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Embodied Avatar Performance,
Han Healing Ritual and Life-Review:
Intersections of Art, Health and Virtual Reality

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Table of contents

Table of figures

Tables

Abstract

This Ph.D. dissertation presents the Embodied Avatar Performance (EAP) projects, which are grounded in transdisciplinary research that explores the potential of performance art, virtual reality (VR), and interactive technology in connection with Korean healing rituals, in order to foster well-being in the life-review process. Life-review is a well-known therapy based on storytelling that opens an important process of self-reflection and meaning-making, fostering healing effects through remembering, expressing, and re-contextualizing personal life experiences in a safe context of attentive listening. It is especially critical for older adults and terminally ill patients in their last stages of life.

This research, in the context of performative and digital media arts, consists of the development of two avatar life-review projects, VoicingElder (2016-2018) and VoicingHan (2018-2020) in the context of Arts and Health. VoicingElder and VoicingHan have been developed together with health professionals as pilot programs in healthcare and wellbeing for older adults in senior residences and for cancer patients in palliative care.

The EAP conveys the research processes of these avatar life-review projects that were developed to support playful and emotional engagement of the participants with their memories, exploring a continuous development of the participant's emotional process as a therapeutic potential. These avatar projects have a transcultural component as based on the Korean concept of Han and the traditional healing rituals in Korea, and are inspired by the model of puppetry, in which the puppeteer playfully embodies the puppet in a transformative relationship.

The hypothesis underpinning this doctoral inquiry is that the avatar virtual body holds great potential as an avenue for emotional exploration, playful engagement, and self-actualization in life-review processes, which relate to healing aspects in many therapeutic traditions. This embodied performance could benefit people's emotional health by facilitating a journey of discovering alternative selves and sharing these personal experiences with others.

Conceptually, the EAP platform is inspired by a Korean healing ritual that involves quite an emotional journey, from extreme grief to joy, continuously dreaming, desiring, and eventually "transcending sky". The ritual goes through different phases of embodiment, with powerful wishes to "fly" to a meta-dimension of human experience. Technically, the avatar system

involves the development of an avatar virtual body that mimics the speech and the movements of the participant who interacts with it.

This practice-based research is presented as an article-based thesis that acknowledges transdisciplinary contributions in exploring the potential of digital media art in healthcare as well as diverse technologies such as avatar interactivity, motion capture, emotion AI (a sentiment analysis algorithm), and virtual reality. The research has expanded tremendously thanks to transdisciplinary collaboration with computer scientists, gerontologists, medical doctors, social workers, and drama therapists. Within these transdisciplinary teams, we have implemented quantitative and qualitative methodologies to test the design and evaluate the participant's experiences. This feedback has been crucial to understanding participants' virtual body experiences and enhancing the artwork's theoretical and analytical scopes.

The main contribution of EAP is in advancing the field of avatar performance art and life-review therapy through a transcultural approach, implementing a contemporary translation of the Korean healing ritual mediated by the avatar virtual body. Working with diverse fields of study within a transcultural perspective, EAP aims to contribute to the fields of virtual reality and performance art, drama therapy, therapeutic puppetry, and life-review therapy, introducing innovative forms of narrative transcending orality to a performative embodiment through the avatar, generating a safely distanced environment. The results shown for older adults and cancer patients have demonstrated the therapeutic potential of EAP for promoting wellbeing and health benefits in various contexts and diverse populations.

Keywords: avatar; virtual body; interactive art; performance art; embodiment; healing ritual; Korean shamanism; virtual reality; extended reality; transcultural; transdisciplinary; arts in health; drama therapy; VR healthcare; life-review therapy; HCI.

Acknowledgement

Note to the reader

This thesis report is submitted as a compendium of five publications which chronologically explains the development of Embodied Avatar Performance projects, specifically two avatar life-review projects from 2016-2021, in terms of concepts, design, experience, methodology, and analysis.

The data analysis and results have been published during the different phases of the development and implementation of the Avatar platform. The publications, which form the main contribution to this dissertation, follow the thesis report as an Annex.

- Publication 1: Examination of VoicingElder avatar life-review project, in the light of drama therapy concepts and methods, exploring a hybrid mode of avatar/drama therapy in a virtually mediated environment.
- Publication 2: Discussion of the VoicingHan project as an approach to dealing with mortality and potentially mitigating existential suffering for palliative care patients in the digital age.
- Publication 3: Demonstration of the methods of experiencing virtual bodies, in the context of Korean healing ritual, along with discussions of VoicingElder and VoicingHan avatar life-review projects, in the phase of wishing, facing, creating and performing virtual bodies.
- Publication 4: Demonstration of the quantitative methodology and analysis of the VocingHan avatar life-review project, in the context of clinical feasibility study, working with VCU palliative care team.
- Publication 5: Demonstration of the qualitative methodology and analysis of the VoicingHan avatar life-review project, which considered the avatar videos as qualitative data emerging from individually constructed life review narratives.

List of included publications

- **Publication 1:** Ryu, S. (2017). Avatar life-review: Virtual bodies in a dramatic paradox. Virtual Creativity, 7:2. Bristol, UK: Intellect Ltd, 121–31. doi: 10.1386/vcr.7.2.121_1

- **Publication 2:** Ryu, S., Noreika, D., Dang, M., & Del Fabbro, E. (2019). VoicingHan: between Mortal and Immortal. In Park, J., Nam, J., Park, J. W. (Eds.), Proceedings, 25th International Symposium on Electronic Art. Asia Culture Center, Gwangju, Korea, 174-180. ISBN: 979-11-87275-06-0

- **Publication 3:** Ryu, S. (2020). Performing virtual bodies. International Journal of Performance Arts and Digital Media, Taylor & Francis, 1-17. doi: 10.1080/14794713.2020.1778899

- **Publication 4:** Dang, M., Noreika, D., Ryu, S., Sima, A., Ashton, H., Ondris, B., Coley, F., Nestler, J., & Del Fabbro, E. (2020). Feasibility of Delivering an Avatar-Facilitated Life Review Intervention for Patients with Cancer. Journal of Palliative Medicine, Vol. 24, No. 4.1-7.Apr.2021.520-526.doi:10.1089/jpm.2020.0020

- **Publication 5:** Ryu, S., & Price, S. (2021). Embodied storytelling and meaning-making at the end of life: VoicingHan avatar life-review for palliative care in cancer patients. Arts & Health: An International Journal for Research, Policy and Practice. Taylor & Francis, 1-15. doi: 10.1080/17533015.2021.1942939

Preface

I have explored the transformative relationship between the performer and her virtual body (avatar) through digital art experiments since the beginning of my artistic career. This topic has been my lifelong inquiry as I grew up exploring "virtual bodies" in my consciousness to escape from the oppressed reality and disciplined body in Korean Confucian society[1]. For me, the virtual body and virtual reality are more than emerging digital technologies, these concepts evoke an active state of consciousness, perception, and phenomenological experience emerging from suppressive contexts. They are tools for questioning the self and accepted realities situated in definite sociocultural fields.

My virtual puppetry research project started from my conceptual interests in Korean shaman rituals and puppetry, connected with my personal experiences exploring virtual bodies and realities since my childhood. For years, I have studied Korean rituals and philosophy as explanations for healing human experiences that have occurred during the virtual body rituals I created. These explorations gave me transcultural insights into digital media discussions, suggesting new potentials for interactivity, transformation, virtuality and embodiment that can be applied to both art and therapy.

The background of this thesis goes back to 2010, when my art project had a critical shift from personal expression to community engagement projects. I realized that my virtual body interactive platform could facilitate emotional release for myself, as well as for others in diverse communities. In 2016, I started this doctoral research by working with a gerontologist and other medical professionals to investigate how my projects might have a social impact in the community. First, I worked with older adults in the project VoicingElder. Later, I developed VoicingHan to work with cancer patients in palliative care. These projects have given me special opportunities, the courage to communicate with people, and the confidence to share my feelings and personal narratives at a level I never thought was possible.

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[1] During the Choson dynasty in Korea, Neo-Confucianism emphasized the corporeal for the female body, the very aspect men were supposed to transcend with the life-giving force, *KI*. Women were regarded as subjectless bodies without *KI*, and believed to be inferior to men. The main role of Women was to reproduce the family body, under the rigid Confucius disciplines (Yoon, 1990, 9-10).

Throughout my research, I have explored *Han*, a Korean emotional concept, to activate the healing ritual based on the Korean shaman ritual *Kut*. *Han* is in a state of extreme grief combined with great hope to overcome the situation, even if it seems impossible. My seminal idea was that the process of emotional healing in Korean ritual could be useful beyond cultural boundaries, working with diverse communities and situations of grief and suppression.

After I first recognized my personal Han, I began to come up with the idea that perhaps Han could work in both transcultural and transnational contexts. This thesis demonstrates that Han-based artifacts can be used for well-being and to empower underrepresented populations who have suffered and been isolated due to power dynamics, sociocultural forces, illness, or mental complications. The principles of the Korean healing ritual that transforms Han into Hope can be activated through digital art, promoting a healing context for emotional release.

Experiences of the Virtual

As a woman raised in the way of traditional Korean culture, I always feared being punished for expressing my emotions. My love was never to be exposed. It had to be kept eternally secret. There was something exciting about this secret game, though. Even when barred from the actual experience, I was rewarded with an imaginary virtual one, sometimes more vivid than my reality. I could be the grand narrator of my own love story, playing endlessly in an infinite imaginary virtual space — an experience that almost seemed tangible, working with the entire body, constructing alternate states of senses, nerves, and physicality. I experienced it as a new reality, the rainbow, which could not be perceived except from a distance. Not only that, but I promised myself never to touch it, so I could still see, feel, and dream it over that distance. The distance challenged me to look over, stand on my toes, lengthen my neck, and narrow my eyes, carefully and longingly nurturing my eternal process of loving.

Korean society is traditionally based on Confucianism, which has promoted profound gender discrimination. Even in contemporary times, despite all the advanced technology and the IT industry, this way of thinking dominates Korean society and is embedded into the cultural paradigm. Korean neo-Confucianism uses the concept of *KI*, which promoted self-cultivation of the mind and body, but only applied to men. Women were believed to be inferior to men because they did not carry the life-giving force (ki) that men did (Yoon, 1990, 9). Quoting Kim (2003, 97-102), the trinomial body-mind-ki is a Neo-Confucian concept of the male body.

Neo-Confucianism emphasized the corporeal for the female body, the very aspect men were supposed to transcend. "Women are trapped by the physicality of the body, mainly as reproductive machines" (Kim, 2003, 113). In this cultural milieu, it is interesting to see how Korean shamanism has played a role as a counter force, releasing and liberating these gender and class oppressions from Confucian disciplines. What was happening in my consciousness was akin to the process of Korean healing rituals, which were used as a tool to escape from oppression.

This research started from my inquiry of oppression in Korean Confucian disciplines, and my relationship with virtual bodies. With the realization of my powerlessness and the fact there was nothing I could do to fix the underlying social structure, I started searching for alternative bodies and realities in the virtual domain which was my consciousness. To escape from this harsh reality, I had to practice ways in which I could use my gaze, speech, and body movement to access the virtual realm, and experience the virtual. I worked hard to achieve the state of performing virtual bodies and virtual reality by using an active state of consciousness, imagination, and belief.

One of the methods I developed was voice acting to access my virtual bodies, which eventually motivated the idea of virtual puppetry. One of my childhood dreams was to become a voice actor who could transform into any person, acting out multiple selves and realities. This dream was eventually realized as a puppeteer in my virtual puppetry projects, and in my research on virtual bodies and avatars. I have performed as a storyteller speaking through a virtual puppet, very much like a voice actor in my fantasies. Virtual puppetry is a digital interactive puppet performance which projects a 3 dimensional digitally rendered puppet on a screen, controlled by a variety of interactive technologies such as voice and motion to create a live storytelling performance. It has constantly evolved throughout my embodied avatar projects such as VoicingElder and VoicingHan, providing a therapeutic relationship between virtual and physical bodies for older adults and cancer patients.

As a reflexive researcher, it has been important to reflect on my personal feelings, memories, and perceptions, which lead to my own definition of the virtual. This research is grounded in my personal inquiry, artistic creation and technical development of an interactive apparatus, to understand virtual body experiences, and to investigate embodied perceptions in a complex emotional phase, informed by the Korean healing ritual. Throughout the research development,

I have been dedicated to understanding human experience as mediated by virtual reality technology, which is, in my opinion, inherently connected with the consciousness of underrepresented populations, including older adults and terminally ill patients. Throughout the research, a transdisciplinary and transcultural approach has been used, to investigate and understand human experience of the virtual body and reality. Working in the field of digital art through the virtual body, virtual reality, and interactive technology, I have realized it is critical to bring transcultural dialogues and alternative perspectives into discussions of digital media. Transcultural dialogues have been formed between Korean healing rituals and western therapeutic concepts. Transdisciplinary collaboration has involved computer science, gerontology, medicine, and social work, which has enabled discussion of multiple perspectives in examining the complexity of human experience.

Introduction

This thesis report explains the overall development of the Embodied Avatar Performance, specifically two avatar life-review projects that correspond to the period of 2016-2020, VoicingElder (2016-2018) and VoicingHan (2018-2020). However, I also included the project Parting on Z (2010), developed in a period before my enrollment to the Ph.D. program, to give more context to the antecedents of the thesis research and to explain the design research process.

This thesis is practice-based research in the field of digital media art, and it has a clear application component. Robin Nelson in his book *Practice as research in the arts: principles, protocols, pedagogies, resistances* (2013) set the principles that must guide practice-based research; that is the imbrication of theory within practice, especially in research projects based on arts and design. Following this author, practice led research involves a being-doing-thinking that can generate new knowledge across a range of disciplines and is entangled in an ethical dimension. Although the product and the research process are the primary output of this kind of research, a contextualizing complementary writing is necessary to include and reflect upon the research questions, objectives, and the conceptual framework for the research. Thus, this practice-based thesis is also an article-based thesis, and includes the two artwork projects, the 5 publications and this thesis report to contextualize the articles and explain the different contexts of my research process and the main goals obtained.

Publications

This thesis report accompanies the compendium of publications in order to explain the research process and to contextualize the papers' contributions in the field of art, health and digital technologies, while highlighting conclusions that are supported by the results presented therein. It is based on my Embodied Avatar Performance research, specifically two avatar life-review projects from 2016-2020, and the research results have been published during the different phases of the development and implementation of the Avatar platform. The following papers are the main contribution of this thesis, where I present my research advances in the form of published papers that are attached in Annex 3. These are:

- Publication 1: Ryu, S. (2017). Avatar life-review: Virtual bodies in a dramatic paradox. Virtual Creativity, 7(2). Bristol, UK: Intellect Ltd, 121-31. doi: 10.1386/vcr.7.2.121_1

This publication presents the research process of the VoicingElder avatar life-review project I designed as part of this doctoral research. Life review is a narrative-based intervention in the light of drama therapy concepts and methods, exploring a hybrid mode of avatar/drama therapy in a virtually mediated environment. I reflect upon the applied qualitative methodologies to evaluate participants' experience and its positive results.

- Publication 2: Ryu, S., Noreika, D., Dang, M., & Del Fabbro, E. (2019). VoicingHan: between Mortal and Immortal. In Park, J., Nam, J., Park, J. W. (Eds.), Proceedings, 25th International Symposium on Electronic Art. Asia Culture Center, Gwangju, Korea, 174-180. ISBN: 979-11-87275-06-0

This publication, written in collaboration with the medical palliative care team of Virginia Commonwealth University's Massey Cancer Center, Dr. Danielle Noreika, Dr. Egidio del Fabbro, and Malisa Dang, presents the VoicingHan project, the avatar storytelling platform I designed for patients with advanced cancer receiving palliative care. This is a theoretical paper about the experience of mortality in relation to the Korean concept of Han and how VoicingHan supports terminally ill patients by using oral storytelling as an artistic medium, facilitating patients' interactive performances while promoting autonomous creativity to support "patient activation" or "patient-centered care."

- Publication 3: Ryu, S. (2020). Performing virtual bodies. International Journal of Performance Arts and Digital Media, Taylor & Francis, 1-17. doi: 10.1080/14794713.2020.1778899

This publication presents the theoretical background of my two research projects VoicingElder and VoicingHan, and how my research can contribute to enhancing the notion of 'virtual bodies' by considering a cross-cultural approach that links traditional methods and digital outcomes. This article demonstrates methods of experiencing virtual bodies, in the context of Korean

healing ritual, and discusses my avatar life-review projects, in the phase of wishing, facing, creating, and performing virtual bodies.

- Publication 4: Dang, M., Noreika, D., Ryu, S., Sima, A., Ashton, H., Ondris, B., Coley, F., Nestler, J., & Del Fabbro, E. (2020). Feasibility of Delivering an Avatar-Facilitated Life Review Intervention for Patients with Cancer. Journal of Palliative Medicine, 24(4), 1-7. Apr.2021.520-526.doi:10.1089/jpm.2020.0020

This publication was written in collaboration with Dr. Danielle Noreika (Medical Director, Inpatient Palliative Services, Department of Internal Medicine, Division of Hematology, Oncology, and Palliative Care, VCU), Dr. Adam Sima (Director of Statistical Consulting, Department of Biostatistics, VCU), Holly Ashton (Research Assistant, Department of Kinetic Imaging, VCU), Brianna Ondris (Research Assistant, Department of Kinetic Imaging, VCU), Felicia Coley (Nurse Patient Navigator, Department of Internal Medicine, VCU), Dr. John Nestler (Professor of Internal Medicine, Department of Internal Medicine, VCU) and Dr. Egidio Del Fabbro (Palliative Care Endowed Chair and Program Director, Department of Internal Medicine, Division of Hematology, Oncology, and Palliative Care, VCU) and presents the clinical results of the VoicingHan project demonstrating that the avatar design was feasible with a high rate of adherence, completion, and acceptability by patients.

- Publication 5: Ryu, S., & Price, S. (2021). Embodied storytelling and meaning-making at the end of life: VoicingHan avatar life-review for palliative care in cancer patients. Arts & Health: An International Journal for Research, Policy and Practice. Taylor & Francis, 1-15. doi: 10.1080/17533015.2021.1942939

This publication, co-authored with Dr. Sarah Price, Professor and Associate Dean at the School of Social Work, VCU, presents the results of the qualitative analysis based on narrative review of the Video recordings with cancer patients, demonstrating the benefits of VoicingHan life-review through the lens of Social Constructivism. This qualitative study deepens our understanding of human-avatar interactions to support life review processes and the role of creativity, play and performativity within the liminal space of a life-threatening illness.

Thesis report structure

The next pages complement the research products and contextualize the publications presented to fulfill the requirements for the Ph.D. thesis program by compendium of publications. This report chronologically explains the development of the project ideas, their design implementation and conceptual frameworks, as well as previous concepts and backgrounds which are important foundations of Embodied Avatar Performance, including two avatar life-review projects. The five publications demonstrate different lenses and methodologies for understanding the VoicingElder and VoicingHan avatar life-review projects as transdisciplinary research, with diverse analyses, results, and discussions. In this report, these five publications are paraphrased or quoted in the appropriate chapters, along with other contributions made during this research process.

Chapter one, The Embodied Avatar Performance, explains the main axes of the thesis research plan, its aims, research questions, the working hypothesis, objectives and overall methodology. **Chapter two**, Virtual Puppetry, explains the philosophical foundation of the projects; the Korean healing ritual, Korean emotional concepts, impossible love, and paradox, as well as my virtual puppetry project "Parting on Z", and transition to Embodied Avatar Performance. **Chapter three,** VoicingElder, introduces the pilot avatar system developed for this thesis. It includes the description of the project designed for elderly populations, presenting thematic analysis, field notes, data analysis, and main results. Enhancing Theoretical Horizons, **Chapter four**, explains new conceptual frameworks that have emerged from the VoicingElder project, such as drama therapy, performing virtual bodies, person centered care, and digital orality. **Chapter five**, VoicingHan, includes a new development of the avatar design applied to cancer patients as part of palliative care. This chapter additionally describes the research methodology in terms of quantitative analysis, qualitative analysis, and the results, including a Korean emotional interpretation of the experience. Finally, **Chapter six** is devoted to summarizing the main conclusions and future research directions.

Chapter 1. The Embodied Avatar Performance

In this chapter, I introduce the state of the art and main theoretical framework regarding the Embodied Avatar Performance in the context of Arts and HCI design, and in the context of Therapy. Then, I present the main goal, research questions, hypotheses that lead to this research, its applied purpose, and its transdisciplinary scope. I also mention the methodological framework and guidelines that have oriented the different phases of the research and its objectives. The concrete methodological procedures are developed at length later, when explaining each phase of the research development.

This thesis in the intersection of Art, HCI design and Therapy is grounded in the conceptual framework of virtual puppetry I have developed as a live storytelling performance art. Early on, the interactive system was a virtual puppet activated by voice, recorder play, a wiimote controller, and a wii fit board. The structure of the virtual puppet was very simple, like the traditional Korean puppet. Later on, and for this doctoral project, it evolved into a more sophisticated form and has been reconceptualized in what I call Embodied Avatar Performance (EAP), by enhancing the theoretical framework and the design technology. In particular, body detection technologies such as Kinect and motion capture sensors were adopted into the virtual body as a human shape, and are called "avatars."

Embodied Avatar Performance (EAP) is a live performing art and healing ritual, investigating the virtual body experience facilitated by the embodied avatar's mimicking a participant's body movement and speech, in real time. A performative aspect of EAP is live oral storytelling, based on Korean ritual, and transformative interactions between physical and virtual bodies, explained in Ch. 2. The process of embodiment is based on the emotional phases of the Korean healing ritual explained in Ch. 2.2 and 2.3.

This thesis describes a movement from a performing arts practice to a health and wellbeing research project centered in the performer's consciousness and community with the purpose that Art and HCI design can contribute to improve health and wellbeing for people and community. The EAP projects specifically designed for life-review therapy are called "avatar life-review", and form the core of my Ph.D. research.

1.1. EAP in the context of arts

Embodied Avatar Performance is grounded in the figure of the Avatar. The word avatar originates from Hindu mythology which describes a physical manifestation of Hindu deities. In eastern traditions, the avatar also serves as an alter-ego that supports play with perceptions and emotions as a way to manage life crises, helping to restore an inner balance. In fact, the original meaning of "avatar" includes this holistic notion of balance. In Hinduism, the avatar balances cosmic forces and energy. When the cosmos is out of balance, the avatar appears in material form to destroy evil and restore the cosmic balance between the ever-present forces of good and evil (Lochtefeld, 2002).

