This design work dovetails with Rouse's research in design methods, media theory, and media archeology. Rouse teaches courses in Games, AR Design for Cultural Heritage, Mixed Reality Performance Design, Playwrighting, and the history of technology at World's Fairs and Expositions.

Current projects include: an essay collection expanding Rouse's Media of Attraction concept and media historical research in connection with design practice for emerging media; a book on the history of and methods for media theater practice; a series of handmade artist books bridging traditional movable / pop-up / animated paper engineering with mixed reality technology.



Aljosa Smolic

Professor Aljosa Smolic is the SFI Research Professor of Creative Technologies at Trinity College Dublin (TCD). Before joining TCD, Prof. Smolic was with Disney Research Zurich as Senior Research Scientist and Head of the Advanced Video Technology group, and with the Fraunhofer Heinrich-Hertz-Institut (HHI), Berlin, also heading a research group as Scientific Project Manager. At Disney Research he led over 50 R&D projects in the area of visual computing that have resulted in numerous publications and patents, as well as technology transfers to a range of Disney business units. Prof. Smolic served as Associate Editor of the IEEE Transactions on Image Processing and the Signal Processing: Image Communication journal. He was Guest Editor for the Proceedings of the IEEE, IEEE Transactions on CSVT, IEEE Signal Processing Magazine, and other scientific journals. His research group at TCD, V-SENSE, is on visual computing, combining computer vision, computer graphics and media technology, to extend the dimensions of visual sensation. This includes immersive technologies such as AR, VR, volumetric video, 360/omni-directional video, light-fields, and VFX/animation, with a special focus on deep learning in visual computing. Prof. Smolic is also co-founder of the start-up company Volograms, which commercialises volumetric video content creation.