In HCI, an avatar is a graphical representation of the user's body or the user's character or persona. Usually, avatars present as two-dimensional icons in Internet forums and online communities, where they are also known as profile pictures. However, an avatar can also take the form of a three-dimensional model, as in online worlds and video games (Calleja, 2007 and 2011). However, we see the usage of "avatar" quite simplified in digital space and in the literature of interactive design. Filiciak (2008) defines it as "the user's representative in the virtual universe." Chris Crawford describes avatars in a similar way: "virtual constructs that are controlled by human players and function as a means of interacting with other characters" (Waggoner, 2009). These definitions are merely operational; they don't account for the rich emotional component embedded in the experience of interplay with an avatar. The same problem exists in defining the puppet. The Western view of the puppet is one of low ontological status, caught up in hierarchical prototypes and a rhetoric of command and control (Shershow, 1995). However, in societies where shamanic practice persists, puppets are ritual entities with a subjective status, an evolutionary step beyond masks (Baird, 1965). Avatars can also be understood in terms of puppetry and viewed through this cross-cultural dimension.

At early stages, digital avatars were limited, but with the advance of technology, became more complex and opened up new possibilities for customization and interactivity between physical and virtual bodies. There has been extensive research in the field of avatars from the humanities and social sciences (Doyle, 2008), but there has not been much creative art and live performance research using avatars. At the same time, avatar researchers in humanities, social science and medicine have not fully considered the potential for improved therapeutic experiences that may be achieved by collaborating with artists in the design, creation and

performance of interactive avatars and their virtual environments, without putting enough weight for artistic creation of the avatars and virtual environments, or experimentation of interactive modalities and performativity which has a tremendous potential to proactively design human experience. This research explores this potential in the process of creating and engaging virtual avatars and sharing them for communal healing and deep reflections, an important artistic feature of EAP, inspired by the Korean healing ritual that will be explained in Ch.2.2 & Ch. 2.3.

In psychology, behavioral and communication studies, Jeremy Bailenson has worked extensively on virtual human research projects at VHIL (Virtual Human Interaction Lab) at Stanford University and had many publications on the psychological and behavioral effects of Virtual Human and Virtual Reality (VR) interactions. Barcelona neuroscientist Mel Slater's extensive work exploring the concept of body ownership illusions points to an additional power of VR. Slater and Sanchez-Vives beautifully described virtual body experiences, referring to Franz Kafka's novella Metamorphosis, and addressing body transformation and reconfiguration (Slater & Sanchez-Vives, 2016). Research into virtual body experience and body representation began with virtual reality pioneer Jaron Lanierin the late 1980s (Slater & Sanchez-Vives, 2016).

Virtual avatars are not simply more or less realistic representations of the human body, but also opportunities to examine "embodiment", creating new awareness and cognition of the body, in a virtual world. An early, pioneering example of virtual embodiment is "The Placeholder" project, done in the early 1990s by Brenda Laurel, Rachel Strickland and team (Laurel, Strickland, & Tow, 1994). The Placeholder reflected Donna Haraway's notion of our relationship to other gendered creatures (Haraway, 1985). In The Placeholder, you are embodied as one of four totemic animals: spider, crow, snake or fish, performing from their point of view, speaking in their voice, and seeing with their eyes (Morie, 2007). A virtual avatar allows us to adopt a third-person point of view, looking at our own body representation as a virtual self in VR space, and offering an opportunity to explore new awareness and realization in line with the original Hindu meaning of the term avatar: "the incarnation of a spiritual being into physical form.

Other early art works employing avatars include Victoria Vesna's Net Art project "Bodies INCorporated", first exhibited in 1996, which allowed people to log on to the site and build 3D bodies from different components and "World of Female Avatars", created by Evelin Stermitz, Jure Kodzoman, Ljiljana Perkovic, and Loritz Zbigniew, which asked visitors to submit images of

and texts about the female body that make a personal statement. (Stermitz, Kodzoman, Perkovic, & Zbigniew, 2004, para. 1 and Liao, 2013).

Avatar technology has advanced significantly since then, with more customization possibilities and controls. Currently, VR chat is available with full body motion capture and speech, and brings public attention to avatar-based communities. In the past, the most popular avatar platform was Linden lab's virtual world "Second Life" (SL) launched in 2003 (Rymaszewski, 2007).

Artists have used the SL platform for avant-garde performance, such as Allan Kaprow's "Happening," which had roots in the 1950s (Liao, 2013). Other virtual performance artists include Cao Fei, Eva and Franco Mattes, Second Front, Gazira Babeli, and Micha Cárdenas. Artist, activist and theorist Patrick Lichty (2008) proposed three theoretical frameworks for his works in SL : Allan Kaprow's Happenings, Joseph Beuys's idea of social sculpture, and Nicolas Bourriaud's theory of relational aesthetics. Happenings and relational aesthetics help to explain avatars as tools for performance art. Moreover, Second Life was considered as an alternative place to perform, socially engage and act. The performance artist Joseph DeLappe re-enacted Mahatma Gandhi's famous 1930 Salt March, in his SL performance "The Salt Satyagraha Online: Gandhi's March to Dandi in Second Life (2008)". It was a 26 days walking performance, via a customized treadmill designed for cyberspace. He also performed at the online game space and created machinima. His work "Dead_in_Iraq (2006–2011)" used the online US Army recruiting game, "America's Army", to create an online memorial for the US military people who have been killed in this conflict (Doyle, 2008).

More recently, in 2021, Laurie Anderson used avatars to perform her talk for the Norton Lectures-the Annual Arts and Humanities lecture series coordinated by the Mahindra Center for the Humanities at Harvard University (Scherlis, 2021). This lecture was crafted specifically for Zoom. She featured embodied virtual avatars in her talks, with her voice speaking through the faces of Gertrude Stein, Sigmund Freud, Brian Eno and John Cage, borrowed from an old photograph Anderson has turned into a mask, which demonstrated a lot of potential for performing live with the avatars, in the context of contemporary art.

In the film industry, avatars have been used as a symbolic metaphor by contemporary artists. For example, a British contemporary artist Ed Atkins explores mass media reproduction and

transhumanism, by using the avatars in his HD video works. His avatars look like computer-generated autonomous beings that are hyper-realistic and uncanny. They cannot be separated from their creator, like surrogates (Spampinato, 2014). Even in the format of video, Atkins' work is highly performative, presenting avatars performing with his facial expression, body movement, and voice tone. Jacolby Satterwhite is another contemporary artist who uses virtual avatars dynamically in his dance animation works, for diverse representation of bodies. Various avatars of the artist himself appear and dance on-screen, often at the same time, as electronic music plays, providing interesting audio-visual aesthetics. Contemporary artists have also used virtual avatars as new visual and conceptual elements, in video, animation and time-based media, which is different from EAP putting emphasis on the performer's kinesthetic consciousness and the embodied perception in a real-time performance setting.

Game designer Lehrer (2006) draws on theories of emotion to argue that increased bodily movements have the potential to alter the emotional state of players, and as such also afford intensified experiences that designers need to consider. This aspect is connected with the concept of embodied storytelling as discussed in Ch. 5.4.1.2. It is also known that there is a critical difference between a tangible and intangible interface. Intangible interfaces such as Kinect virtual sensors have been shown to facilitate an active state of body engagement (Hornecker and Buur, 2006) promoting emotional and empathetic relationships, suggesting a ripe area for additional research (Mueller, 2016).

In their book Infinite Reality: social identity and the self, Blascovich and Bailenson (2012) discuss two aspects of avatar representation. Individuals play multiple social roles and hence have multiple, often overlapping, social identities. Social Psychologist Darly Bem's self-perception theory demonstrates that people are constantly influenced by their own bodily feelings, appearance, and utterances in making decisions. The virtual body can provide diverse looks, and bodily feelings, to facilitate a diverse spectrum of self-perception. People's self-concepts are influenced not only by others with whom they interact, but also by their own appearance and behavior, which suggests the potential of avatars to impact real life, and to be used for therapy.

1.2. EAP in the context of therapy

In the context of traditional art therapy, Embodied Avatar Performance (EAP) is associated with drama therapy, therapeutic puppetry and embodied art therapy. This thesis report covers drama therapy and therapeutic puppetry as discussed in Ch. 4.1 and Ch. 5.4.3. One form of drama therapy that is particularly important to explain the basis of EAP is therapeutic puppetry.

The human experience is the most critical element in Embodied Avatar Performance, as it involves the person's embodied state, self-perception, emotion, and the phenomenological reality mediated by technology (Merleau-Ponty, 2012). Researchers have suggested that puppets may be beneficial for patients with mental illness (Schuman et al, 1973; Koppelman, 1984; Steinhardt, 1994; Gerity, 1999). Therapeutic puppetry is defined as the use of puppets to aid physical and emotional healing and can include the construction, use and observation of puppet performance (Bernier 2005). Seen as a psychodynamic object, the puppet represents parts of the self. By acting out complex emotions using the puppet, the patient externalizes their internal state, helping to craft a more coherent self and resolve "splits" (Gerity 1999). Holmes (1993) similarly suggests that puppets can help patients achieve "autobiographical competence (Holmes 1993)." White & Epstein (1990) suggest that puppets help patients to create "thick" stories that incorporate lost or fragile memories, as opposed to the "thin" stories of the self that can overly dwell on shortcomings and stigma. Therapeutic puppetry supports the central aspect of embodied storytelling in EAP, explained in Ch. 5.4.2.

Embodiment can deepen the experience of art therapy. In embodied art therapy, movement, perception, and emotions are sensed, processed, and expressed through the arts (Koch & Fuchs, 2011). Combining movement with the creative process facilitates agency and empowerment of individuals, in the process of discovering their authentic voice (Majaj, 2020). This is the therapeutic potential of EAP, mediated by avatar virtual bodies and virtual environments. Body movement can directly influence affect and cognition (Koch & Fuchs, 2011) as discussed in Ch. 5.4.2.

In the area of Avatar therapy, clinicians have explored using the online virtual world Second Life as a site for psychotherapy (Gorini, Gaggioli, Riva, 2008; Quackenbush, 2012). Other researchers have had success using avatar-based interventions for depression (Melissa, Pinto, et al, 2013; Wiederhold, Riva 2013). Recently, researchers used dynamically controlled avatars

to bring to life patient's visual hallucinations. By providing a face for the patient's mental image of their hallucination, and by controlling that image in real time, the therapist was able to embody the persona of the patient's hallucination. The experience for the patient is that they are speaking directly to their hallucination. This technique was deemed effective in reducing the frequency and intensity of persecutory illusions (Leff et al, 2013; Craig et al. 2014).

Nowadays, VR has been used a lot in therapeutic contexts (Hacmun et al., 2021). For instance, virtual reality therapy is now commonly used to treat post-traumatic stress (Rothbaum et al, 2001) (Difede, Hoffman, 2002), allowing patients to explore trauma and difficult situations in a safe and controlled environment. Studies consider artistic VR to be crucial for the evolution of the field of art therapy (Carlton, 2016; Hacmun et al., 2018; Lohrius & Malchiodi, 2018; Marks, Marks, & Brown, 2017). VR has the possibility of fostering empathy, intimacy and a therapeutic alliance between the client and therapist (Hacmun et al., 2018; Lohrius & Malchiodi, 2018; Marks et al., 2017). Virtual reality art can contribute to the self-observation and reflection process, which is critical to psychotherapy (Beitman & Soth, 2006).

Embodiment entails complex emotional experience (Burkitt, 1999). The well-documented relationship between emotion and memory (Uttl, Ohta, Siegenthaler, 2008), is critical in therapeutic traditions such as drama therapy, and has been recognized for years. In "Drama as Therapy Volume 1: Theory, Practice and Research", Phil Jones writes: "Embodiment in drama therapy involves the way the self is realized by and through the body". The body is often described as the primary means by which communication occurs between self and other. This is through gesture, expression and voice" (Jones, 2007, 113). Attention is given to the ways in which the body communicates on an unconscious, as well as conscious level (Elam, 1991). The way the body relates to an individual's identity is, then, an important element in drama therapy work.

Embodiment is an important subject across therapy, digital worlds, and mindfulness practices, with different methodological implications. Varela (1991) has discussed embodied interaction between a subject and another entity in a Buddhist worldview: mindfulness provided insights in embodied cognition, with integrative models of mind/body only recently explored by Western science. User experience in virtual worlds needs to be further investigated through cross cultural perspectives where Buddhism, Hinduism or other eastern philosophies can contribute. EAP offers traditional Korean thoughts and healing practices, in the context of artistic creation, HCI

design, conceptual frameworks and methodologies, investigating the embodied perception of user experiences.

1.3. Research design

This research is framed as therapeutic practice, lead in creative arts (Smith and Dean, 2009; Nelson, 2013) utilizing an embodied avatar performance to assist the life review process as a playful and therapeutic experience for different populations to foster well-being. To accomplish this main goal, I focused my design research in developing an avatar platform following the principles of person-centered therapy developed by humanist therapist Carl R. Rogers (Rogers, 1951). As seen in the previous section, while researchers have used avatars in many ways to increase the efficacy of therapy (Craig, 2015), the person-centered approach has not yet been fully explored.

The aim of this research is to allow the individual to recall, enact and narrate their own life stories which is related to the active state of expressing memory and stories via avatar virtual bodies. Healthcare professionals have been increasingly moving toward a holistic model of care that emphasizes individually defined experiences and needs (Brook, 2007; Kitwood, 1997). The concept of person-centered care builds on a fundamental respect that personalizes care, emphasizing the person's past, present, and emerging life history as well as respecting their values, culture, and preferences. The person-centered model moves away from the clinical and professionally oriented models of care to a perspective that promotes individual autonomy in all settings.

This research also brings forth the importance of cultural diversity in designing technology. Diverse cultural perspectives in HCI are necessary to realize the importance of cultural factors in the design and evaluation of interactive technologies (Salgado, L., Pereira, R., Gasparini, I., 2015). I expect that one contribution of this research is to demonstrate that diverse cultural traditions can be merged in digital media design and performance processes to enhance theoretical and methodological frameworks in the field of HCI and VR AR MR. The cultural traditions like the Korean can be successfully implemented and used by people coming from diverse cultural backgrounds. Moreover, incorporating our own cultural tradition in digital media

art practice and performance will also enhance not only the field of HCI and VR, but the way we all understand digital technology and human experience.

This transdisciplinary research intermingles art, design, health and therapy, aiming to explore possibilities for the therapeutic use of performing art. It cannot be done within one discipline and needs support and insights from diverse fields of study. During these research projects, I have collaborated with doctors, nurses, and therapists,[2] and under my direction, I coordinated a production team "CoPuppet" which has 3D modeler/animators, sound composers, videographers, and interaction designers. A computer science professor, Dr. Stefano Faralli at University of Rome La Sapienza, Italy, created the sentiment analysis algorithm to detect the emotional state of the user's speech contents that was implemented in VoicingElder. The team has updated this sentiment analysis for working in continuous live speech for ongoing embodied avatar performance projects.

1.4. Research questions, working hypothesis and objectives

The overall thesis proposal is that Avatar virtual bodies help the participants to improve their wellbeing by therapeutic engagement in life review processes. Thus, the main research question is the following:

- Can Avatar virtual bodies engage the participants' own memories and storytelling, to improve their wellbeing?

And two related questions are:

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- How to design a digital avatar to improve the participant's playful engagement in life-review processes?
- How to evaluate that the digital avatar helps the participants to be more emotionally engaged with their storytelling in life-review contributing to their well-being?

The assumption that underlies the main research question is that performing with one's own avatar virtual bodies may increase the participant's playful engagement with his or her own memories. My main working hypothesis is that acting out through (or performing) the avatar virtual body facilitates one's own healing process in conversation with different versions (age, environment, situation) of the self, with distancing effects. This can be used for memory retrieval and help people to tell painful stories or memories in an easier way.

The use of Avatar virtual bodies facilitates distancing effects that are beneficial for expressing people's stories in challenging situations. By acting out complex or difficult memories using the virtual bodies, the person can recreate internal states in an external form, helping to recall memories, self-expression, and meaning making, promoting therapeutic effect.

My working hypothesis in relation to the expected results of the avatar platform is that the avatar virtual bodies will facilitate a playful and safe life-review process by helping the participants' self-expression of emotions and deep memories that will be experienced as a therapeutic effect for the participants.

Thus, the research objectives are:

1) To design an Embodied Avatar Performance to assist the user to:
- Explore his/her lifespan in a more meaningful and playful way.
- Access deep memories, and the emotions and feelings linked to past experiences.
- Communicate their memories, emotions, and feelings to an audience.

2) To explore how transcultural art based HCI can contribute to enhance design methods:
- How the designer's cultural background is put into work impacts research design method, approaches, and outcomes.
- How an interactive system based in nonwestern thought can be integrated in diverse cultural contexts of the participants contributing to their wellbeing.

1.5. Methodology

In this section, I present an overview of the methodological approach for design and research, and the ethical procedures carried out. Particular research methodology for each Avatar platform implemented will be given in Ch 3.3 and 5.5.

I understand my research as practice-based research as it is an original and innovative investigation undertaken to gain new knowledge in which practice is part of the method of inquiry (Nelson, 2013). This conception of research has been discussed largely in the field of arts and design claiming that these fields have their particularities diverse of well-established sciences methods but share the main principles of academic research in its substantial bases. Brown and Sorensen in their publication "Integrating Creative Practice and Research in the Digital Media Arts" explain that "in the research process theoretical claims are usually evaluated in practice and, indeed, the observations and experiences of practical circumstances often lead to new research questions. This feedback loop between speculation and experimentation is fundamental to research in many disciplines and is also appropriate for research in the creative arts" (Brown and Sorensen, 2009, p. 153). According to Candy and Edmonds (2018), in creative practices, including digital media art, the output of the research process is both the artifact developed and the new knowledge that is produced. In this sense, "practice and research operate in such a way as to generate new knowledge that can be shared and scrutinized" (Candy & Edmonds, 2018, p.63). Practice-based research, then, is an original inquiry undertaken in order to gain new knowledge by means of practice.

Practice based research is a methodological framework for both art and design practices. And in fact, my research engages both of these fields. Henk Borgdorff in his paper "The production of knowledge in artistic research" (2010) poses artistic research as a form of knowledge production described in terms of subject, method, context, and outcome as research "in and through art practice". In his own words: "Embedded in artistic and academic contexts, artistic research seeks to convey and communicate content that is enclosed in aesthetic experiences, enacted in creative practices and embodied in artistic products." (Borgdorff, 2010, p.45). I agree in general terms with this definition, but my research is not limited to "aesthetic experiences" and includes design HCI practices. Thus, I would rather follow Robin Nelson's definition of "research as practice" or practice-based research, and develop my methodological approach through the design tradition, although connected with research through art. In fact, Nelsons' recent book

Practice as Research in the Arts (and Beyond) (2022) acknowledges the transdisciplinarity of this approach, arguing that arts research is not an irreducible different kind from other modes of research, but we must challenge the assumption that positivism is the only way to advance knowledge, and develop our methodologies in dialogue with other disciplines in humanities and social sciences, engaging with different scientific traditions, digital technologies, and socio-political issues, in an entanglement of modes of knowing (Nelson, 2013; 2022 2ed.,p.5).

Thus, the research methodology designed for this thesis follows two interrelated paths: one corresponding to the design of the avatar interactive platform itself (design research methodology) and the other exploring the participant's experience and the evaluation of the results in concordance with the hypothesis and research questions using social sciences qualitative and quantitative methods. This mixed methodology has involved the iterative development of the avatar interactive system and the enhancing of its theoretical foundations through a loop of testing and evaluating the Avatar system with the participants and different interdisciplinary teams.

1.5.1. Design research methodology

The Avatar interactive system was designed to support person-centered therapy, a non-directive form of talk therapy that was developed by humanist psychologist Carl Rogers during the 1940s and 1950s. Today, it is one of the most widely used approaches in psychotherapy. Rogers initially started out calling his technique non-directive therapy, supporting autonomy of the patients' self-exploration. In line with Rogers' model, the avatar interactivity was designed to support the participants' discovery of their own healing process.

To create an avatar interactive system to support person-centered therapy, the avatar needed to be easily controlled by the participant, requiring minimal assistance and minimal prompts. It needed to support autonomous talk of the participant and had to support unconditional positive feedback and empathy.

The second premise of the Avatar platform[3] followed the concept of unconditional positive regard as used in person-centered therapy, which is the basic acceptance and support of a person regardless of what the person says or does (Rogers, 1951). This concept neatly aligns with traditional Korean healing rituals, as I will explain later.

The Avatar Interactive system design was developed based on the following parameters:

1. *Lip Syncs* with the participant's live speech. Parsed voice input animates the avatar's lips to produce real-time lip synchronization.

2. *Random eye movement* is used to simulate a typical human gaze.

3. *Body motion detection* and tracking causes the avatar's body to emulate the user's body motions.

4. *Avatar customization*: The participant can choose the avatars in different developmental stages (childhood, adolescence, adulthood, old age), ethnicity, gender, and outfit.

5. *Sentiment response*: Background images and sound reflect the emotional content of the participant's speech (based on six emotional categories; happiness, sadness, anger, fear, anxiety, and laughter). This feature supports an empathetic environment in the context of person-centered therapy that will be explained in Ch.3.5.
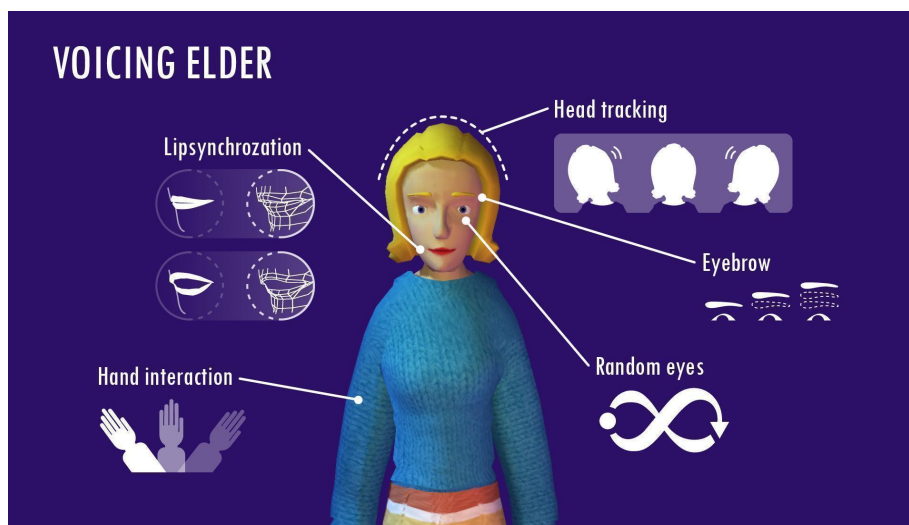
Figure 1: VoicingElder Avatar interactive design.

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[3] I use instinctively Avatar interactive system, Avatar system and Avatar platform as the artifact is a computing platform, the environment in which a piece of software is executed; but also, an interactive system as defined in Human Computer Interaction (HCI), which refers to evolving digital technology to allow people to interact with computers more naturally.

The design of an avatar platform is important, but as Paul Dourish notes in his book *Embodiment: where the action is*, emphasizes a consideration of setting is also important in the use of interactive platforms (Dourish, 2001). Designing the avatar system is important, but how the system can be used in, by who and which setting is critical. I used the avatar system in a diverse setting - social and clinical - which allowed exploration of inventive problem-making, speculative design, and reflexivity.

My design research process followed a human-centered methodology that included speculative design and reflexivity as discussed in Mike Michael's "inventive problem-making" (Fraser, 2010). Speculative design (Michael, 2016), in an empirical research setting, allows the researcher to be open to possibilities, mutual change and co-becoming with participants, rather than only looking for answers to pre-existing research questions. "Speculative design" is conceptually situated between "participatory design" and "critical design", allowing for unexpected insights from emergent properties. Reflexivity is also a core methodological principle in my design process. Reflexivity has recently been introduced across disciplines, in social sciences, humanities and design. It is a core of participatory design practice where researchers, designers, and participants are positioned within projects, to generate possible meanings considering the voice of the participants and by being there, with special sensitivity to the participants' actions and feelings (Ardevol, Pink, Lanzeni, 2016). I maintained a reflexive register (field notes, video documentation, memory, etc.) of my own process in incorporating performing art, interactive design and audiovisual composition while implementing the avatar system with participants. Reflexivity offers opportunities for participants to collaborate with the artist in design and experimentation processes; my field notes, following an ethnographic approach, allowed me to track and learn from experiences means that the artist as researcher participates in the design experimentation with participants and takes fieldnotes following an ethnographic approach that allows the researcher to learn from experience in a meaningful reflexive way (Dourish, 2006).

Although I did not follow a participatory design methodology, I agree with Elisabeth Sanders (2002) that my aim is to design for experiencing:

> "But we can never really 'design experience'. Experiencing is a constructive activity. That is, a user's experience (with communication, for example) is constructed of two equal parts: what the communicator provides, and what the communicatee brings to the interaction. Where the two parts overlap is where the actual communication occurs.

Knowing about users' experiences, then, becomes vital to the process of designing the communication. If we have access to both what is being communicated and what experiences are influencing the receipt of communication, then we can design for experiencing. In fact, if we can learn to access people's experiences (past, current and potential), then we can make user experience the source of inspiration and ideation for design. And by making user experience the source of inspiration, we are better able to design for experiencing." (Sanders, 2002, p.2).

Sanders' (2002, p.3) design methodology includes social science methods both, to test participants' experience following an empirical objective procedure, and to discover participants' subjective perceptions of experience. Incorporating inquiry into how participants' feel about their interaction with the artifact helps the designer or artist researcher to empathize with them. This is an intersubjective research model that makes evident tacit knowledge and provides the researcher with new insights and new knowledge for improving her or his work in a research loop between design, participants experience, social sciences methods and reflexive critical thought.

1.5.2. Qualitative and quantitative methodologies

My thesis is related to the Art therapy tradition that supports patients in engaging in creative processes to improve their wellbeing. However, Zubala et al. (2021) argue that the adoption of digital media in art therapy has been slow due to health professionals' resistance to digital technology and concerns about the effectiveness of the treatment. Incorporating digital media within therapy processes is not always easy, especially as it is key to incorporate, in research design, the role of the triangular therapeutic relationship among the therapist, the client and the artwork. Teamwork with health professionals in developing methodologies to evaluate the implementation of the EAP model was crucial to this research.

To evaluate the participant's experience through the avatar platform, quantitative and qualitative research methodologies were used, together with medical professionals, gerontologists and a social worker, for multiple angles of understanding experiences, and diverse research findings. In each case, the research design, methodology and analysis were conducted as a transdisciplinary team. This transdisciplinary team was necessary to work with vulnerable populations such as older adult and terminally ill patients ethically with IRB approvals, and to

understand their quality of life and experiences, in a holistic view of artistic, gerontological, clinical and social work perspectives.

In VoicingElder (2016) I collaborated with Gerontologist Tracey Gendron at the Department of Gerontology, Virginia Commonwealth University. VoicingElder research was designed to fulfill 3 specific aims (see Ch.3.3.1 and Annex 1), using qualitative data collection strategies to address the research objectives (Strauss & Corbin, 1998). Working with Gayton Terrace Senior Living in Richmond, VA, we collected qualitative data to track and evaluate the older adult participant's transformation and the impact of VoicingElder on Quality of Life for seniors. Examination of the specific aims were accomplished using surveys, semi-structured interviews, non-participant observation, and field notes (Creswell, 2007). The interviews were conducted directly after the VoicingElder life review sessions. Publication 1 "Avatar life-review: Virtual bodies in a dramatic paradox" (2017) presents the methodology and empirical results of this project. A more detailed explanation is offered in Chapter 3 and Annex 1.

VoicingHan (2019) combined quantitative and qualitative methodologies. This project enrolled a team of medical care experts and incorporated a mixed methodology for gathering and analyzing data. Avatar life-review sessions were conducted in the VCU palliative care outpatient clinic, at Virginia Commonwealth University's Massey Cancer Center (see Ch.5 and Annex 2). The primary objective of the VoicingHan project, with the VCU palliative care team directed by Dr. Egidio del Fabbro and Dr. Danielle Noreika, was to explore the therapeutic benefits and determine the feasibility of delivering an avatar life review platform for patients with active cancer. Feasibility and acceptability were explored through semi-structured interviews and Likert scale-based patient satisfaction surveys. Following each Avatar session, a member of the research team conducted a face-to-face interview that consisted of open-ended questions to elicit detailed responses. Questions sought to understand participants' attitude about the intervention, perceived effectiveness or lack of it, barriers to engagement, and challenges faced throughout the session.

After the initial study of VoicingHan, a new IRB amendment[4] was made to add a new

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[4] In this secondary analysis, the completed digital stories will be the qualitative data source. A secondary qualitative data analysis will be conducted based on the digital stories as artifacts of the VoicingHan project which offer a narrative lens of human experience crafted by those engaging in the study, all of whom were impacted by a life threatening illness. A qualitatively trained researcher, Dr. Sarah Kye Price and Semi Ryu will be the primary investigator on this component of the project. Dr. Price had no contact with or information regarding the original project participants. Dr. Price will have access to the completed digital Avatar video which contains detailed life

component to the research study based on the completed life histories which emerged from the VoicingHan project. An IRB amendment was obtained for the retrospective qualitative analysis which included Dr. Sarah Price, a social worker and qualitative researcher onto the project team. In this secondary analysis, the completed digital stories were the qualitative data source. A secondary qualitative data analysis was conducted based on the digital stories as artifacts of the VoicingHan project which offer a narrative lens of human experience crafted by those engaging in the study, all of whom were impacted by a life-threatening illness.

Publication 4 **"**Feasibility of Delivering an Avatar-Facilitated Life Review Intervention for Patients with Cancer" (2020) and Publication 5 "Embodied storytelling and meaning-making at the end of life: VoicingHan avatar life-review for palliative care in cancer patients" (2021) present the empirical results of this project and its methodological grounds. The reader can also go to Ch. 5 and Annex 2 for further details.

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stories presented in Avatar technology, along with spontaneous participant reflections on the project which occurred during the course of the filming but none of which are personally identifiable.

Chapter 2. Virtual Puppetry

This chapter will discuss the theoretical backgrounds I developed for virtual puppetry, which is the foundation of Embodied Avatar Performance research and its projects. In this chapter, I explore the old tradition of puppetry, the definition of puppet and the relationship between the puppeteer and the puppet. Then, I investigate the traditional Korean concept of emotional phase in Korean ritual, and its relation to healing that contributed to the fundamental design principle and purpose of the embodied avatar performance art platforms. One of my virtual puppetry projects "Parting on Z (2010)" is included here as a first prototype for the Embodied Avatar Performance research.

2.1. What is a puppet?

In this section, I will introduce the reader to the Puppetry tradition and its relation with Korean Ritual. First, the connection between puppetry and ritual will be established. Then, I will explain the emotional tapestry in traditional Korean culture and how it relates with Korean shamanism and healing rituals.

2.1.1. Puppet as ritual object

Theater scholar Steve Tillis mentions the basic etymology of the word in the English language: "'Puppet' comes from pupa, Latin for 'girl' or 'doll' or 'small creature.' The -et makes it diminutive, a small, small creature, and the word marionette, of Italian-French origin, [meaning] 'little, little Mary,' does not differ from puppet in basic meaning, though it has a double diminutive ending" (Tillis, 1992, p.16). Shershow points out the "ontological lowness of puppet" in *Puppets and "Popular" Culture*: "The word 'puppet' derives from pupa, the feminine version of the classical Latin word for 'little child' which also had the meaning 'doll.' Pupa thus seems to manifest at once a psychosexual expectation of gender behavior (little girls play with dolls) and a more general semantic impulse of diminution (the small made smaller) … furthermore, the Latin 'pupa' itself derives from the Indo-European root pou, 'little,' which figures in other English words such as pupil, puppy, puberty, pauper and poverty—a semantic map of social and corporeal

subordination" (Shershow, 1995, p.17, p.69). The Allegory of the Cave from Plato's Republic supports this idea, describing prisoners who watch a shadow puppet theater, having their legs and necks fettered from childhood, which demonstrates a hierarchy of representation and the ontological lowness of puppet (Shershow, 1995, p.14-15). Shadow puppet has the lowest position on the hierarchy, in the Allegory of the Cave, which correlates to a greater distance from reality. The word puppet reflects this tradition, in understanding puppet and puppeteer, inherited in digital media culture as well.

However, shadow puppet is understood in an entirely different context in Indonesian shadow puppet theater, Wayang Kulit. The shadows are considered spirits of the deceased, maintaining the traditional Javanese animistic belief that everything had a soul (Djaja Soebrata, 1999, p.23). Wayang Kulit functions as a ritual for calling spirits in order to ask for advice or help in overcoming problems related to disharmony, and to bring balance between positive and negative forces of the community (Van Ness & Prawirohardjo, 1980, p.11).

In this ritualistic context, the puppeteer plays the role of shaman, entering into a transformative relationship with his ritual object, the puppet (Baird, 1965, p.56). This has later resulted in forms of freely improvised storytelling and of lively interaction with the public in the community. A coconut oil lamp fire casts constantly dancing shadows over the performance, allowing the viewer to perceive life, even when the puppet makes no physical movement, which demonstrates the ritual aspect of puppetry. The shadow puppet is alive in the viewer's consciousness and appears vividly in their perceptions. Puppet's life is completed in the viewer's spiritual engagement and imagination, which is an important part of the ritual. Puppets would be defined as a source of energy continuously sending the puppeteer into altered states of consciousness, breaking the constraints of the material world.

There are different ranges of understanding of the puppet and the relationship between puppet and puppeteer, inherited from digital media, as power hierarchy over transformation. I have been interested in the process of transformative ritual as a key component in puppetry, as I see a puppet as a ritual object.

2.1.2. Becoming puppet: transformation and paradox

The remarks of Michael Malkin, American scholar and producer, could be read in the context of transformation: "the animated object becomes a puppet not when the operator assumes complete control of it, but at the infinitely more subtle moment when the object seems to develop a life force of its own" (Tillis, 1992, p.24).

In my definition, a puppet is a ritual object going through and activating the process of transformation which is connected with the process of Korean shaman ritual. During the puppetry performance, the puppet object is transformed into a living being, then this living being comes back to the object, after the performance is ended. Such transformation happens in ritual objects such as knife, fan, rattle, puppet, etc. which become much more than daily objects, activating something like a spiritual power, during the ritual.

A puppet truly comes to life in man's consciousness, as in this description by Obraztsov: "In reality, no inanimate object can be animated—not a brick, rag, toy, or theatrical puppet—no matter how expertly it moves when manipulated by a puppeteer. Regardless of circumstances, the objects listed above remain objects lacking any biological features. However, in man's hands any object—the same brick, rag, sole of a shoe, or a bottle—can fulfill the function of a living object in man's associative fantasy. It can move, laugh, cry, or declare its love" (Tillis, 1992, p.23).

Steve Tillis, a theater theorist, comments about the paradoxical nature of the puppet: "The Puppet is given movement for the explicit purpose of encouraging the audience to imagine that the puppet has something that, in fact, it does not have: its own life…. The paradoxical pleasure created by the puppet's process of double vision operates on a fundamental level, beneath the more obvious pleasures that are provided by 'object'" (Tillis, 1992, p.28, p.65).

Thus, a puppet can be understood as an ancient prototype of dynamic human interactions with objects, for transformation. A ritual object such as a mask or puppet, used by a shaman, brings a trance state of consciousness, resulting in a performance of great excitement, public engagement and reflection of community. The willful engagement of the puppeteer (or shaman) continues in this play, which drives an infinite process of transformation. I think this willful

engagement is related to Cheong and Han in Korean emotional perspectives that will be explained in the next chapter.

2.2. Emotional phases in Korean transformative ritual

In my virtual puppetry projects, puppets are designed to function as ritual objects, to activate the ritual of transformation. The relationship between puppet and puppeteer has been my ongoing inquiry, as different states of consciousness and perception gradually emerge while facing, speaking and performing with a puppet. Here I present the Korean emotional phases, as it is important in understanding how healing rituals work in Korea as part of the main framework of my design and concept. Korean ritual represents a complicated and rich emotional psychic journey which can be transposed to explain the emergent relationship between virtual puppet and puppeteer, and between virtual and physical bodies. These three phases are:

Cheong: the nostalgic dream towards infinite oneness

Han: an extreme state of grief, distinguished by a strong wish to overcome a situation that seems impossible

Shin-Myeong: the ultimate state of playfulness

2.2.1. Cheong

Traditional Korean ontology has three basic elements: sky, earth and human, and has forces to integrate these three into a dynamic one. The symbol representing three elements is called *Sam-Taeguk*, and dynamic circulation of three elements, in swirls, is called *Yul-Lyeo* (율려). The driving force of this *Yul-Lyeo* dance is, in my perspective, "*Cheong*", and I see it as Korean nostalgia to embrace three to one. The Korean word for one is "하나 *Hana*" which has two dimensions such as "single" or "whole" (Lee, Park & Cha 2001, p. 45). There is a strong nostalgia towards oneness (from single to whole) present in the Korean emotion 정 *Cheong*. *Cheong* is the Korean psyche of feeling "us" (우리) (Choi 1993, p. 9). Silha Woo (2004, p. 1)

describes the dance of *Sam-Taeguk*, called *Yul-Lyeo* (율려), as a repetitive circulation of three kinds of energy, sky, earth and human, in alternate phases (swirls), from a quiet phase to a dynamic one. In this swirl, we can see a Korean nostalgia for *Ha-Na, meaning oneness* (하나) which, I think, is related with the motivation force for *Cheong* (Ryu, 2014).

Figure 2: Sam-Taeguk: Blue represents Sky. Red represents Earth. Yellow represents humans.

Cheong can be demonstrated in Korean dominant usage of the words "our" or "us", instead of "my" or "me". Koreans say "our" country, rather than "my" country, "our" mother rather than "my" mother, "our" family rather than "my" family. It is a Korean effort to get around ownership and individualism, by using "us" instead of "me". In the sensibility of "Us", we care for each other with affection, embracing differences in oneness Hana and this emotional concept is *Cheong*-voluntary emotion towards other selves, transcending the rational criteria of judgment or likability. *Cheong* is not only shaped in good relationships but also difficult relationships, in its special attitude of embracing all differences. *Cheong* is the warm and peaceful mind embracing it all, beyond agreements, beliefs, preferences, comfort or likability.

Sometimes, a *Cheong*-motivated behavior looks impolite and ill-mannered, since there are no personal boundaries to be protected, in the state of much *Cheong*. If someone tries to protect their own privacy, or show much kindness in the name of manners, this behavior is rather considered as "ingenuine" and "artificial" showing a sign of lack of *Cheong* (Choi, 1993, p. 13).

I think *Cheong* can be also related to quantum theories, metaphorically. This notion refers to a quantum psyche capable of unconditional love. In quantum psychology, there are no isolated persons; therefore, it is impossible not to love a neighbor as myself (Zohar, 1990, p. 169). The

dance of burning flames in *Sam-Taeguk* demonstrates longing for *Hana*, in infinite oneness shown in many Korean cultural motifs, including the Korean modern theology *Donghak* (Kim, 2001, p. 305). Quantum theory supports this, by revealing the essential interconnectedness of the universe, and coexistence of opposite states in paradox, such as force/matter, wave/particle, and existence/nonexistence, related with the Korean emotional paradox Han (Capra, 1975).

2.2.2. Han

Han is known as the most important element of the Korean mind and emotional landscape. It is an emotional paradox that combines an extreme state of grief but with a great hope and desire for overcoming a seemingly impossible situation. *Han* emerges from *Cheong* as it brings up the level of sensitivity,awareness and frustration we experience in our daily lives. When we are emotionally invested in a situation involving *Cheong*, frustration can follow against individualism, etc. At the end of *Cheong*, there comes *Han*. This is a frustration of not being one, coupled with strong wishes to be one.

The painful nature of *Han* has been described in diverse ways, as, for instance, an old score inside the mind that has not been settled (Choi, 1991, p. 342). Gil-Sung Choi describes *Han* as the sentiment created by a permanent resignation and a sense of great sorrow. Sometimes *Han* has been described as a blood clot, blocking the healthy circulation of energy flow in the body (Choi, 1991). Yeol-Kyu Kim (1982) showed the diverse spectrums of the *Han* quality by describing it in many dimensions: loneliness, emptiness, pain, sorrow, misery, sharp pain, lyricism, regrets and incompleteness. *Han* was visualized as an image of the Korean pine tree called *So-Na-Moo*. *So-Na-Moo* (소나무) is not as straight as the Japanese pine tree, *Sam-Na-Moo* (삼나무). *So-Na-Moo* grows curved with several turning points, reflecting the pains and difficulties endured over a long period. Ironically, those knuckles of Korean pine trees make the inner nature of *So-Na-Moo* eventually stronger and heavier. *Han* is like those knuckles of Korean pine trees deeply embedded in the tree's structure (Park, 2002, p. 72).

However, the more important aspect of Han is its optimistic nature for hope and change, rather than pain and grief. *Han* is connected with the action of looking up to the sky. What the king of the *Cho-Sun* (조선) dynasty of Korea feared most was to see people looking up to the sky with

sighs and tears, since this is the sign of *Han*. Han motivates people to look to the sky with a fearsome desire for change. *Han* is a complex mix of feelings combined with a sense of grief but accompanied by a strong will to overcome them, and it is believed that Han is easily found in persons with lots of *Cheong*.

Historically, *Han* has been developed from the specific geographic situation of Korea, being invaded a lot, as an important cultural route and a pathway between China and Japan. *Han* has been built as part of the Korean cultural psyche, based on many tragic historical events. *Han* can be also understood in the context of Confucian society. *Han* was triggered by minority's oppression in Confucius disciplines, including the lower class and women. As society's true voice remained unspoken and unexpressed behind rigid rules and authority, there has been a continuous frustration developing in the Korean subjectivity.

The emotional character of *Han* can be contrasted with a similar emotional concept called Won. Won is an important source of emotion driving heroic literatures. When an enemy kills a master that has a servant, *Won* rises in the servant's heart. He/she then promises to avenge his/her master and kill the enemy. Won is about eliminating the source of the problem by resolving it, whereas Han is the way to live with the problem, by releasing it. Unlike Won, in the state of Han, one acknowledges one's own participation in the situation (Kim, 2004, pp. 320–321), projecting responsibility towards oneself, regarding extreme states of grief, self-accusation and a sense of futility. This kind of mental state positions the self as part of an interconnected system, in the attitude of embracing everything, including problems and difficulties.

Han has been primarily discussed negatively in Korea (Han & Han, 2007, p. 84-85), because of its passiveness. However, the Korean scholar Eeo-Lyeong Lee highlights this optimistic sense of *Han*, saying "*Han* cannot be shaped without a strong desire to overcome the situation" (1982, pp. 9–23). *Han* gives one the courage to confront and deal with pain. Showing the other side of *Han*, 김열규 Yeol-Gyu Kim explain *Han* as a necessary condition to jump up to the extreme state of playfulness called "신명 *Shin-Myung*," (Kim 1986, pp. 123-133). *Han* is a necessary condition of *Shin-Myeong*, as a springboard allowing us to fly higher. The real potential of *Shin-Myeong* is driven by *Han* (Cho, 1997). *Han* starts as a sense of grief but is transformed into a sense of joy, in the state of *Shin-Myeong*.

2.2.3. Shin-Myeong

It is difficult to translate all the layers of meaning of *Shin-Myeong* into English. *Shin-Myeong* includes the meaning of "joyful spirit" and "bright spirits present in earth and sky (Koo, 1985, p.10)." In contemporary Korean culture, *Shin-Myeong* has been used to describe people singing and dancing well, accompanying extreme immersion and focus. When people say "*Shin-Myeong* has arisen!", it means that people feel and respond to the sky, which reveals the ultimate potential of play. Dong-Il Cho explains it as the state of a bright mind's swirling tremendously, like a tornado (Cho, 1997). Koreans call this phenomenon "*Shin-Ba-Ram*" which means "winds of spirit" that will eventually dissolve the incredible sadness of "*Han*." *Shin-Myeong* is a psychological state of extreme excitement, immersion, and focus (Kim, 1982).

The root of *Shin-Myeong* is *Han*. It is important to understand that people consider *Shin-Myeong* authentic when it starts from the opposite state, *Han*. This condition brings synergy that is impossible to be explained logically, with the tremendous power of swirling movements, transmitted from mediator to mediator with great speed, and creating chaotic and orgiastic energy against structures. The real potential of *Shin-Myeong* is driven by *Han* (Kim, 2005, p14) (Cho, 1997).

A scene "*Go-Pu-Ri*", from a cleaning ritual (*Ssi-Kim-Gut*), in *Jin-Do*, Korea, shows this relationship between *Han* and *Shin-Myeong*. In this scene, there are white cloths with 7 or 9 knots, which a shaman releases one after another, showing the process of releasing *Han*.
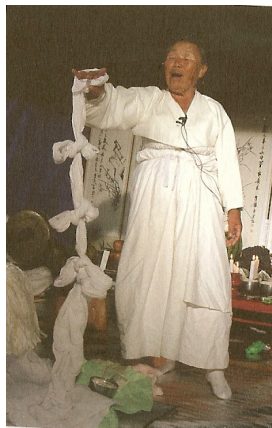
Figure 3: Go-Pu-Ri; Shaman releases seven or nine knots representing
Han of the deceased, during Shaman ritual, Ssi-Kim-Gut, in Jin-Do, Korea (Lee, 2004, p37).

The state of *Shin-Myeong* was known to have chaotic and orgiastic energy (Han & Han, 2007, p. 86). Jun-Sik Choi says Korean aesthetics comes from challenging liberty against any stereotypes, connected with shamanism (Choi, 2002). The state of *Shin-Myeong* allows people to do something that cannot possibly be done in their daily lives. The function of shaman ritual is destroying boundaries and rules given by society (Han & Han, 2007). People enjoy the chance of real freedom, against hierarchy and stereotypes, which originated from dualistic thinking. Yeol-Kyu Kim (1982) said chaos resulting from *Shin-Myeong* allows things that seem impossible to be expressed. Shaman ritual allows expression of hidden emotions and release of stress. It is culturally allowed disorder and chaos, providing a great exit from dissatisfaction to satisfaction, from oppression to liberation, and from *Han* to *Shin-Myeong*.

Shin-Myeong was also described as complete focus, absence of fear, transcendence of daily self, being natural, destruction of dualistic thinking, special cognition about space and time and feeling of oneness (2005, pp. 161-172) and also evokes the primitive vital cognition of time and space. The state of *Shin-Myeong* brings a special state of cognition and consciousness (Han & Han, 2007, p. 88). Hee-Wan Che explains that *Shin-Myeong* is the expanded self when combined with the life energy of the cosmos (Chae, 1983). Another characteristic of *Shin-Myeong* was the speedy impact and connection between people, from individual to group consciousness. Yeol-Kyu Kim defines it as "The transfer phenomena of *Shin-Myeong* (Kim, 1982)." It was demonstrated in international sports events such as The World Cup 2002 in Seoul, when every Korean experienced the group as a whole.

Cheong would be the important source in this connection, from individual to group consciousness which activates the telematic connection as a group (Choi, 1991, pp. 339-350). There is also an interesting concept connected with *Cheong* in Korea, called "*Shim-Cheong*", which is the source of transfer, from individual to group consciousness. (Choi, 1991, 1997) *Shim-Cheong* is the co-experience where people indirectly experience other's hearts. This can be explained in eastern wisdom, called "*I-Shim-Jun-Shim*", "*Yeom-Hwa-Mi-So*", describing how one's state of mind can be directly transferred to the other. In these terms, it is about exchanging from heart to heart, which is like a kind of telepathic connection between people. First, person A's heart will transfer to person B. B's interpretation about A's heart will transfer back to person A. It is mutual feedback and confirmation between states of mind. *Shim-Cheong* is driving the mediator's channels of transfer, as I defined it in the form of ritual (Ryu, 2005). It is

interesting to note that *Shim-Cheong* also is thought to happen between an object and a person. In other words, in traditional Korean thought, the heart can also be found in objects. This chain reaction of spiritual connections can be considered similar to a telematic connection, as in the relationship between the virtual and physical aspects in human interaction with ICT. The relationship between the Shaman and the Shaman's object initiates this spiral expansion of transfer (which also happens between puppet and puppeteer). The first mediator is the Shaman's object which brings the Shaman into a trance state. The second is the Shaman, and the third is the witnessers who will eventually acquire the Shaman's state of transformation. The dynamic transformation from *Han* to *Shin-Myeong* is the form of Korean ritual that is happening in Korean cultural consciousness.
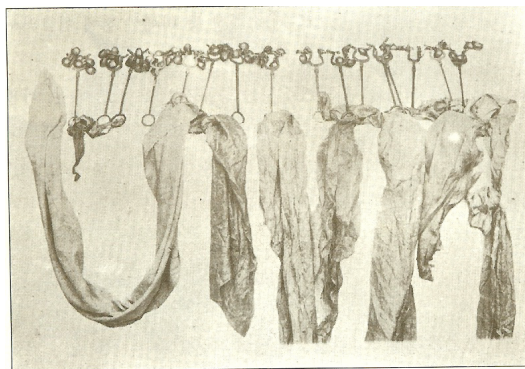
Figure 4: One of shaman (ritual) objects in Korean shaman ritual;
7 rattles hung at the end of divided sticks, tied with a long cloth (Dakashi, 2000).

2.3. The form of the healing ritual

Korean emotional phases explained in Ch. 2.2 are important in understanding how healing rituals work in Korean culture. This section explains the form of the healing ritual, considering the agents as polar opposites (spiritual/mundane, puppet/puppeteer, virtual/physical, etc.), the channels of mediators (the ritual object, shaman, witnesses), the driving force (*Han* and *Cheong*), and the byproducts of the process. This ritual is for the process itself, as the process brings the transformation of the emotional state as the desired product.

In the Korean healing ritual, the ritual starts by recognizing *Han* (extreme emotional states of grief caused by physical or mental constraints, with strong wishes to overcome the situation). In

the moment of recognizing this irremediable distance, we confirm our own tragedy in the mode of *Han*, with extreme grief but with a strong will to overcome. *Han* thus drives the process of transformation. *Han* initiates the ritual of healing where polar opposites begin to interact, interpenetrating and eventually transforming into each other. In this state of transformation, the puppeteer becomes the puppet, and the puppet becomes the puppeteer.

This process intensifies, mediated by multiple shamanic channels: the ritual object, the shaman herself/himself, and further, the witness. When the ultimate state of transformation and play arises, the ritual shows its power of healing. The heart of the ritual is the process of healing itself. The byproduct of ritual is an unexpected transient encounter which can be speech, stories, singing, dancing, behavior or acts happening during the ritual.

2.3.1. Impossible love

In the relationship between puppet and puppeteer, *Cheong* and *Han* can explain the willful engagement and willing suspension of belief of the puppeteer. *Han* explains the paradoxical relationship between puppet and puppeteer, in a symbolic situation of impossible love.

In Korea, the theme of impossible love is easily found, in the songs, literature, theater, movie, or drama, from traditional to contemporary culture. The process of celebrating and lamenting the tragedy, with many tears, is one of the interesting cultural characteristics of Korean culture which has a close relationship with the Korean emotional concepts of *Han* and *Cheong*.

The emotional relationship between puppet and puppeteer can be illustrated in the situation of Impossible love. In this context, the tragedy of the puppeteer lies embedded in the recurrent and ironic process of joining before the farewell. In this scenario of impossible love, the puppeteer is in love with the puppet (her alternative body), despite all the definite portents of the upcoming farewell. It would be a tragedy because of the puppeteer's continuous desire for an impossible relationship: the paradoxical aspect of becoming the other. The puppeteer faces the irremediable distance of the puppet and experiences nostalgia for the fulfilled moments of integral unity. The puppeteer laments her separation from her alternative body, as a symbolic lover, a symbolic dream of oneself displaced, renewed or forgotten. From a Korean perspective, it is tragic when you recognize the separation from that which you love. It is tragic when you are

aware of the upcoming farewell, even when deeply in love. Tragedy comes from a paradoxical situation of the continuous denial of one's current state. In Western psychoanalysis, Lacan (2019) discusses impossible relations as a never-ending desire for becoming and a desire for love. As desiring entities, we are the main characters of impossible loves; we follow the rainbow that cannot be perceived, felt or dreamt except from a distance. The distance challenges us to look over, standing on our toes, lengthening our necks, and narrowing our eyes, carefully and longingly, for the eternal process of loving. Humans' broken hearts and tears are the very signs of *Han* emerging in the story of impossible loves, caused by *Cheong*.

Cheong and *Han* play important roles in understanding emotional aspects of the Korean story of impossible love, as *Cheong* is associated with unconditional love and *Han* is dealing with impossible situations, with grief and hope.

As discussed previously, *Cheong* is understood as a voluntary feeling of affection and caring for each other. In the state of *Cheong*, we feel other's hearts and emotions, and this includes even things thought of as inanimate. In Korean cultural imagery, *Cheong* exists between humans and the sky. Sky is personified as a human being with personality regarding shared feelings, grief and love. Feeling others' hearts (for example, sky's grief and joy) is a great way of acknowledging, confirming and extending our own body states rooted in physical organs and senses. *Cheong* would be the Korean emotional way of relocating, distributing, and expanding the body into different dimensions of reality without losing the person's root in the physicality of the body. Based on the impossible love relationship described between human (puppeteer) and object (puppet), *Cheong* can be activated between the multiple bodies supported by interactive technology that inhabit different layers, real and virtual.

2.3.2. The performing object and technological development

In the previous section, we considered the relationship between the puppeteer and puppet, as something akin to an impossible love situation. It is interesting to take a look at the relationship between performing objects and the body which has progressed throughout history, mediated by technological developments. Masks were primary ritual objects, but they have been gradually transformed to be held in front of the body, then made to move by strings (Tillis, 1992, p.20). The hinged and jointed mask moved upward, off the head, and was held in the hands in front of

the body. Later it moved farther away and was made to live by the manipulation of strings (Baird, 1965, p. 30). In this progression of mask, we can see the eventual transformation into a puppet.

There were the constant separations that happened between the performing object and the performer's body which can be likened to a farewell between lovers in an impossible relationship. It is connected with the situation of the virtual body that constantly leaves the actual body in the digital age. For me, it is the ongoing situation of impossible love explained in Ch 2.3.1.

This trajectory is in concordance with Stephen Kaplin's puppet tree (2001), where the distance between the performer and the object increases along a continuum encompassing performing objects, actor, character role, masks, body puppets, hand puppets, rod puppets, marionettes, remotely controlled figures, shadow figures, animated figures, etc. In the digital age, I would like to add digitally generated performing objects that I can call virtual bodies in Kaplin's puppet tree (Kaplin, 2001). Kaplin's puppet tree clearly shows the evolution of performing objects (alternative bodies) moving away from the performers' bodies, and the relationship between spatial distance and technological development.

Kaplin's puppet tree model is built on the Indonesian *kayon* cosmic tree. As a two-dimensional model, the Y axis maps all kinds of distance, corresponding to the height of the tree. The puppet tree shows that when the physical distance between the performer and performing object increases, more sophisticated technical support is expected to bridge the gap. For example, moving the center of gravity outside the performer requires more complex linking systems (Kaplin, 2001, pp. 21-23). Though technically more challenging, increasing the distance between performer and object contributes to the sense of the performing object as an an autonomous life force.

Figure 5: Puppet tree (Kaplin, 2001).

Kaplin's puppet trees show that the distance between performing objects and the body increases with the advancement of technology. In the digital age, we seem to be drastically increasing the height of the cosmic tree, reflecting humans' increased desire for a more dynamic version of the swirling dance, transformation and a more dramatic story of impossible love.

Virtual bodies would be new ritual bodies in the context of the impossible love, becoming more and more remote, intangible, deconstructed, multiplied, and fragmented: challenging us with new types of challenges and desire for connections that pose different experiences of Korean healing ritual. In my perspective, virtual space can be understood as a space for Han, with new challenges and hope in the digital age, telling a new story of impossible love.

2.4. From Virtual Puppetry to Embodied Avatar Performance

In the prior sections, I have explained the traditional basis of Korean healing ritual as the foundation of my Embodied Avatar Performance projects and how the emotional flow in the Korean healing ritual is related to what is happening in the relationship between puppet and puppeteer, in the context of impossible love. Digital virtual bodies can be understood within a context of performing objects leaving the body towards a virtual dimension, creating more transformative power for the healing ritual, which is the basis of my virtual puppetry as an embodied avatar performance art exploration.

2.4.1. Virtual puppetry: design, technology, interactive mechanism

My virtual puppetry, digital interactive puppet performance uses a 3-dimensional digitally rendered puppet on the projection screen, controlled by a variety of interactive technologies, for a live storytelling performance. This work has gradually evolved since 2016 into my thesis research into avatar life-review projects. In the beginning stage of the virtual puppetry project, my virtual puppet emulated the primitive expression of Korean traditional puppetry and mask theater. Lacking realistic details, the virtual puppet's appearance connected us with the remote era of the totem pole. It stimulated the viewer's perception of the figure in question and encouraged an act of imagination based on the abstracted signs of life. Virtual puppet leads viewers to imagine. The viewer's imagination completes the life of the virtual puppet.

Real-time speech interaction played a significant role, in making a virtual puppet seem to live. The sign system of speech is of vital importance to puppetry, allowing people to imagine the puppet as having life. The virtual puppet mimicked an up and down mouth response, matching the puppeteer's mouth movement, voice and a recorder play. However, what truly made the puppet "alive" is not the technical control over the puppet's physical movement, but the puppeteer's engagement and "willing suspension of disbelief" (as discussed previously, connected with *Cheong* in Ch 2.3.1) towards the presence of the virtual puppet. The puppeteer's willingness to make the leap from the perception of representative abstractions to the imagination of life completed the puppetry experience. The audience also chose to imagine and complete the puppetry.

Unlike traditional puppets, the virtual puppet was motivated by voice and sound, not by string, rod or hand triggers. Any sound input coming into the computer's microphone, such as music or the puppeteer's storytelling voice motivated the mouth, body and facial expressions of the 3D virtual puppet on screen, in real time. Sounds were sampled and converted to digital data through Fast Fourier Transformation, and the puppet software then used this data to manipulate the movement of the puppet, and is applied to the 3D puppet's mouth, body and texture with different types of sensitivity and controls. Later, real-time motion was added on top of pre-animated movements, providing for playful puppet structures that can play between realtime motion and animation. Mask textures also responded to audio signals. The animated texture feature, activated by speech volume, gave an interesting facial expression to the virtual puppet, along with stop-motion aspects that matched with primitive looks.

2.4.2. Virtual puppetry "Parting on Z"

I mention here the Parting on Z (2010) project because it was my first artwork directly linked with the notion of an impossible love relationship between a virtual and physical body linked to the concept of *Han.* This was an important foundation for the next iterations of the avatar projects in a community engagement context that forms the core of my research thesis.

The virtual puppet performance Parting on Z explored *Han* in the paradoxical relationship between a virtual puppet and a puppeteer, imagined as an impossible love relationship between an artist (physical body) and an avatar (virtual body). During the performance, the symbolic lovers continuously exchanged dialogues of love and farewell, facing each other, on the Z axis. Virtual space affords an infinite depth along the Z axis, bearing both physical and psychical dimensions. The potential distance of the virtual puppet far exceeds the range of the physical puppet. Virtual puppets traveling on such a vast Z axis constitute new ritual objects parting on Z, becoming increasingly remote, intangible, flexible, deconstructed, multiplied, and fragmented, challenging us continuously with new experiences of distance.

The story chosen for this performance was the farewell scene from "*Chun-Hyang-Ga*", a classic Korean story of an impossible love that enacts *Han*. In Parting on Z, the puppeteer controlled the puppet through their voice and by shifting their weight balance on a Wii Fit balance board. Speaking into the microphone changed the mouth, body and facial expression of the 3D virtual puppet in real time. These expressions continuously helped the puppeteer to improvise in his or

her oral storytelling. The virtual puppet constantly spoke and sang back to the puppeteer, like real-time echoes and mirror reflections. As her reflection, the virtual puppet appeared to face the puppeteer from a distance, echoing speech in real-time and mirroring body movements in swaying motions.
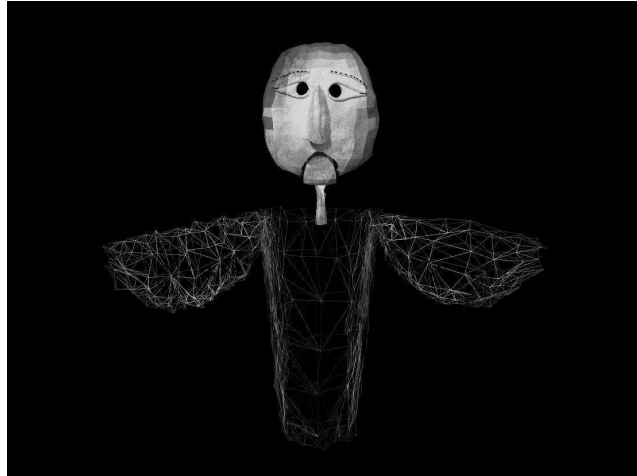
Figure 6: One of the virtual puppets in Parting on Z (Ryu, 2010).

The Parting on Z was performed in Antonin Artaud space, Brunel University, London in 2010. As described before, this performance provided a special experience and motivated me to transfer my personal artistic project to a community engagement project working with the public, especially underrepresented populations. From this transition, my digital media performance projects became more closely related with the main spirit of Korean healing ritual and planted the seed for this Ph.D. research.

My Parting on Z performance generated several reflections about powerful emotional experiences, working with virtual bodies, demonstrating Korean emotional phases for healing rituals, enacting the story of impossible love (Ryu, 2014). This experience was also given in my TEDxRVA talk "Virtual Reality for Han" (TEDxRVA, 2017), which described my insights into using avatar virtual bodies for emotional release, self-actualization, and healing for myself, as well as for others in the community.

The gradual phase of the performer's emotional state, in the last scene of Parting on Z performance, was described in the book *Point of Being* (Ryu, 2014), connected with the aspect of healing. It described the last scene of Parting on Z where my attention was moved from focus

to horizon, as I witnessed my virtual body gradually disappear on the Z axis (Ryu, 2014, p.192-193).

It is interesting to observe that, in my performance as an artist, digital technology has supported the ritual of farewell between human and alternative bodies, provoking in the performer an increased state of *Han*. The virtual body parting on the Z axis reflects the human desire to achieve a different dimension, by maximizing the state of challenge supported by this advance in technology. The conceptual model of the Korean healing ritual can be actualized in the digital age, as rendered by an emotional and psychical human engagement with virtual bodies, further supported by the ongoing evolution of technology.

Chapter 3. VoicingElder

As explained in the previous chapter, EAP projects specifically designed for life-review therapy are called "avatar life-review" and are the core subject of my Ph.D. research. This chapter explains the VoicingElder avatar life-review project designed for older adults in 2016 and supported by the VCU Presidential Research Quest Fund. This chapter first introduces the VoicingElder project and its theoretical framework (elderhood, life-review therapy, reminiscence and the aging psyche), then discusses the research design, methodology, and the research team, which included gerontologists, artists, computer scientists and technological developers. The chapter concludes with discussion of the research experience, thematic analysis and sentiment analysis algorithms implemented into VoicingElder as trials, errors, and future directions.

Publications 1 "Avatar life-review: Virtual bodies in a dramatic paradox" (2017) and Publication 3 "Performing virtual bodies" (2020) are presented for this phase of the research. Here, the purpose is to give background and explain the context of the research process.

3.1. The avatar life-review for older adults

Embodied Avatar performance was specifically designed to generate the emergence of the Life-Review which I call "avatar life-review". The first prototype was VoicingElder, an avatar life-review platform designed for older adults. The project was designed to allow older adult participants to embody life histories through interactive avatars that responded to speech, gestures, and emotions in real time. The underlying working hypothesis was that the aging psyche of the older adults population, and their tendency to sync with the state of Gerotranscendence,[5] are connected with Korean ritual and phases of the embodiment process (Faircloth, 2003; Tornstam, 2005; Erikson, 1998).

3.1.1. Project description

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[5] The shift in meta-perspective from a materialistic and rational view to a more cosmic and transcendent one, normally followed by an increase in life satisfaction.

The VoicingElder project was developed at Gayton Terrace Senior Living, Richmond, VA, 2016, in collaboration with Dr. Tracey Gendron of the VCU Department of Gerontology. From March through June 2016, ten avatar life-review sessions were held for ten older adult participants at the public theater of the Brookdale Gayton Terrace Senior Living Center in Richmond, VA, USA. In the sessions, participant residents chose an avatar and told autobiographical stories. They faced their avatars on-screen, and told the stories to themselves and others, speaking through avatars that lip-synced their speech and mirrored their upper body movements via a Microsoft Kinect sensor. The 8 available avatars included male and female versions representing 4 developmental stages (Childhood, Teenagerhood, Adulthood, Elderhood) of male and female avatars were provided, total of 8 avatars, reflecting the participants (current age: around 80)'s time/ fashion of each stage: childhood, teenagerhood, young adulthood, and elderhood. Each life-review session was followed by an open discussion among the storyteller, the artist (mediator), and the audience (residents), intended to engage empathetic bonds within the group. An avatar movie screening brought everyone together, allowing reflection on all those stories replayed via the recorded avatar performance. Later, the avatar movie was distributed to the participant's family members and grandchildren, as an effort to enrich intergenerational relationships. The project was funded by the VCU Presidential Research Quest Fund.

In VoicingElder, a virtual puppet was designed as a doll-like human body with moving arms, legs, and head, so it was called "avatar" rather than "puppet". Instead of a performance undertaken by professional storytellers, VoicingElder was a resource made available to diverse participants as a form of self-expression and healing. The avatar was designed to mimic the participant's gestures via Kinect and lip-sync with the participant's voice via microphone input. Seniors acted out reminiscences at various developmental stages (child, teenager, adult, elder), embodying their life stories and those of significant others through configurable avatars. The avatars' background image and sound reflected results of sentiment analysis algorithms that detected the emotional content of the older adult participant's live speech.

Following the basic elements of virtual puppetry, the avatar life-review supports oral storytelling by using a movement and voice-activated onscreen avatar that lip-syncs with the participant's gestures and spoken words in real-time, helping seniors engage in a transformative state that allows recall of distant memories, feelings and hidden emotions as they tell their own stories. The aspect of mirroring was emphasized and facilitated by Kinect sensors, as a mirrored projection on screen.

3.1.2. Project concept

VoicingElder aims to support the beauty, wisdom, and experiential knowledge of older adults' oral stories, while acknowledging positive aspects of aging and wisdom of older adults in coping with technical and physical limits. The relationship between the avatar and the participant promotes distancing effects and explores "unconditional positive regard" via sentiment response, as explained in Ch. 3.5, and 4.1.4. VoicingElder enables the senior participants to give new voice to their own stories, exploring a rich state of mixed reality in their consciousness. It seeks to renew the oral storytelling tradition for the digital age, recording and sharing the seniors' lifetimes of wisdom for later generations. VoicingElder employs design methodology previously developed in virtual puppetry projects, expanding the scope of that work to therapeutic interventions and community engagement. The VoicingElder project shifts the focus of virtual puppetry to a new direction engaged with the public.

The project strives to enhance seniors' quality of life by engaging with their memories and emotions. They can experience their life stories as "thick" documentation (versus "thin": minimal and narrow thinking), reflecting on contexts and assumptions, revealing deep memories and feelings, and developing new perspectives. The underlying idea is that the unique histories uncovered in engagement with the virtual avatar will help users better communicate intergenerationally with family, caregivers and friends in a playful, engaging format that can be viewed both in live performance and as recordings.

The project explores the transformation of emotional states and identity in the context of a healing ritual. Adaptations of Korean healing rituals prompt certain reflexive and transformative states in the participant, as happens to the participant's consciousness in a traditional ritual setting. The integration of ritual elements with virtual interactive technology creates a participatory, multimedia form of reminiscent storytelling, intended to promote therapeutic effects.

3.2. Theoretical framework

In this section, theoretical backgrounds for understanding issues of the aging population are

presented, including elderhood, life review therapy, reminiscence and oral storytelling, the aging psyche and mode of Han. The VoicingElder project was designed based on these underpinnings.

3.2.1. Elderhood and the arts

In the United States and elsewhere, we are being challenged to appreciate a whole new phase of life called "elderhood." Today, millions of people can expect to live 25 or more years in relatively good health after retirement. This change in life expectancy inevitably coincides with great cultural change, and it is critical for our society to think about how to shape elderhood in ways beneficial to both the individual and community (Bianchi, 2005), promoting intergenerational relationships, understanding and support (Bianchi, 2005). Recent research suggests exciting possibilities for the therapeutic use of art to support the health and well-being of older adults. More research needs to be conducted in the use of arts practices to nurture the quality of life of older adults. This project addresses this research gap while developing new technologies.

3.2.2. Life review for older adults

Long-term care facilities may conduct regular life review sessions to strengthen self-worth, identity, communication, and intergenerational sharing. Life review, sometimes called reminiscence therapy, includes aspects of oral history and autobiography. Life review is described as "a systematic, chronological review of one's entire life from early memories through the present and involves evaluation of the meaning of life experiences" (Leupker, 2010; Haber, 2006; Woods et al., 2005).

Reminiscing serves several functions for older adults including promoting self-understanding, preserving personal and collective history, transcending the material world and physical limitations, and reinforcing coping mechanisms. Literature shows that life review has significant effects on late life depression and can work as an alternative to psychotherapy (Bohlmeijer & Filip, 2003). Life review has been shown to improve relationships between caregivers and seniors, increase staff knowledge of the client's backgrounds and history, and develop understanding of one's sense of self (Scogin, at al., 1994). The VoicingElder project strives to

increase Quality of Life (QOL) for seniors, by promoting avatar-mediated stories. Videotaped recordings of these life review sessions actively involve family members with the senior's life review process, promoting intergenerational knowledge. Younger generations benefit from reviewing documentation of an older adult's life moments and life lessons as a tool for learning and understanding their family and cultural roots. Research has demonstrated that younger generations report regrets when they have no recorded memories of their parents before their death (Leupker, 2010). Therefore, videotaped life review can be an important part of preserving family legacy.

3.2.3. Reminiscence and oral storytelling

The seniors' stories include rich materials full of memory, feelings, life lessons, and wisdom. They are an exceptional gift obtained from their own experiences over time. Many elders are skilled storytellers, recounting cultural knowledge through orally told stories. The written text of their stories may lack emotional connection and interpersonal interaction (Archibald, 2008). For seniors, telling a story has many dimensions: It heals their mind through remembering, expressing, re-contextualizing and being listened to by another person. Storytelling is an important channel for their communication with the community. Reminiscence therapy is one form of treatment that is known to influence dementia and Alzheimer's disease, helping patients remember and play with their memory, giving them a sense of relatedness and connection (Coaten, 2001).

Storytelling and reminiscence are enormously important processes in old age, because they nurture intergenerational sharing and communication and allow seniors to express and strengthen their identities as they review their lives through their memory (The Benevolent Society, 2005). When seniors tell stories and share reminiscences, they share themselves. Past events and experiences are brought into the present day, not with historical or factual accuracy, but in a warm, lively, engaging way. Younger people can gain from the wisdom of older people, learn about the past, and even begin to imagine themselves in old age. The process has emotional benefits for older and younger people. This is especially true in a Confucian society like Korea where an elder's wisdom is acknowledged and valued as a true knowledge. In traditional oral cultures, the elder's oral storytelling functioned as an intergenerational education process, delivering experiential knowledge, values and passion from generation to generation

(Archibald, 2008). VoicingElder uses virtual interactive technology to nurture intergenerational relationships, aiming to benefit seniors, younger people and the society as a whole.

3.2.4. The aging psyche and mode of Han

VoicingElder allows participants to speak and reveal their hidden emotions and stories in an oral storytelling platform. It is a journey of discovering lost selves. The concept of lost selves is particularly apt to describe the older adult population. "The aging psyche must grapple with a huge distance between the true self and the socially constructed self (how others perceive them), between the lived body and the biological body, and between the ageless body and the aging body" (Fairhurst, 1998; Faircloth, 2003). The senior's perception of their own body, and their questioning of identity, has the potential to bring forth a dynamic transformation by using the alternative bodies available in VoicingElder.

In Ch. 2.2, I have described the role of Han in the Korean ritual. Korean ritual begins by recognizing inevitable constraints. In the moment of recognizing this irremediable distance, we confirm our own tragedy in the mode of Han, with extreme grief but with a strong will to overcome. Han thus drives the process of ritualistic transformation. VoicingElder considers the experience of seniors as being at least akin to Han and seeks to mediate the distance between the true self that the person experiences and the socially constructed image, between the lived body and the biological body, between the ageless body and the aging body, and so forth (Fairhurst 1998; Faircloth 2003). We can acknowledge Han in the consciousness of elders when they begin to feel a discrepancy between their perceived identity and social identity suggested by society (Faircloth, 2003).

Seniors live in a mixed reality between phenomenological and social layers of their body and identity. The unavoidable limitation the elder experiences as he or she perceives daily life activates important realizations and potentialities. Emotion existing in such a limbo state might be confusing and paradoxical: a chaotic mixture with rich tensions. The mixed emotions found in old age are similar to the emotional character of Han. The mixed emotions of seniors may actually bring them more stability and a stronger sense of well-being if they have the opportunity to express and ritualize their experiences through their storytelling. VoicingElder can provide the platform for this transformative process. When human beings are aware of their limitations, time constraints and bodily constraints, the emotional experience is rich and complex, like joy and

gratitude mixed with sorrow (Roberts, Gotlib 1997). An acceptance of complex emotions has the potential to generate a desire for self-actualization, as in the Korean notion of *han*. If a senior has the ability and the resilience to tolerate the tensions of his or her chaotic and unanswered states, then VoicingElder can offer the chance to use those tensions for creativity.

Korean experiential reality emerges from understanding *han*. It is about lightening the weight of actuality to open the infinite space of full potentiality. Although the popular assumption in the West is that old age means disempowerment and marginalization, Bianchi suggests that the opposite is also true, that seniors can live in a more authentic experiential way than when they were younger because their expectations have changed (Bianchi, 2005). Older people's understanding of their lives, their bodies, and of time is different from that of younger people, in ways that may make them more open to a sense of wellbeing (Ross 1989). This renewed understanding of one's own life and experiences relates to Korean experiential reality and Korean healing ritual.

3.3. Research implementation

In collaboration with Gerontologist Tracey Gendron, VoicingElder research was designed to have 4 specific aims; qualitative methodology and data collection were developed by working with Gayton Terrace Senior Living, Richmond, VA.

3.3.1. Specific aims

VoicingElder was designed specifically for seniors citizens, and according to the general hypothesis of the project (Ch.1) the main objectives were:

1) Help to develop the seniors' personal and emotional stories from their life history performed using the VoicingElder system.

   VoicingElder project was implemented at Gayton Terrace Senior Living as a mechanism for supporting improved quality of life for the older adult participants. The VoicingElder system helped to develop and present the senior's personal life history with emotion and

feeling. The staff at Gayton Terrace Senior Living regularly uses photographs, evocative objects, and verbal prompts to elicit memory recall from their clients. The VoicingElder system will provide a new, innovative technology to improve the life review process by providing diverse virtual body avatars that can resemble different ages, genders and races.

As the senior speaks through the virtual body, they will become the listener of their own story, in the middle of the storytelling process. This technology provides a mechanism for the older adult to recognize and reflect upon their emotional state and the emotional importance of their personal life story.

2) To determine if the transformative consciousness will happen to the senior participant during their life review process using the VoicingElder system.

The working hypothesis was a gradual development of the participant's consciousness in the relationship with the virtual body, which is essential to evaluate the avatar life-review as a therapeutic tool. I have defined the "Emotional phases in Korean transformative ritual" (Ch 2.2), and "The form of healing ritual" (Ch 2.3). Now I am exploring whether the participant's experience with virtual bodies occurs as it does in the Korean shaman ritual.

3) Help the senior participants to communicate better with caregivers, friends, and family.

- ● By facilitating intergenerational relationships and family legacy through sharing video-recordings of 10 seniors' life reviews with family members.

To promote active family involvement in the life review process, we invited family members to attend the VoicingElder life review session with their loved one. We also provided a copy of the videotaped life review session for the family after the process. As the project aimed to promote intergenerational relationships, we provided easy access to the senior's life stories to their family members if they wished and the seniors agreed. After the implementation of the system, I can say that the videotaped avatar life review was important for all family members. The videotaped record can be reviewed by the senior, allowing them to develop their story, and can be shared with the family, promoting intergenerational relationships and building family legacy.

- By facilitating avatar life-review sessions at public theater, and Avatar video screening day, for the residents and staff to enjoy the collection of life stories told.

During VoicingElder life-review sessions, the residents at senior center participated as storytellers and audiences, in the public theater. All the avatar videos were recorded and screened at the avatar video screening day when the residents and staff reviewed the life stories via avatar. After each life storytelling, everyone circled around the storyteller and shared their ideas and feelings. This provided opportunities for better understanding and communication between the residents and staff.

3.3.2. Methods and procedures

For this project, we use qualitative methodologies to track and evaluate the older adult participants' transformation and the impact of VoicingElder on Quality of Life for seniors.

Ten older adult participants were recruited through the activities department at Gayton Terrace Senior Living. The research team attended a family night event to demonstrate and promote the project. Older adult residents and family members had the opportunity to sign up to voluntarily participate in the VoicingElder program; the first ten to consent to participation were included in the study. We began recruitment of participants as soon as IRB approval was obtained. During the consent process, participants were assured the highest level of privacy and confidentiality. Additionally, it was stressed that participation in all aspects of the study was completely voluntary and participants were informed that they may limit (e.g., skip or not answer a question) or discontinue participation at any time without any negative consequences. Participants were asked to sign a consent form and confidentiality was accomplished through the assignment of identification numbers.

Examination of the specific aims described above were accomplished using surveys as well as qualitative methodology that included semi-structured interviews and non-participant observation, and field notes of each session. The interviews were guided and took place directly after each VoicingElder life review session.

3.3.3. Avatar design and production

The VoicingElder project required a team of digital arts professionals with multiple skill sets to develop and maintain a successful avatar platform. The project required experts in 3D modeling, animation, sound, video documentation, programming, and interactive technology. Ryu's VCU production team (under the name of CoPuppet) successfully produced and performed their first production, "Targeting Eyes," at the Brick Theater, Brooklyn, NY. The CoPuppet team consisted of the following members:

- Research Coordinator: Neal Swisher (Doctoral student: MATX-Media, Art & Text program)
- 3D character: Anne Lantz (Alumni: Kinetic Imaging)
- 3D environment: Tian Qin (Alumni: Kinetic Imaging)
- Game mechanics/ Programming by: Omri Glaser, Justin Moore (Alumni: Kinetic Imaging, Photography/film)
- Sound: Zach Kurth Nelson (Graduate student: Kinetic Imaging)
- Video documentation: Andrew Cote (Alumni: Kinetic Imaging)

For this project, visual design of virtual avatars was based on an understanding of the aging psyche and identity issues in aging adults. The CoPuppet team, therefore, based their ongoing design improvements on the seniors' feedback, as well as feedback from staff and family members, exploring diverse visual aesthetics from abstraction to realism, in order to better engage the seniors in playful virtual conditions, faces, and bodies.

We designed the avatars to fit the eras and fashions of American older adults. Four developmental phases, with male and female, were created. The skin color of avatars was white, as all the residents at the senior center were Caucasian. The residents wanted to have a doll-like avatar that was not too realistic, but colorful and friendly.
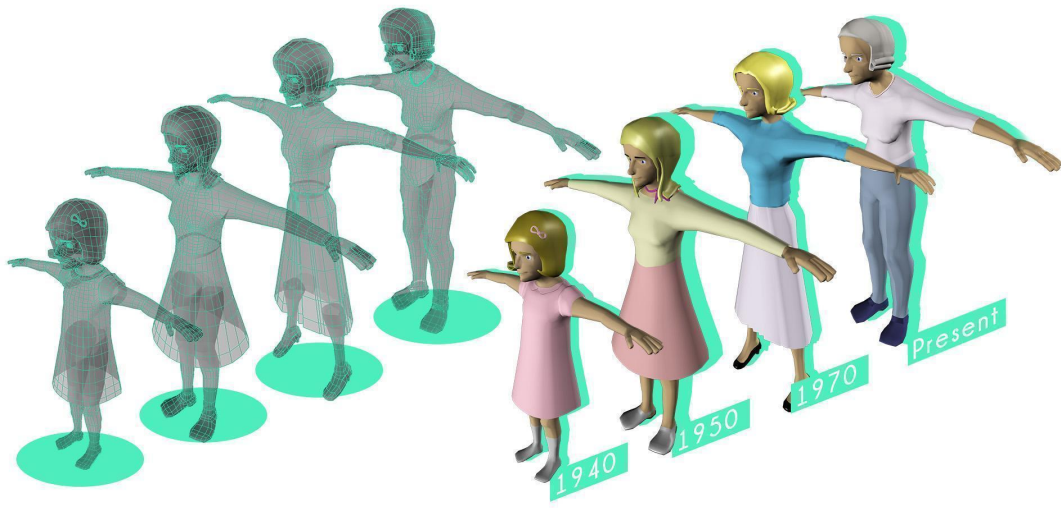
Figure 7: VoicingElder Avatar representation-woman.
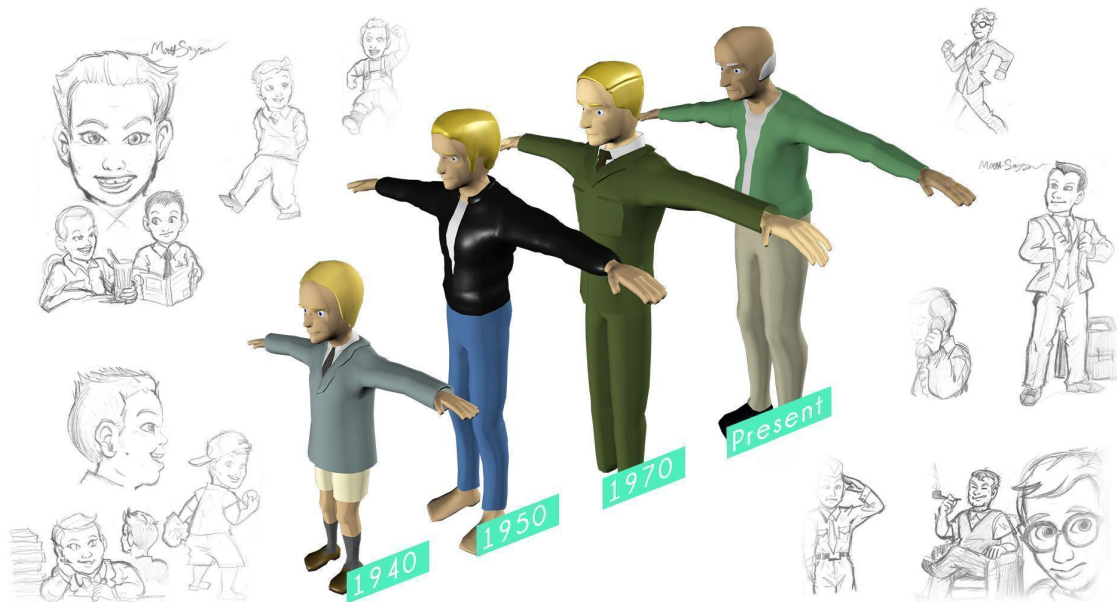
Figure 8: VoicingElder Avatar representation-man.

VoicingElder implemented various interactive components. The core interactive feature was body detection via the Microsoft KINECT virtual camera. The project explored speech recognition functionality using a word classification algorithm that detected specific words or themes and adjusted the virtual environment of avatars. Sound generation was implemented for appropriate sound feedback based on the generic contents of the senior's speech. Computer scientist Stefano Faralli provided advice on interactive technology and helped to incorporate emerging technologies into the software design.

During the life review sessions, we captured the live footage of avatar performance on screen using screen capture software. The footage was edited and given to each client for his or her family legacy as an HD DVD disc, for the participant and family members to review and share the senior's life stories and perspectives. We also held a screening day for avatar videos where every participant enjoyed their storytelling and that of other participants.

3.3.4. Demographic characteristics of participants

The age range of the participants was between 69 and 93. Most of the participants were female (9 participants out of 11). All the participants were Caucasian, reflecting the major ethnicity of this particular senior center. Everyone had a minimum high school education. All but one of the participants self-reported good health.

The survey results showed that most of the participants had positive experiences from VoicingElder life-review sessions. For the question "How was your overall experience with VoicingElder?", 36% of the participants said Very Good, 18% of the participants said Excellent, and 18% of the participants said Good. There were no responses for FAIR or POOR. For the question "How likely are you to recommend VoicingElder?", 73% of participants said VERY LIKELY. 18% said UNSURE.

	N (%)	M (SD)	Range
Age		83.8 (6.7)	69-93
Gender			
Female	9 (82)		
Male	2 (18)		
Ethnicity			
Caucasian	11 (100)		
Level of Education			
High School/GED	5 (46)		
Bachelor's Degree	2 (18)		
Master's Degree	3 (27)		
Doctoral Degree	1 (9)		
Self-report health			
Excellent	3 (27)		
Very Good	1 (9)		
Good	6 (55)		
Fair	1 (9)		
How was your overall experience with VoicingElder?			
Excellent	2 (18)		
Very Good	4 (36)		
Good	2 (18)		
Fair	0 (0)		
Poor	0 (0)		
How likely are you to recommend VoicingElder?			
Very Likely	8 (73)		
Likely	0 (0)		
Unsure	2 (18)		
Unlikely	0 (0)		
Very Unlikely	0 (0)		

Table 1: Demographic characteristics of participants and survey results

3.4. VoicingElder experience and main results

This chapter section will discuss theVoicingElder experience and its results supporting the specific aims presented in Ch 3.3.1. In collaboration with Dr. Tracey Gendron, the following themes were discovered based on qualitative data that was gathered via interviews, observations, video, field notes, and surveys. We centered our analysis on four main themes:

1) Personal Immersion

2) Social Engagement

3) Technology, and

4) Improvisation and Mediator.

We examined our data in relation to the three main objectives in order to:

1) assess If the VoicingElder system helped the senior participants to develop playful and emotional stories from their life history.

2) determine if the transformative consciousness will happen to the senior participants during their life review process using the VoicingElder system.

3) evaluate if the VoicingElder was useful to communicate better with caregivers, friends and family members.

In the following section I present the main results, including Dr. Gendron's perspective as the health care expert in this project. I also add some details of the sessions and my personal reflections to give context to the reader.

3.4.1. Personal immersion

The qualitative data analysis corresponding to the theme "personal immersion" supports specific objectives 1 and 2, demonstrating that participants' emotional engagement and transformative state had happened during the VoicingElder life-review process. Dr. Gendron remarked about the aspect of personal immersion, in VoicingElder sessions:

"For some participants participating in VoicingElder was a personal experience in which connecting with the avatar was central to the experience. Two participants went to great lengths to connect with the avatar. In one case, a female participant was heavily focused on having the avatar mirror her movements. In a second case, a participant was moved to try to engage with the avatar physically by attempting to hug/kiss the screen. There was also an instance in which a participant did not tell a story but sat in front of the screen interacting with the avatar by making movements. Personal engagement was individualistic and idiosyncratic."

The VoicingElder session was held in a public theater, and it was hard to expect someone to tell a very personal story, in front of the public. Originally, we had planned to test the project in private rooms to promote exposition of subjects' personal stories. To our surprise, the elder home gave us access to their common theater space for avatar life-review sessions, which supported a socially engaged dynamic but not a personal one. In this theater setting, participants were public storytellers with an audience of staff, residents, participants, and team members. It was challenging for the participants to tell a personal story in this context; however, very interesting personal engagement emerged in the follow-up sessions.

For example (taken from my fieldnotes): on May 4, 2016, 11am at Gayton Terrace senior living, Mrs. C. entered the theater, and said, "I am going to tell a sad story today." It was surprising since previous stories told by residents had been all positive. I knew telling a sad story would be even harder in this public theater setting. Mrs. C. selected the young adult woman avatar and started telling a story about movie actor, Cary Grant, with voice & hand movements to demonstrate her emotion. She used lots of body language to connect with the avatar. Then, Mrs. C. started telling her story about her father, from when she was 6 years old. He had scolded her badly when she surprised him in jest. She acted out a wonderful dramatic performance, identifying strongly with the avatar, using broad physical gestures and an animated tone of voice. She concluded with a single sentence, repeated in different voices: "please help me to forgive him." The first seemed to belong to the avatar, speaking forthrightly, but the second was different—Mrs. C.'s voice, weeping and trembling. Her tears surprised us. She confessed she rarely cries. She spoke of her experience as "such a good release," and described a sense of "anonymity" of being able to disclose something, not as herself, but as the avatar. This sense of anonymity is related to distancing effects in drama therapy, where

participants feel safe relating hid-den emotions and stories. The system allowed her to talk to herself, rather than talking to another such as a psychiatrist in a potentially judgmental situation.

Figure 9: An avatar tells her childhood story with sad and angry emotions.

Another case excerpted from my fieldnotes: Mr. W., a 90-year-old gentleman with a husky voice, also built a strong emotional relationship with his avatar. He started his life-review using a boy avatar to tell his story from elementary school. In the middle of storytelling, he began looking for his teacher. I changed the avatar from a boy to a young woman, upon which he started making his conversation with the avatar as if she were his teacher. He pleaded, "why didn't you love me?" "Come close to me," "hug me." We paused, as we judged he was too immersed into the avatar. Then he stood up slowly, with his walker, walked to the screen and tried to touch the avatar image. His own shadow in the projector light erased her image. It was a heartbreaking moment for the viewers.

During VoicingElder sessions, participants developed new modes of expression, involving unique patterns of gesture and speech while engaged with the avatars, in part, I think, because the forms of these gestures were affected by the theatrical environment. From these experiences we decided to look forward to further experiments in more personal settings to compare the variant dynamics.

3.4.2. Social engagement

The social engagement theme is related to specific objective 3. Our data demonstrated socially engaged dialogues and conversations after avatar life-review sessions, helping the residents to communicate deeply with each other.

Dr. Gendron remarked on this aspect of social engagement:

> "For the majority of the participants, telling a story appeared to be a social experience with a focus on the audience and how the audience was reacting and responding. This was particularly evident among the female participants (n=8) who often engaged in animated conversation with the audience members after telling their stories. For some the opportunity for social engagement appeared to provide a primary benefit of participating in VoicingElder while for others the social connections appeared to be an addition to the experience of storytelling through the avatar."

The avatar life-review was conducted in a common theater space, building an interesting tension between private and public experience. The presence of an audience made personal engagement more challenging, but lengthy discussions followed each life-review, allowing for a strong empathetic experience. Cross-cultural discussions emerged involving traditional Korean culture, different modes of communication, etc., as the artist became a part of this community. We celebrated similarity through empathy; difference through conversation.
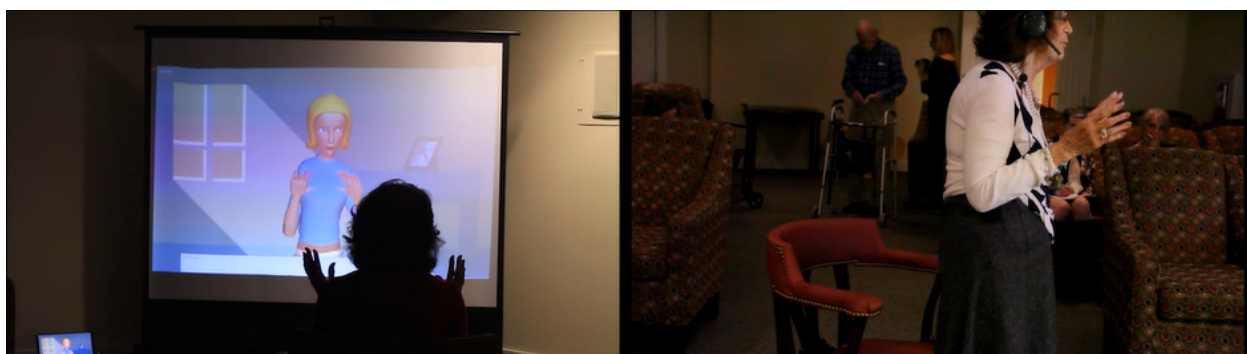
Figure 10: A participant performing avatar life-review. Video capture.

Although the system was designed around the avatar, participants were conscious of the audience's presence and responses. Each story was followed by applause. We shared joy, grief, anger, and many feelings about fathers, husbands, mothers-in-law, children, and other relations. The avatar system's sentiment analysis and enhancement algorithms amplified these empathetic relationships as the screen and sound responded to the emotional quality of the storytelling, reflecting the empathy of listeners.

We tried various setups to experiment with the relationship of audience, storyteller, and avatar: audience located before or behind the storyteller, central or diagonal screen placement, etc. In a central setting with the audience located behind, some participants felt uncomfortable; they felt it was poor manners to turn their backs on the audience, although the avatar was facing them. Some participants wanted to watch the audience's response during their storytelling, to be engaged with the audience more than the avatar. The aspect of communal ritual was evident after each life-review session. Often, the audience surrounded the storyteller and dynamically expressed their impression, empathy, encouragement, and similar experiences, using warm body language such as hugs and hand-holding. This occurred consistently and involved everyone, including observers, mediators, residents, and staff members. This social engagement was also highlighted on the screening day when we showed all the recorded avatar videos in the same theater. The participants enjoyed watching their own avatar performance as well as others'. Often, they were surprised by witnessing their own stories as avatar performances. The distanced setting brought a fresh perspective on stories they told via avatar; some were surprised by their own words. Participants wanted DVD discs of their avatar video to watch again with friends and family members.

3.4.3. Technology

Theme 3 (technology) relates to specific objective 1 in terms of the avatar technology and how interaction facilitates playful storytelling by the older adults participants. Our data analysis evaluation was positive, although there were some technical disruptions during the sessions and technical limitations detected.

Dr. Gendron remarked about the aspect of technology:

"Sometimes the avatar did not work properly (did not pick up movements, or background scenes were not reflective of the tenor of the story, e.g., sad music would play when the story was happy) but this did not seem to overly distract or disrupt the participants. For example, one participant continued to work diligently to get the avatar to mirror the gesture of putting her hand to her heart."

From the beginning, the avatar system was designed and adjusted based on the residents' feedback. Avatar's faces were updated to more cheerful expressions at the request of residents. They wanted to engage with happier looking avatars and probably happier aspects of their memories. The avatar originally had head motion tracking and lip-sync only. But we observed the significant role of hand gestures in older adult's speech. The residents also wanted full upper body interaction. The final prototype incorporated full upper body interaction with hand-gestures, lip-sync, and sentiment response. The technical setup was challenging, due to the physical limitations of older adult users. The Microsoft Kinect sensor requires straight body registration. However, the participants were usually sitting in a chair in a semi-reclined posture, which made body registration difficult and unstable. We tried to make the system work optimally but realized the participants' comfort was more important for the natural storytelling process. Wearing headsets created a connection between artist and participant and built a sense of trust. It was like placing a crown or ceremonial headwear on each participant to guide them to an alternate virtual world.

Figure 11: A participant registering her body with the Kinect sensor. Photo: Brianna Ondris.

We had anticipated a moderate number of technical conflicts but, as always, the particular challenges surprised us. Some participants' jewelry conflicted with Kinect sensors due to reflections. But if jewelry was important to their identity, we couldn't ask them to remove it. Technical limitations of the prototype system prompted unexpected negotiations with the technology by the older adult users, who continually challenged the system, discovering innovative ways to express their emotions. For example, one participant was speaking the words "in my heart," and trying to make her avatar touch her heart. Since finger detection had not been implemented yet, it was a challenging motion for the avatar—not quite detecting her hand on her chest. Suddenly, she stood up and repeated the phrase "in my heart," trying to elicit an appropriate response from the avatar. She also attempted to create a hole with her fingers, but when the avatar's fingers did not follow, she spun her hands together, to express the notion of "hole." New gestural language emerged to suit what the technology could support. The older adult users continually challenged the system, discovering ways to express their emotions despite its limits. We didn't expect older adults to be so kinetically animated in their storytelling. As noted above, their hands served as another speech organ, but the avatar system could engage the entire upper body. I felt a strange sense of guilt when the avatar couldn't fully support the user's emotional expressions. They wanted to express emotions through gestures such as kissing, hugging, or touching the heart. There was something beautiful about their wishes, struggles, and humor in relationship with the avatar.

The sentiment analysis system can detect emotions in the user's speech. Background images and sounds were modified based on detection of 6 emotions, to support an empathetic connection between storyteller and audience. These changes were managed by both automatic and manual means, creating a semi-automatic solution. Emotions in their stories were complex and changed rapidly. The artist/mediator often intervened ahead of the computer response in an effort to keep pace. Often, participants and audience members interpreted the avatar's appearance and behavior differently, even when it was unchanged. They seemed to base their interpretations on who was telling the story, and how she/he interacted with it, rather than according to an impartial, abstract analysis of its gestures.

3.4.4. Improvisation and mediator

The fourth theme about improvisation and mediation was related to specific objective 1, supporting the gradual engagement in emotional and spontaneous responses of the older adult participants in their storytelling, over time.

Dr. Gendron observed:

"Participants became more comfortable interacting with the avatar and telling stories over time. During the first session, many participants demonstrated more neutral emotions, limited body movement, shyness and nervousness. Some participants expressed feeling shy or uncomfortable and expressed concern about audience members watching. During subsequent sessions, the process of storytelling appeared to become more natural, and researchers observed an increase in body movements, increase in focus on the screen and the avatar and an increase in emotion during storytelling. For example, some participants would come with a prepared story for their first encounter with the avatar; however, subsequent interactions with the avatar contained more impromptu and spontaneous stories. These impromptu stories would often be inspired by listening to others tell their stories through the avatar."

To help explain avatar interaction to the older adult, we demonstrated hand puppetry as a familiar analogy. We explained that this 21st century puppet could be used to uncover hidden memories and feelings through improvisational storytelling. However, most participants came with a prepared story. They seemed to have practiced the story before the sessions. But eventually, they began to improvise, and volunteered to participate again, inspired by others' stories. We offered a weekly topic to help them to prepare, but often residents prepared stories they wanted to tell, regardless of topic. Participants usually said their story would be very short, but they often turned out longer than anticipated. Over time, the line between private and public was blurred as participants became more comfortable telling stories and improvising.

Regarding the artist's participation as a mediator during the avatar life-review sessions, Dr. Gendron noticed:

"Semi, we think that your personal experience with the participants contributes another important theme to this project. You connected personally with them and with their stories and also provided encouragement and a safe place to engage with the avatar. We hope that you share this when you share results, as your personal connection to the project as an artist, and as a person, was evident throughout."

For me, as the artist, actively participating as a mediator, designer, audience member and storyteller, the Avatar Life-Review was an outstanding sharing experience. I had explored virtual puppetry inspired by Korean healing ritual and explored cultural factors in the emotional psyche—in particular the Korean notion of Han—in paradoxical relationships between the virtual puppet and puppeteer, but it was the first time I had applied these principles to the study of therapeutic interventions with a senior population coming from different cultural traditions than my own.

I realized that cultural background is uniquely connected with the therapeutic potential of avatar life-review. Korean culture differs from Western culture in many respects. As a society with a strong Confucian heritage, we value our elders highly and seek them out for guidance and connection. Direct eye contact is regarded as a challenge towards one's elders; averting one's eyes is more respectful. Life-review sessions became an opportunity to mediate these cultural differences. The residents were fascinated by Korean culture—food, clothing, traditional costumes, Confucianism—often leading to cross-cultural discussions after life-review sessions.

Personally, I had experienced many guilty feelings during VoicingElder avatar sessions whenever the technology was not working properly. It was much more than disappointment about system failure/glitch. Rather, I felt terrible, as if I had completely ignored someone as a person. This happened when Kinect sensor body detection was not working, and especially when the sentiment response system was not working properly. This may be due to the fact that the avatar storytelling platform was designed to assist people's personal storytelling and emotional expressions. I assumed a huge responsibility by asking people to reveal very personal stories and feelings, and when my avatar system couldn't support their effort, I suffered with guilty feelings and asked myself ethical questions. Fortunately, later on, data analysis showed that our hypothesis worked, and this was encouraging.

3.5. Sentiment analysis

Finally, in this section I will present the design research results regarding an important aspect of the technological development of the Avatar interactive system, the sentiment analysis.

3.5.1. Research context

In collaboration with Computer Scientist and professor Dr. Stefano Faralli at University of Rome La Sapienza, Italy, sentiment analysis algorithm was used for VoicingElder life review sessions, as a beta test. Emotion plays a significant role in life storytelling, and everyone's life stories have emotional flow crafting perception of each life event. There was an interesting scientific case study about sentiment responses used for the voice of the car. Drivers who interacted with a voice matching his/her emotional state had less accidents on average than drivers with unmatched emotional voices from the car [Stanford University's Department of Communication and Toyotas Information Technology Center (Nass et al., 2005). This shows empathetic connections between humans and machines are important, so sentiment analysis can play an important role in creating empathy and promoting cooperative relationships between humans and machines via emotional connection (Gunko, 2018). Sentiment analysis is defined as the computational study of people's opinions, appraisals, attitudes, and emotions toward entities, individuals, issues, events, topics and their attributes (Liu, Zhang, 2012).

VoicingElder used a sentence level sentiment analysis method. According to the research of Bing Liu (2015), there are 3 different levels of sentiment analysis: document level, sentence level, and aspect level. Document level sentiment analysis attempts to classify sentiments in product reviews or news articles, sentence level attempts to classify positive and negative sentiments for each sentence, and the aspect level is targeted at capturing multiple sentiments that may be present within a single sentence (Gunko, 2018).

Social media gathers people's information by collecting behavior, comments, etc. They have used sentiment analysis to analyze thousands of comments, reviews, and survey responses in a short period of time. However, application of sentiment analysis was not much done, especially for live speech used in therapeutic settings. The VoicingElder project detects the speaker's current emotion and polarity continuously, during live speech, which is more challenging than analysis of written text materials. We used audio wave data containing the

participant's speech recorded by microphone to detect the participants' emotions and polarity, based on sentiment analysis of textual speech representation via speech recognition.

The goal for sentiment analysis in my research was to promote playfulness and emotions in the life storytelling process, thus helping the older adult participants generate genuine and meaningful narratives based on their own lived experiences. In VoicingElder, the software generates a generic idea of the dialogue topic through a combination of speech recognition and simple text classification. This opened possibilities for appropriate graphic and acoustic feedback for perceptual changes in the human psyche. We used 6 emotions: happiness, sadness, anger, fear, anxiety and laughter. The VoicingElder system provided audiovisual feedback, based on the emotional states of the participant's expression. For example, when a participant elaborated on a sad story, a background picture and sound reflecting sadness were presented with an interactive avatar.
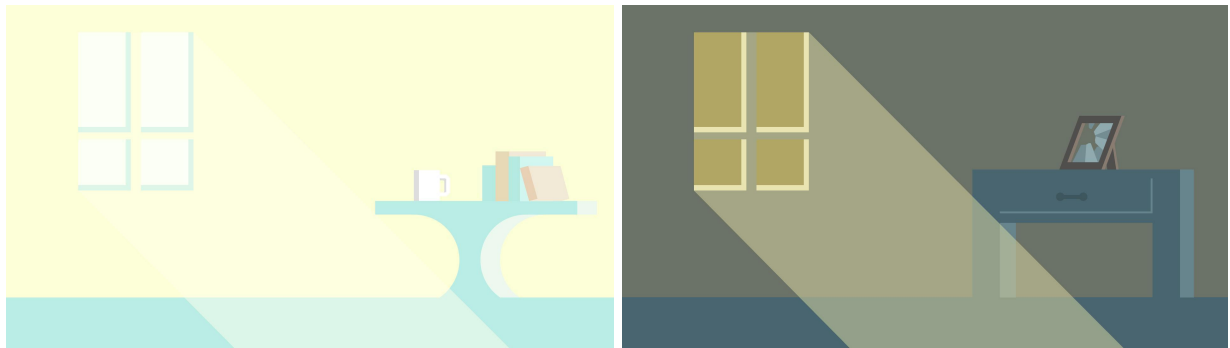
Figure 12: Emotional background images: Happiness, Anger.

Figure 13: Emotional background images: Sadness, Anxiety.
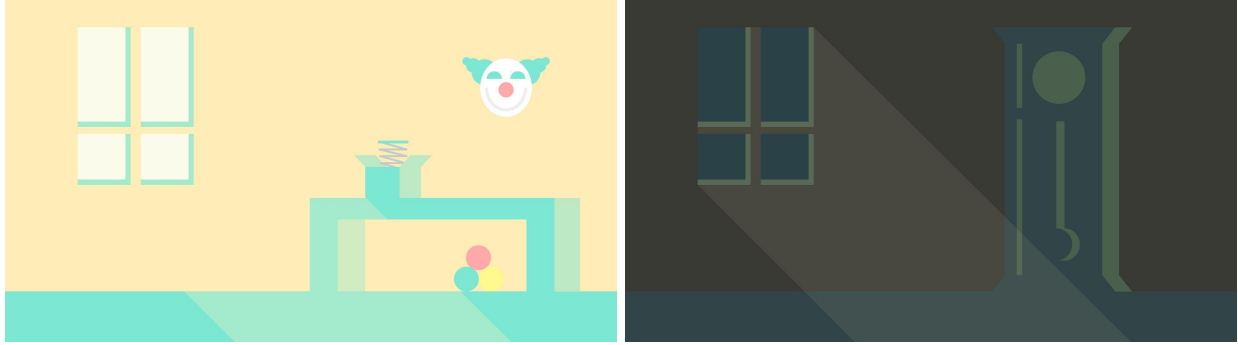
Figure 14: Emotional background images: Laughter, Fear.

3.5.2. Self-reflection and problems regarding sentiment analysis

Sentiment response technology allowed me to have the opportunity for self-reflection and realization about the importance of emotional response in my communication. I have realized that I never paid full attention to the story itself, rather focused on the emotional flow of the story. This may be caused by my language problems. Sometimes it was difficult for me to understand a senior's English speech. During VoicingElder sessions, there were many moments when I realized that I didn't remember the details of the story just told. There was a live text box in the projection screen where I could put questions or words for the participants; however, sometimes I failed to respond appropriately.

My fieldnotes show my struggles of understanding the storytelling:

> "My live text input was bad…. I kept asking him to tell a story about war, even after he already spoke a lot about it. I see my listening is horrible. Based on the captured screen video, I see I misunderstood a lot. I couldn't remember the detailed story at all. I could feel emotional contexts from nuance but not from story contents.
> What is wrong with my listening? I am not the right person to insert with text input, and ask appropriate questions to the storyteller…. "

I started to ask myself whether this issue reflected a language problem or emotional focus? Or both? My emotional attention seemed to be related to Korean culture, but probably affected more by my language problem. These were my questions from field notes:

"I realized the avatar system is related to my listening problem. I found I am not hearing the details of the story at all. I am just following the emotional flow of storytelling. I am not sure why. Am I thinking emotion is more important than content? I guess the language barrier had a huge contribution. My English listening capacity has been limited. While listening, I am used to following the emotional flow rather than details. Is this the role of the sentiment responsive system in VoicingElder?"

A beta version of sentiment analysis was first time implemented in VoicingElder, and there were technical problems in this first experiment.   During the VoicingElder life-review sessions, we used Google speech API for our speech to text feature; however, it was not able to analyze "continuous" speech. The main requirements in order for speech recognition to support the nature of live speech sessions is to stream audio and receive the transcription also as a stream with minimum latency. Google cloud speech API was unable to keep up with participants' stories. In one session, the audio length was limited to 60 seconds. The mediator manually pressed the Google speech recognition button whenever speech recognition was paused. As the first beta version, sentiment analysis was not working accurately, either. Sometimes, an unrelated emotion was selected, so that incorrect visual feedback and sound were presented. In order to resolve this issue, we added a feature that allowed manual control of the emotional response. This field note shows how we came up with the button idea:

"We found a way to neutralize emotion in the sentiment response system. In the last session, we experienced that the speech from the previous user was still influencing sentiment analysis (SA) of the next user storytelling. We came up with the idea of resetting the SA system."

For situations with incorrect emotional response, we prepared buttons to activate emotions manually: happy, sad, angry and neutral. When the button was pressed, many words related to each emotion were submitted to the server. Sometimes, I submitted 50 words of "happy", then the system started recognizing the emotion of happiness. This was a primitive way to handle the sentiment analysis algorithm, but it proved very interesting. We made three more buttons to add emotions like fear, anxiety and laughter later, as we hadn't created an emotional dictionary for these emotions. These emotions were triggered directly by pressing the keyboard. The semi-automated system worked well in general, but many times computer responses were slow, and that gave me guilty feelings. Many times, I couldn't wait for the computer processing time

for sentiment response and manually pushed the emotion button ahead of the computer, in order to show empathetic connection to the participants as quickly as possible. I wanted to show my emotional response (through the computer) as soon as possible, to show the participants that we were listening, understanding their feelings and that we were together emotionally, with empathetic bonds, which seemed critically important for me.

The following field notes discuss the process of creating the emotion buttons, and my experience in using them during VoicingElder life-review sessions, with the sentiment responsive system. The button activated hundreds of words for each emotion. Whenever I pressed the buttonI was submitting my virtual speech to the server and the SA system started responding to my request. This was a very different experience than the usual button experience, as shown in my field notes:

> "Stefano made a textbox where I can put words, to control emotion. When I put lots of words "neutral", SA becomes neutral mode. Stefano eventually made a button for neutral, but the process was exactly the same. This was a very different experience from pushing the reset button. Still I was doing input of words "neutral". Virtually, I was speaking " neutral" many times, to neutralize the system. Interesting feelings…. when the system was responding to my words input, I felt like someone was hearing my virtual speech and responding to me. Now the SA system was not fully automatic- hybridized. Humans were being involved in the system. I realized that this kind of semi-automatic system is very nice. Half is controlled by computers, and the artist can be against the computer decision for some reason. Half was run by computer; half was by artist. Nice collaboration- teamwork."

It is interesting that the older adult participants were not much impacted by visual feedback. For example, they were not overly distracted when the wrong emotional image was displayed. However, they seemed to pay more attention to sounds. The sound of birds and rain seems to have inspired some of the residents' storytelling. This could be due to the older adults' vision issues. Due to the complexity of the speech recognition, lip sync, sentiment analysis and motion detection, the entire avatar system setup was very complicated, including the projection screen, Microsoft kinect sensor, wireless microphone, sound mixer, google speech tablet, and wireless keyboard. The complex technical settings delayed VoicingElder life review sessions significantly. A major problem involved voice input, which is key to avatar lip sync, as well as speech

recognition for sentiment analysis. We ended up using two separate microphones for each input: one wireless headset microphone for lip sync, and a lapel microphone for speech recognition and sentiment analysis.

Based on beta testing experiences in VoicingElder sessions, Dr. Stefano Faralli and his Master student Leonid Gunko, working with Microsoft Cortana in 2020, have updated the SA system for emotion recognition from live speech. They addressed the problem of real-time detection of emotions from live speech. Figure 15 demonstrates the architecture Dr. Faralli 's team has developed for emotion recognition from live speech, which will be used in a future avatar system.
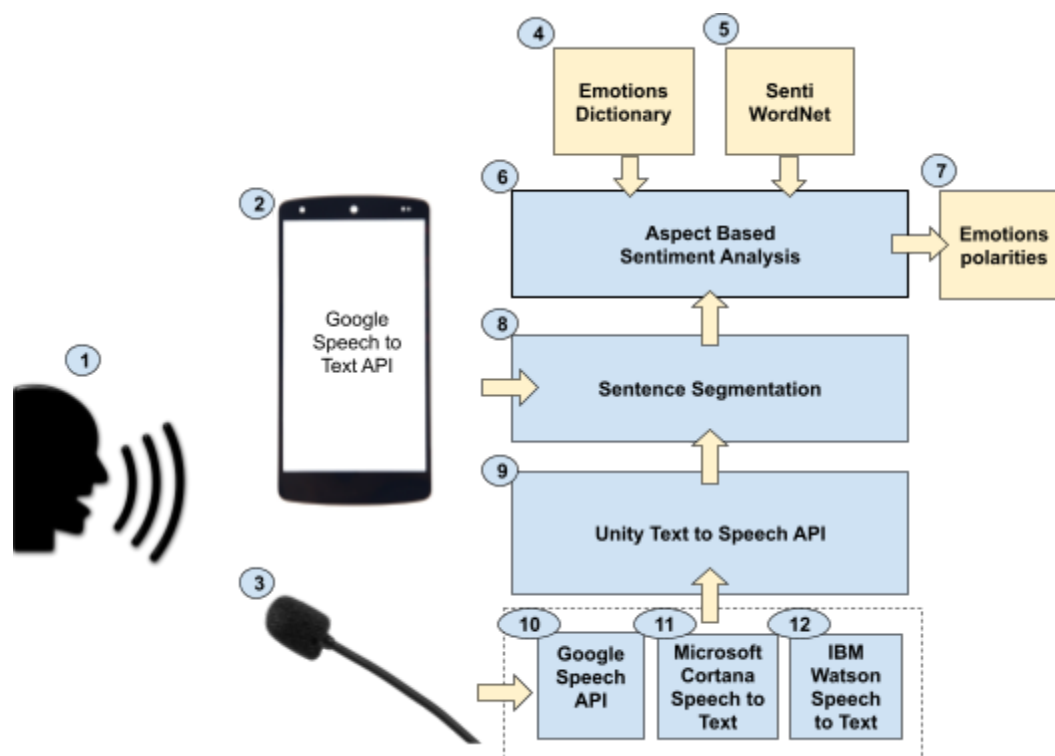
Figure 15: The overview of the architecture for the Emotion analysis from the live speech sub-system (Stefano Faralli, 2019).

Another challenge for VoicingElder sentiment analysis was audio capture of a participant's performance. Sometimes pronunciation was not perfectly clear, so it was hard to be detected by the speech recognition systems, which must be also considered when developing a system. For the best avatar performance, sentiment analysis needs to be analyzed, not only by the audio stream containing the speech, but also by a video stream captured by the web camera (Wang,

Guan 2008). Emotions are classified not from the textual speech representation, but from audio features. In the future, we will try to incorporate the audiovisual information, as well as the recognized textual representation of the speech.

Chapter 4. Enhancing theoretical horizons

This chapter is the hinge between the VoicingElder research process and the next VoicingHan project. At the end of the sessions with VoicingElder and while I was trying to make sense of the data gathered, I was interested in Western therapeutic concepts of drama therapy and how the concept and method of drama therapy may illuminate my data and research results for the VoicingElder project. With this interest, I participated in a North American drama therapy conference and presented the VoicingElder project, receiving enthusiastic responses from drama therapists. They gave me helpful insights into understanding the VoicingElder life-review project, in the context of drama therapy and psychodrama.

In this chapter, I introduce the new theoretical frameworks that have been incorporated in my reflection about the avatar life-review system that contributed to understanding my previous research experience in VoicingElder. This theoretical framework along with rethinking the experience and rereading the data gathered will form the foundation of the next project VoicingHan. Thus, I will refer in the next pages to both projects and how drama therapy and the concepts of embodiment and performativity are/were useful to understand my artwork and its utility in health care and wellbeing.

However, I also demonstrate that Korean emotional concepts are in concordance and resonate with Western thought. This is explored in the second and third sections of this chapter, where I intermingle Western thought with my own reflections about the traditional Korean ritual presented at the beginning of this report. Korean emotional concepts can also be useful for interpreting data gathered during the session experience of the participants with the avatar life-review system, enlightening the virtual with an innovative transcultural perspective. In this chapter, I also introduce Western therapeutic concepts in drama therapy, psychodrama, and person-centered care. Then, the concepts of virtual body and performing virtual bodies are

introduced, as a new framework for using Korean emotional concepts in understanding the relationship of virtual and physical bodies, in VoicingElder and VoicingHan life-review sessions.

4.1. Drama therapy and VoicingElder

This section examines the EAP in the light of drama therapy concepts and methods, exploring a hybrid model of avatar/ drama therapy in a virtually mediated environment (see Publication 1 "Avatar life-review: Virtual bodies in a dramatic paradox" (2017)). These concepts enhanced the transcultural theoretical framework, demonstrating that Avatar storytelling experience can incorporate Western concepts of drama therapy and psychodrama, as well as Korean cultural perspectives. Thus, for my ongoing avatar life-review platform, I plan to include techniques/methods of drama therapy and psychodrama such as role playing, role-reversal, doubling and mirroring as a hybrid therapeutic model between VR and theater. Augmented by VR and simulation technology, the EAP platform can address multiple states of self in dramatic paradox, which may be therapeutically helpful for people with traumatic memories, disabilities, memory loss or mental health complications.

4.1.1. Dramatic paradox

The exploration of multiple states of self and realities is a core aspect of drama therapy (Landy, 1996) that has a long history of developing diverse methods, techniques and theories. In my perspective, this aspect is contemporarily mediated by virtual reality technology, in VR AR MR. The multiple states of self and realities can be understood, based on the humanistic psychologist's self-actualization process, which is augmented and expanded with virtual bodies and virtual realities, for the digital age. This self-actualization process in humanistic psychology perspective was a central element in Publication 1, as I stated:

> "Humanistic psychology understands self-actualization as a process that fulfills its full
> potential and from this, there is a tendency to develop a healthy state of being (Rogers,
> 1961; Maslow, 1962). Advanced virtual reality (VR)/ augmented reality (AR) technology
> allows the process of self-actualization to be augmented and expanded with virtual

bodies and virtual realities, highlighting diverse states of the self and reality, exploring 'the virtual' as the full potential of human experience" (Ryu, 2017, p. 122).

The idea of multiple states of self and reality is the foundation of the dramatic paradox which is an important element of drama therapy. Drama therapist and theorist Robert Landy underlines 'paradox' as the heart of dramatic experience, calling it the 'dramatic paradox'. There are diverse aspects of paradox in the human condition such as mind/body, thought/action, and subject/object (Landy, 2001, p. 380) In dramatic paradox, the actor and the role are both separate and merged, in a coexistence of fictional and nonfictional reality (Landy, 1996, p. 11). Publication 1 explained the dramatic paradox in the Korean ritual perspective and emotional concept of Han.

During the VoicingElder session, the older adult participants faced the avatar on screen, and watched their own performance as mirrored by the onscreen avatar. In this setting, they were both actors and observers of their performance, storyteller and audience, at the same time. The VoicingElder avatar was projected on screen, in a mixed reality setting (not via VR headset) where the participant and audience could see the avatar in a community theater space. The size of the avatar projection was similar to human life-size. The mixture of the avatar onscreen and the participant sitting in front, created paradoxical tensions between virtual and actual body mirroring and facing each other. Such mixed reality experience is critically different from fully immersive VR headset experience, engaging the participant to become a spontaneous storyteller.

Figure 16: Residents watching a participant's avatar performance, June 2016. Gayton Terrace Senior Living, Richmond, VA. Photo: Brianna Ondris.

Dramatic paradox is maximized in the VoicingElder life review session where the boundary between real and virtual is blurred in viewer's consciousness, just as in theatre where the actor holds the opposite realities together (Landy, 1996, p.11). This explains the older adults' self-perception as well. For instance, they may perceive themselves a lot younger than their actual age when a youthful avatar is projected on screen. In drama therapy, the actor finds a way to transform into a state of being that holds the actual and fictional realities together. During the avatar storytelling, the border between actual and virtual is also dissolved, as a new dimension of dramatic paradox in the digital age, engaging new dimensions of the self, transformation and realization.

4.1.2. Role playing

Robert Landy considers a role as a 'basic unit of personality containing specific qualities that provide uniqueness and coherence to that unit' (1996, p. 230). The term role has been used by social scientists as a metaphor to analyze everyday psychological, social or cultural life (Goffman, 1959; Brissett and Edgley, 1975). The founder of psychodrama, J. L. Moreno, understood that the personality is developed as one plays out many roles (Moreno, 1946; Johnson and Emunah, 2009, p.395).

The VoicingElder project provided a role-playing platform by providing eight avatars - four females and four males, each with four developmental stages: child, teenager, young adult and older adult. In VoicingElder, the process of role playing was accomplished by acting out the story, which was mirrored and spoken in real time by the avatar. This mirroring effect allowed new perspectives on one's life, memory, and self-perception in the older adult participant's storytelling.

The transition process, however, is different from traditional role-playing methods. The avatar provides quicker and easier access to a role, without a warming up process. However, in Landy's role method, there are two steps before playing out a role: (1) invoking the role and (2) naming it. As I argued in Publication 1: "He describes that '[t]he invocation of role, is a calling into being of that part of the person that will inspire a creative search for meaning' (Landy 1996: 47). For this process, he uses the method of movement warm-up, asking people to focus on one part of their bodies and to allow a movement to extend and a character to emerge. Also, naming

is important as it concretizes the chosen role. This allows people to immerse into fictional and creative reality, 'oneself'' and 'not oneself' simultaneously" (Landy, 1993, p.47 quoted in Ryu, 2017, p. 125).

Thanks to interactive technology, Avatar role playing brought an instant connection with the role, but did not have time to build a deep connection with the role. We may come up with hybrid methods to invoke roles using both traditional and digital methods. In virtually mediated environments, the role-playing and dramatic paradox can be different from traditional methods, allowing exploration of a diverse relationship between the actual and the virtual body, and different aspects of healing which require different methodology. Diverse ways to engage with avatars were facilitated by different age groups and cultural situations. During the VoicingElder sessions, we encouraged the older adult participants to name their chosen avatar, however, most of the older adult participants used their real names and were reluctant to create a fictional person. This aspect was changed in my ISEA2017 avatar workshop, where the participants were mostly young (20s and 30s) and were willing to create imaginary persons with their avatars, in exploring their life stories (Ryu, 2017, pp. 125-126).
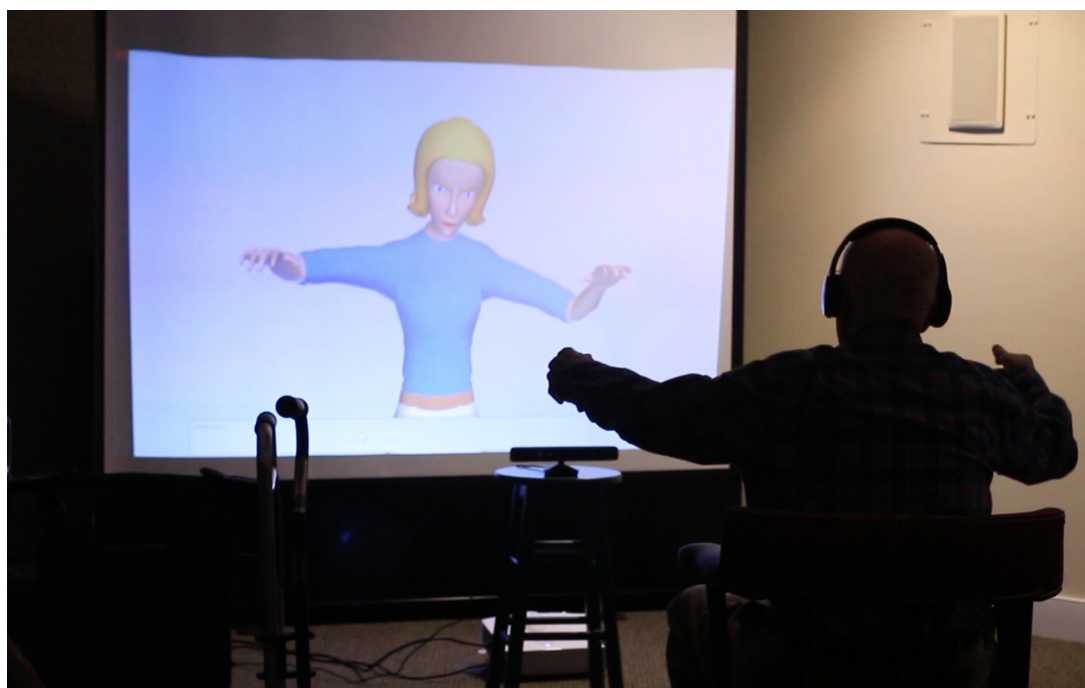
Figure 17: A participant who was trying to hug the avatar who he thought was his elementary school teacher, June 2016. Gayton Terrace Senior Living, Richmond, VA. Photo: Brianna Ondris.

Throughout the VoicingElder sessions, we have learned that designing the avatar life-review system is important, but how the system can be used within which setting is crucial. Paul Dourish suggests some anthropological perspectives in his book *Embodiment: Where the Action Is* (2001), emphasizing the importance of the setting where an interactive system occurs. I feel that the methodology of how to facilitate avatar life-review in particular settings needs to be investigated more, in this mixed reality theater environment. Even if interactive technology is used, the activity is primarily facilitated by the human mediator which impacts the outcomes and aspects of engaging with technology.

4.1.3. Embodiment and the Korean Seon 3 stages

Embodiment is an important concept in drama therapy and has been described as experiencing 'here and now'. In cognitive science, Varela et al. (1991) has discussed embodied interaction between a subject and a separate entity in a Buddhist world-view, connected with the idea of mindfulness and embodied cognition, also emphasizing the 'here and now'. Embodiment was described as an emotional state triggering memories, crucial to the healing process (Burkitt, 1999; Uttl et al, 2008). Jacob Moreno describes being in the 'moment', related with the embodied experience of 'here and now'. In his concept of 'theater of spontaneity', there is a 'moment' when individuals respond creatively to emerging situations (see Ryu, 2017, p.126).

Embodiment is a prominent feature of Virtual reality art. Virtual reality constitutes a distinctive medium of embodiment. Morie (2007) in her article "Performing in (Virtual) spaces: Embodiment and being in virtual environments" said "Virtual environments engage the body, as kinaesthetic input via the specialized interface devices that not only permit but require bodily actions to be performed sensorially, kinaesthetically, proprioceptively – within a full 3D spatial, yet virtual construct (Morie, 2007)."

Char Davies's seminal work "Osmose"(1995) brought much attention to discussion of embodiment and mindfulness in VR. Osmose was created for meditation and healing experiences (Cobb, 1999). Davies' visual aesthetic involves the creation of ambiguity and transparency, exploring meanings and metaphor. Inspired by Davies' scuba diving experiences, the interactive modality uses breathing as a navigation method. As a result of using deep breathing interactive techniques, participants attain a relaxation and mindfulness of being centered in their body in the virtual space (Davies, Harrison, 1996). Char Davies' Osmose

proclaims the role of the body in immersive virtual space as "subjective experiential ground" (Davies, 1995). She believes having a body representation as an avatar would interfere with the connection to the physical body, highlighting the importance of having the first-person point of view in this project, to explore the imagined self (Morie, 2007). Although Davies' works didn't use avatars, it demonstrates a powerful aspect of embodiment and healing, mediated by VR and interactive technology.

Embodiment is an important terminology in digital media and has been used to describe the most meaningful experience, along with terms such as immersion, engagement and presence (Bayliss, 2007, pp.1–6; McMahan, 2003, pp. 68–86). Although embodiment is associated with 'here and now', immersion is regarded as 'there' as described as 'you are there' experience (Heim 1994). The embodied experience can be explained with Korean Seon Buddhism's three stages of enlightenment (Ryu, 2017, pp. 128-129). In Seon Buddhism 'here and now' is a different dimension of 'here'. In my perspective, I interpret 'here and now' as 'once again here, and once again now', as a dynamic reflexive state, returning back to reality with a critical shift in awareness.

As stated in Ch 3.4.1, during a 'VoicingElder' session, a powerful personal immersion was shown in Mrs. C's case. Her case can be analyzed with the lens of embodied cognition in Korean Seon Buddhism. She concluded her story with a single sentence: "Help me to forgive him" and repeated it in different voices. The first seemed to belong to the avatar, speaking forthrightly, but the second was Mrs C's voice, weeping and trembling.

As a mediator, I fully observed her performance the entire time, and never expected that she would end her story in tears. She was playful and humorous throughout her storytelling and freely acted out the virtual body using her animated voice and gestures. Her performance was very engaging with the audience. She was performing the avatar with a neutral and powerful voice. However, during the second try of saying 'please help me to forgive...', her voice began to tremble and shake. Mrs.C seemed to have returned to her own physical body, no longer 'acting out'. She was eventually 'acting in'. The process of acting out, and acting in, seems to be connected with Korean Seon Buddhism's three stages of enlightenment. The moment of 'acting in' is the state of 'here and now' again, returning back to the physical body and reality, with renewed awareness and deep realization.
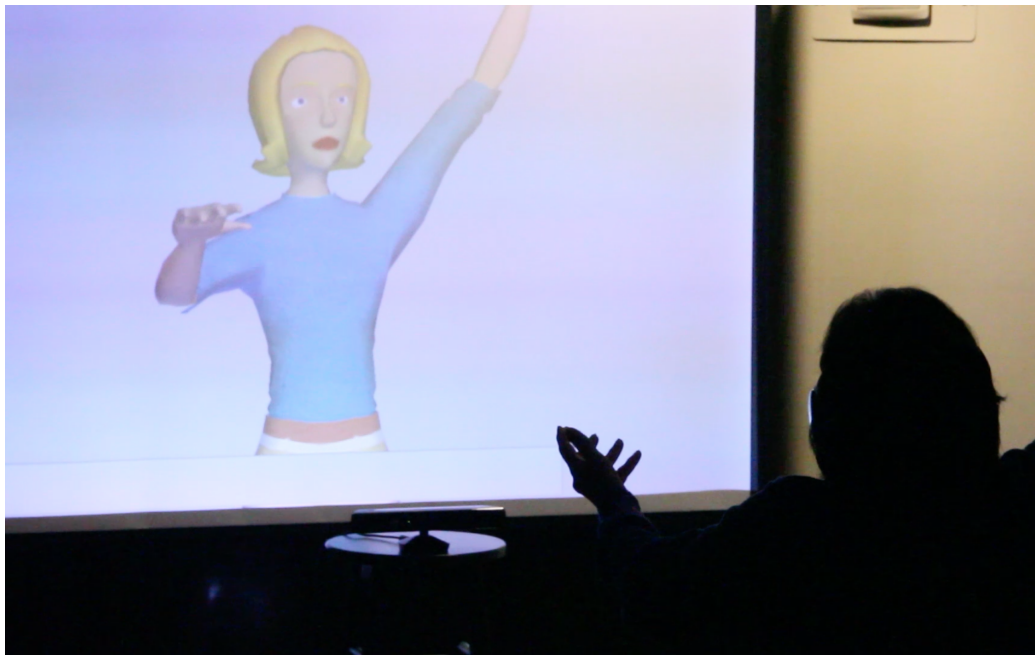
Figure 18: A participant telling her story dynamically using the avatar gesture, June 2016. Gayton Terrace Senior Living, Richmond, VA. Photo: Brianna Ondris.

4.1.4. Person centered care

Person-centered therapy is another key concept in my research, providing a relational and non-directive approach between client and therapist. This practice was developed by humanist psychologist Carl Rogers during the 1940s and 1950s. Rogers' goal was to be as non-directive as possible, supporting the autonomy of the participant's self-exploration. My avatar system operates within this framework, aiming to support patients' discovery of their own healing process.

Healthcare professionals have been increasingly moving toward a holistic model of care that emphasizes patient-defined experiences and needs (Brooker, 2006; Kitwood, 1993). Therapeutic effects emerge from the client in relationship with the counselor, not from the counselor's technique itself (Rogers, 1995). The practice then builds on a fundamental respect that personalizes care, emphasizing the person's past and emerging life history as well as respecting their values, culture, and preferences. Moreover, Rogers' practice of "unconditional positive regard" provides a baseline presumption of deep respect for the worth of each person, supporting safe personal expression (Rogers, 1961). The person-centered model and

unconditional positive regard inform the development of the avatar system as a perspective that promotes individual autonomy in all settings. While researchers have used avatars in many different ways to increase the efficacy of therapy (Craig, 2014), person-centered therapeutic approaches have not been fully explored in relation to interactive systems. Avatar life-review implements this model by allowing users to narrate their own life stories, expressing emotions via virtual bodies.

Healthcare and allied healthcare professionals have been increasingly moving toward a holistic model of care that emphasizes the patient's perspective and their individually defined experiences and needs. The concept of person-centered care builds on a fundamental respect of subjectivity and personhood that personalizes care, emphasizing the person's past, present and emerging life history as well as respecting people's values, culture, priorities and preferences. The person-centered model moves away from the medical-oriented and professional driven models of care to a perspective that promotes individual autonomy in all settings. A person-centered approach uses a social, humanistic, and holistic perspective on how to understand and promote the best possible life and care for people (Brooker, 2007; Kitwood, 1997).

Older age is an appropriate time for evaluating one's life, and this can be accomplished through a life review – a purposeful, constructive effort to review one's life and gain perspective. VoicingElder initiates a life review process by engaging with recent developments that focus on the individual's role in the development and implementation of their own care – person-centered care. Utilizing the concepts of drama therapy, distancing and dramatic reality, VoicingElder sets up a structured life review session in which the older adult narrates their own life stories in a performative setting.

VoicingElder promotes person-centeredness by creating a platform that facilitates the growth of each individual and promotes reflection, healing, and generativity. In the VoicingElder experience, each participant is responsible for their own transformation, setting their own guidelines for how they would like to share their life experiences. No two people will experience it in the same manner. The integration of drama therapy, puppet therapy, avatar therapy, and life review creates a unique and valuable person-centered experience that can improve overall well-being and quality of life for the participants.

4.2. Performing virtual bodies

As previously said, in the VoicingElder project, terms were changed from the initial concept of "virtual puppet" to "virtual bodies", and from "virtual puppetry" to "avatar life-review", focusing on the issues of body and performativity, and interfacing physical and virtual bodies proactively in a mirrored composition. This conceptual change evolved alongside the project of VoicingElder and configures a part of the theoretical framework of VoicingHan.

In this chapter, my definition of virtual bodies and the process of embodiment in what I call "Performing virtual bodies" is explained, inspired by Korean ritual and emotional concepts. Based on a previous discussion about Korean emotional flow in Ch 2.2, virtual body experiences are explained as the phases of wishing, facing, creating and performing virtual bodies as discussed in Publication 3 "Performing virtual bodies" (2020). This theoretical framework was developed to proactively experiment, design and facilitate emotional and therapeutic experiences, and used to rethink the avatar life-review sessions as examples of wishing, facing, creating and performing virtual bodies (Ryu, 2020).

4.2.1. Virtual bodies

Virtual bodies in digital media practices have been defined as simulation of bodies that exist in computer generated environments. Therefore, the virtual body was understood as a technological body, existing in computer generated environments (Peachy & Childs, 2013, p. 103), providing an imaginary escape from the physical body (Cruikshank, 2001). However, virtual bodies have existed in ritual, theater and human consciousness mediated by diverse methods, even before computers. Fundamentally, we cannot discuss a virtual body without discussing a physical body (Ajana, 2005; Balsamo, 1996; Hayles, 1999).

There are two dimensions of virtual; one "technological" and the other "perceptual". I have been interested in the perceptual definition of virtual. As stated in the Preface, "Experience of the Virtual", my speculation of virtual body perception stemmed from my question about the physical body situated in definite socio-cultural fields.

On the one hand, Felix Guattari talked about the micro-fascism of our own body and the molecular revolution. This is what can also be termed as 'ritual', one which happens on a microscopic level of human consciousness (Ryu, 2005, p.105). On the other hand, Korean ritual celebrates the paradoxical mode of the self, starting from an ontological or transcendental oppression (Weinstone, 2004, p. 17). During the ritual, we can imagine ourselves to be much more than our societal definitions, exploring critically different modes of the self. This constitutes a revolution against the power structure, and one which might be impossible within our physical state of being. In Ch 2.3.1, the tragedy of the puppeteer contributes to the ongoing story of the impossible love, an ongoing state of becoming, of being continuously in love with our displaced selves.

This is particularly the case with subject-object relationships occurring within a definite socio-economic field, especially one which is socially predefined, promoting certain modes of behavior and constructing self-observatory systems. In short, the idea of a norm as something immovable and defined by society would be a tremendous obstacle in searching for human freedom and identity.

In Publication 3, I wrote about social body, performativity, and identity, and suggested the role of virtual bodies in the digital age. Our body is situated in the micro-politics of power structures, and systematically trained to be better adapted to the formations of power (Guattari, 1996, pp. 7-14). In the context of Guattari's molecular revolution, virtual bodies emerge in the process of denying the material body from oppressive states: from gender, culture, society, religion, disability and disease. Judith Butler proposes (and I have argued) that socio-cultural constraints are not necessarily a limit to performativity. Constraints may instead impel and sustain performativity (Butler, 1993, p. 95 quoted in Ryu, 2020, p. 4).

In the digital age, with the omni-presence of technological and simulated virtual bodies, we need these discussions of body and performativity to be extended to the relationship between physical and virtual bodies. Speech, behaviors, emotions, and thoughts mediated by virtual bodies may bring new dimensions into the discussion of the formation of self and identity embedded in social relations and cultural backgrounds. Virtual bodies can critically transcend social constraints, allowing exploration of alternative selves and other relations with one's own body. Culture is not a deterministic frame in the virtual world where.

However, there is an idea of liminality and threshold regarding virtual bodies. As I argued in publication 3: "The concept of virtual body has been explained, in relation to phenomenology and embodiment. The phenomenal body was considered the liminality or threshold where physical and virtual boundaries disappear (Broadhurst, 2004; Novak, 2002)" (in Ryu, 2020, p.1). If, as Broadhurst remarked, the experience of the corporal schema is not fixed or delimited but extendable to the various tools and technologies which may be embodied, then the physical body can be considered as an anchor point for complex extension and embodied experience.

Sue Broadhurst explores liminality while explaining the relationship between physical and virtual body. She believes that tensions exist in the interface of body and technology, and these spaces are "liminal" in as much as they are located on the 'threshold' of the physical and virtual (Novak, 2002). Broadhurst says we need a new mode of analysis which foregrounds the inherent tensions between the physical and virtual, and she has developed her theories on liminality (Broadhurst, 1999a, 1999b, 2004b). Our bodies are always open to and 'intertwined' with the world. Technology then would imply a reconfiguration of our embodied experience. Technology becomes part of that body and alters and recreates our experience in the world. Broadhurst (2006) defined 'virtual body' as infinite creativity, deconstructing a physical and virtual body of digital practices.

Using Broadhurst's work as an "anchor point", I am interested in how the virtual body may allow a search for a physical body that has been misinformed and misconfigured. I explore the dynamic possibilities of virtual bodies that can reshape and reconfigure the physical body, that may be ill, oppressed or depressed. A virtual body can serve as an exploratory canvas, allowing return to the physical body with renewed perception and realization (see Ryu, 2020, p.2).

Artists have incorporated virtual bodies in diverse forms of media. Paul Sermon's seminal work, "Telematic dreaming" (1992) demonstrated virtual body-based art where actual and virtual bodies (the projected image) interact dynamically, in intimate relationships. Although the virtual body in this work was the live projected video imagery, it functioned much like the avatar in his Second Life piece "Liberate your Avatar (2007)". "Liberate your Avatar" (2007) facilitated the coexistence of the first life visitors and Second Life avatars, sharing the same bench in a park in a live interactive public video installation, exploring identity paradox (Sermon, 2007) (in Doyle, 2008, p.140).

The avatar virtual body does not need to be limited to 3D representation of the body and can be understood in a broad definition of virtual body. In the book "Closer" (Kozel, 2008), a dancer and media artist, Susan Kozel wrote about her phenomenological experience as a live performing artist, with projected virtual bodies, during the exhibition of Telematic Dreaming (1992), illustrating, and sharing her bodily experience in a thought-provoking essay.

We need to investigate this broader definition of the virtual body. The reconceptualization of virtual bodies would enrich the potential of technically mediated bodies in digital space, supported by the constant development of virtual, interactive and simulation technologies.

4.2.2. Wishing virtual bodies

In this section I reflect upon the experience in VoicingElder through the emotional phases of Korean ritual, in the context of what I call "Performing virtual bodies". Wishing and performing virtual bodies will be explained first in these sections, taking VoicingElder sessions as examples.

This section is related to the Korean emotional concept of Han which was explained extensively in Ch. 2.2.2. Han is known as the most important element of the Korean mind and emotion. It is a paradoxical state of consciousness that combines an extreme state of grief with great hope and desire for overcoming a situation that is seemingly impossible (Lee, 1982). As I explained before, during the Joseon Dynasty in Korea, shamanism functioned as a breakthrough from repressive Confucian philosophies concerning women and the oppressed (Oh, 2016). The Korean emotional state called "Han" was developed by the oppressed over a long period of time and became a source for activating the Korean shaman ritual of "*Kut*". In Publication 3 "Performing virtual bodies" published in the *International Journal of Performance Arts and Digital Media* (2020) I explored the repressed situation of a shaman called Mudang, and women, and how they use the shaman ritual *Kut*, to release their Han.

In this Korean ritual, virtual bodies cannot be activated without strong wishes to overcome physical, social, and cultural limitations. *Kut* functioned as a "safe channel" for the oppressed to perform virtual bodies transcending their limitations. Their Han functioned as a springboard to jump off toward something close to an authentic state of being. For the oppressed, it is a virtual body. Through Han we experience virtual bodies that respond to our desperate longings for

healing. Thus, virtual bodies can be a tool to help people overcome a repressive state (such as Han) through interaction, performance and transformation.

As an artist working with "virtual bodies", I developed the idea of a virtual body life storytelling platform and searched for Han as a source of creative energy for transformative and therapeutic story-telling. I took a transcultural perspective proposing Korean shamanism as the basis of a digital interactive system, with the aim that a digitally mediated body can help transform populations that are suffering and whose voices are not heard. In contemporary society, Han may exist in those who experience difficulties and have existential questions, such as older adults, terminally ill patients, people with mental health complications, and people with anxiety or depression.

As described in Ch. 3.4.1, one of the most powerful performances of the avatar in the VoicingElder session came from Mrs. C, who showed unexpressed feelings and repressed memories about her father, which I connected with Han. Mrs. C's case clearly demonstrated the role of Han, in the context of wishing virtual bodies. Publication 3 analyzed her session, in the context of Han, demonstrating her strong desire to connect to the avatar virtual body. She carefully checked the technical connection with the avatar before starting her story, such as body detection and lip sync. During her storytelling, Mrs. C used her avatar body with the most animated gestures and voice performance. She was desperately longing for a channel to express and communicate her story through her avatar. She continued to describe the incident, facing, connecting, and performing the avatar virtual body on the screen. At the end of her story, she burst into tears and described her experience as "such a good release", as shown in dialogue with the gerontologist in Publication 3: "I am feeling better. I knew I would.... thought last time when I was I might tell this story, but like I said, I've been trying for years to do something… and see today I cried. I very very seldom cry. See this is wonderful. I said this before last time. This is such a good release. This is 'such a good release' to say." (Ryu, 2020, p. 6).

In Publication 3, the process of performing virtual bodies was described as wishing, facing, creating and performing virtual bodies, one after another in a gradually developing phase. In the next section chapter, I would like to explain "performing virtual bodies", first as VoicingElder sessions were appropriate for the case of wishing and performing virtual bodies. Facing and

creating virtual bodies will be explained later in Ch. 5.6, using the VoicingHan sessions experience.

4.2.3. Performing virtual bodies

To understand the full spectrum of "performing virtual bodies", it is important to understand diverse approaches in Korean Shamanism. The Korean shaman ritual *Kut* has been understood with two different perspectives: one as a dramatic art, the other as a sacred ritual for inhabiting trance states of consciousness, showing different ways of understanding emotional involvement and performing virtual bodies. Kister highlighted Imagination as a key aspect of *Kut* performance and understood *Kut* as a dramatic art (Kister 2006). In Publication 3 I wrote extensively about these differences, referencing two types of shamanism in Korea:

> "Supporting these differences, Korean shamanism is divided into two types: the Northern type (charismatic shamans) and the Southern type (hereditary shamans) (Schechner & Willa 1990). The Northern type is characterized by ecstasy and trance and experiences the so-called 'shaman illness' - a mysterious illness that can never be cured until one accepts becoming a shaman. They have the ability to communicate with the spirits of gods and the dead directly. Southern type-hereditary shamans, by contrast, do not have this ability, but have been educated to perform the *Kut.* They practice acting, singing, and dancing and perform complicated ritual procedures (Oh 2016). They perform virtual bodies by imagining the presence of the god, goddess, or the dead, within their own or other bodies." (Ryu, 2020, p. 12)

During the VoicingElder session, it was interesting to observe the gradual transition in the performer's consciousness, starting from remembering the events, to the dramatic enactment of the events, and eventually experiencing it as a living reality. During avatar storytelling, there was one case where a participant gradually transitioned from using the past tense, to present tense, while most of the participants used the past tense in their whole stories. The change from the past to present tense demonstrates the story moving from the past to the current event, which means it started as an enactment of memory, but ended up as a real situation happening right now in the living reality. In Publication 3 I analyzed Mr. W's session in detail (Ryu, 2020, p. 13). Here I want to recall the fragment where Mr. W started using a child avatar and talked about the constant challenges he faced in writing courses during his elementary school years. These were

memories from more than 80 years ago. He started his story in past tense: " I went to school in a one room country school in West Virginia on a farm. I was five years old and they had to show me how to get to the school and it was only 100 yards away and we only had one teacher. We had one row of seats…" And then, his storytelling started changing to dialogue between himself and his teacher: "Mr. W: "...she decided to teach me how to read. And I said "what do you mean?" and she said "I want you to read out of this book." So, "I said (voice gets more strained), read me out of what!?" (Small laughter from the audience). After a while, he changed to a present tense, performing dialogue between himself and his teacher as if it were occurring currently:

> Mr. W: "I... well let's just go up to the sixth grade. Where's the book? The books right there, can you see it right there? "

> Mr. W: (Leans forward)

> Mr. W: "No… Please, please I don't know what to do"

> Mr. W:(Turns to audience)

> Mr. W: "Take me to the fifth grade please, please. Fifth grade please!" (Turns back to the avatar)

The mediator changed his child avatar to a young adult female avatar, on the screen. Then he started to make conversation with this female avatar as his elementary school teacher. During the avatar storytelling, Mr. W became very immersed in the avatar. After his story, Mr. W. stood up with his walker, and seemed to go back to his seat. However, all of sudden, he turned around and quickly walked back to touch the avatar image on screen. He moved impulsively so several people ran to him for assistance while he tried to touch the projected avatar woman - his elementary school teacher. He desperately wanted to touch the avatar but when he approached, the avatar disappeared, covered by his own shadow. It was a heartbreaking moment for the viewers. Mr. W. finally came back to his seat and smiled, like a little boy. This case was a powerful example to demonstrate the gradual transition of the performer's consciousness from memory, to dramatic act, to a transformative state of the here and now.

4.3. Digital orality

This last section of the chapter introduces the issue of digital orality in relation to my art projects. One of my interests in puppetry is to help revive a spirit of improvisation in oral storytelling in our visually dominated digital culture. Digital orality may support emotion, intuition and spontaneity, which have been thought absent in digital communication.

Water Ong (2002) defined three oralities: primary, secondary and third. In traditional nonliterate cultures, the elder's oral storytelling functioned as an intergenerational educational process, delivering experiential knowledge, values and passion from generation to generation (Archibald, 2008). The second orality was inspired by literate culture. The third orality is related to digital orality motivated by the advancement of speech technology. It can bring in aspects of oral culture associated with emotion, memory, intuition, spontaneity and improvisation to the digital realm that has been dominated by texts and visual aspects.

Orality is an important feature of shamanistic society. Korean shamanism is connected with oral culture, with lengthy storytellings, singing and chanting. *Mudang* were illiterate as the lowest social class in the past, and their knowledge passed down from mouth to mouth. Speech is an important modality in communicating with gods, during *Kut.* It is interesting to see women participants (including Korean shaman "*Mudang*") attain an opportunity to speak (as gods or in a dead person's voice) (Lee, 1990). *Kut* worked as a channel for women to speak up, becoming alternative beings. *Kut* liberates a woman from an oppressive state, empowering her with the position of a god. Lewis similarly notes that possession has always attracted followers among the weak and oppressed, particularly among women in male-dominant societies, like in Korea (Lewis, 1971). By transforming into a god or spirit, the oppressed freely speak about their hidden opinions and emotional states. This tendency is evident in puppetry when the puppeteer speaks through the puppet.

In the VoicingElder project, a speech modality was the first thing to be implemented, making the avatar body a channel for free speech. This speech modality can be personally meaningful for someone who has lived with suppressed speech and a desperate need to communicate. Speech consciousness mediated by an avatar body in my avatar projects is different from normal speech. For example, speech amplified by a microphone brings a different perception of speech, allowing the speaker to listen better to what was said, thus facilitating a self-reflection

process. Similarly, slight delays in the lip sync of my avatars distance the speaker from the avatar's mirrored speech, which may have a new tempo, a new rhythm and a different tone, allowing for a sort of subliminal dialogue

For example, in a session of the VoicingElder project, Mrs.C's story demonstrates new speech perceptions. This is an excerpt from Mrs. C's storytelling:

> "He didn't understand me I was just a li-------ttle girl. He was a strong man, strong and really strong. So the next day we went down to the basement and sat in the recreation room in the basement and I sat on his lap, on his lap, and…he talked to me he talked to me he talked to me. Talk b aba b aba b aba……..I am sorry.. b aba b aba b aba ba ba remember I was a little little girl little little girl. Only four. I did not understand anything about anything, anything, I didn't understand it. I went back upstairs. I have a feeling that, into this left a hole---- in my heart."

Mrs.C made up new expressions such as "b aba b aba b aba…" and repeated many words such as "strong", "talk to me", "little", " anything", " wanted", etc. She also used dramatic emphasis on certain words (little, strong) with dynamic gestures, which does not usually happen during typical speech modes. Speech behavior changes when we perform as a virtual body, which results in changing the stories.

In shaman rituals and psychodrama, speech is also mediated by the virtual presence of a god, spirit or character which transforms the speech behavior. Once the shaman is transformed into a god and starts behaving as a god, everyone bows on their knees as they clearly experience the shaman as a different being, from voice, gestures, etc. The tone and speed of speech becomes different with an altered state of speech consciousness when *Mudang* speaks the voice of god, depending on different body perceptions in working with spirit. The use of digital arts media in therapy practice resembles ancient ritual self-experiences of cure and release, and digital orality is also a kind of mediated orality that can help people to express their inner feelings by improvisation and performativity.

Chapter 5. VoicingHan

In this chapter, I provide a description of the VoicingHan project: avatar life-review for palliative care, along with its background, technological design, and digital immortality aspects. Then, quantitative research on the clinical feasibility study follows, describing the methodology, procedure, data analysis and results which are the bases of the Publication 4 "Feasibility of Delivering an Avatar-Facilitated Life Review Intervention for Patients with Cancer" (Dang, Noreika, Ryu et al, 2020). A final section has been added, to reflect on this clinical research process from my perspective as an artist.

After discussion of the quantitative data, the qualitative retrospective secondary research is introduced including the theoretical frameworks supporting the research design, methodology, procedure, analysis and results which are the bases of the Publication 5 "Embodied storytelling and meaning-making at the end of life: avatar life-review for palliative care in cancer patients" (Ryu & Price, 2021). At the end of this chapter, the Korean interpretation of the VoicingHan experience is introduced, in the context of what I define as "performing virtual bodies" as explained in Ch. 4.2. This demonstrates that Western and Korean interpretations are in correspondence and that the Avatar platform is useful for different social and cultural backgrounds as well as from a transcultural theoretical approach.

5.1. Project description and background

The VoicingHan project is an avatar life-review platform designed for patients with advanced cancer who are receiving palliative care at Virginia Commonwealth University's Massey Cancer Center, in collaboration with Dr. Egidio Del Fabbro and Dr. Danielle Noreika, at VCU School of Medicine, Division of Hematology, Oncology and Palliative Care. VoicingHan supports terminally ill patients by using oral storytelling as an artistic medium, facilitating their interactive performance while promoting autonomous creativity to encourage "patient activation" or "patient-centered care", in the avatar facilitated life-review process. The Avatar provides a safe platform for the patients to freely explore their storytelling, which may otherwise be difficult to express. The VoicingHan avatar platform provides an illusion that the Avatar is speaking, thus allowing the participants to observe their stories as they are telling them; this has the potential to

encourage deeper reflection, playful engagement and memory retrieval, in their life-review process.

5.1.1. Palliative care

Patients with cancer face challenges that are multidimensional, extend beyond physical discomfort, and include psychological, spiritual, and existential distress (Coelho et al 2017). Family members and patients often experience elevated levels of anxiety, anger, spiritual pain, sadness and depression.

Palliative care (PC) teams may use a combination of pharmacological and non-pharmacological interventions to mitigate the high symptom burden and distress experienced by patients. Effective single interventions that span multiple domains would be ideal. However, this is seldom possible, and usually several treatment strategies are incorporated to manage individual patients. Although some pharmacological and non-pharmacological approaches may improve multiple domains (e.g. duloxetine alleviates neuropathic pain and anxiety, while acupuncture has been reported to improved nausea and spiritual pain), monotherapies alone are unable to address the complex suffering experienced by patients with cancer (Lopez, Garcia, Liu et al, 2018) (Del Fabbro, Dalal, Bruera, 2006). Unaddressed domains of the patient's experience have a negative impact on their perceived quality of life (Zabora, Brintzenhofeszoc, Curbow, Hooker, Piantadosi, 2001).

Given the degree of existential suffering and high symptom burden experienced by many patients with advanced cancer, interventions seeking to improve quality of life may seem futile for people facing a terminal illness. However, research has shown PC is able to improve psychosocial health, depressive symptoms and caregiver experience in advanced illness (Singer AE, Goebel JR, Kim YS, et al, 2016). The Korean mind/emotion model "Han" reflects this goal of joining apparently contradictory states into oneness, where an extreme state of grief can be combined with great hope for overcoming an impossible situation (Ryu, 2017). For this study we used an accessible, dynamic, artistic medium termed "VoicingHan," in order to facilitate palliative care patients' interactive performance and autonomous creativity.

The avatar facilitated life review platform, an intervention originally developed for elderly patients, was incorporated into conceptual psychosocial models for patients with cancer

(Holland J, Poppito S, Nelson C, et al, 2009). Positive outcomes reported after life review have included decreased despair, less spiritual distress and improved quality of life. We hypothesized that 'Voicing Han' would increase the ability of patients with advanced cancer to experience similar improvement in multiple domains related to physical, psychosocial and spiritual aspects of their lives.

5.1.2. Non-pharmacological Interventions

Regardless of disease severity, the diagnosis of cancer has significant psychosocial impacts on patients and their families, and over one-third of patients with a life-limiting illness experience anxiety, depression or both (Coelho, Parola, Cardoso, Bravo, Apostolo, 2017) (World Health Organization, 2002). Non-pharmacological therapies improve symptoms and reduce the suffering of patients with advanced cancer in palliative care; however, there is limited research on the feasibility and efficacy of specific psychosocial interventions. There are no intervention studies using an Avatar based platform for life review in patients with advanced cancer. Ten different interventions mainly implemented in Palliative Care Units or Hospice settings from 18 studies were identified in a scoping review of non-pharmacological therapies for comfort (Coelho, Parola, Cardoso, Bravo, Apostolo, 2017). The comfort related outcomes included well-being, pain, suffering, anxiety, depression, stress and fatigue. Music therapy was most common while only one study used art therapy. In that study, an Art Therapist provided a 1-hour intervention to 12 patients in a PCU, with significant improvements in pain, fatigue, depression, anxiety, and well-being, compared to baseline (Rhondali, Lasserre, Filbet, 2013). A systematic review of Art Therapy in cancer yielded small, heterogeneous studies and a conclusion by the authors that research in this area was still in its 'infancy' (Wood, Molassiotis, Payne, 2011).

Life reviews help individuals integrate memories into a meaningful whole, providing a harmonious view of the past, present and future. Life review is also likely to be an evaluative process, enabling participants to examine how their memories contribute to the meaning of their life (Haber, 2006). Recently, a multicenter randomized controlled trial used a combination of life-review therapy and memory specificity training to improve ego-integrity and despair in oncology patients receiving palliative care (Kleijn, Lissenberg-Witte, Bohlmeijer et al, 2018). Two earlier trials of life review therapy from China (Xiao, Kwong, Pang, Mok, 2013) and Japan (Ando, Morita, Akechi, Okamoto, 2010) found some aspects of quality of life, including spirituality, were improved.

5.1.3. Avatar intervention in clinical studies

As technology becomes integrated into many aspects of medical care, creative approaches have emerged to address suffering in patients, although few studies have explored the intersection of technology-based therapy and palliative care. The use of technology-based interventions may appeal to patients for several reasons, including familiarity, comfort, and the potential to remain anonymous (Gordon, Carswell, Schadegg et al, 2017).

Technological advances that were originally applications in gaming have found use in health care (Gordon, Carswell, Schadegg et al, 2017). For example, the Microsoft Kinect technology uses sensors that capture body movements, hand gestures, and voice commands. This technology has the potential to be used in novel approaches to support the physical, psychosocial and spiritual domains of care.

Within psychiatry, some studies using an avatar have reported benefit in patients with psychosis and persistent auditory hallucinations. A recently published single-blind randomized controlled trial of 150 patients used a weekly therapist-facilitated avatar intervention over the course of 6-weeks (Craig, Rus-Calafell, Ward et al, 2018). Therapy was delivered through the avatar, which helped to create a less hostile environment between the patient and the therapist. After 12 weeks, improvement measured by a standardized scale was significantly greater than the control group with no evidence of adverse events. In another study of patients with substance use disorder, a different avatar model was used. Through group counseling from separate, remote locations, this proof-of-concept pilot study conducted in 2017 on 59 patients showed favorable results for increasing adherence to treatment sessions and lowering rates of positive urine drug screens (Gordon, Carswell, Schadegg et al, 2017).

Although avatar technology is not new, the incorporation into patient care is relatively recent, and to our knowledge no studies have included cancer or palliative care patients. The use of art to reduce adverse physiological and psychological distress can serve as a platform for alleviating the burdens experienced by patients with life limiting illnesses (Stuckey, Nobel, 2010). Engaging in movement-based creative expression helps to foster positive health outcomes by reducing stress and depression, and creative expression can serve as a vehicle to

help patients with a life limiting illness find purpose and create a sense of meaning (Stuckey & Nobel, 2010).

By integrating art and technology into a storytelling life review platform, patients with cancer may be supported in their ability to contemplate their own mortality and in facing the challenges of engaging the physical, psychological and spiritual domains. The Avatar intervention reproduces the user's gestures and lip-syncs with the user's voice in a virtual environment, which can serve as a springboard for creative storytelling, revealing hidden consciousness, emotion, and memory. This technology could be applied in both inpatient and outpatient palliative settings, potentially mitigating existential suffering and allowing patients to pantomime and explore activities they can no longer physically complete.

5.2. Technological design and digital immortality

VoicingHan avatars are the same as the VoicingElder avatars, in terms of a mirrored body movement and lip-synchronization of live speech. However, VoicingHan used a wireless motion capture sensor directly attached to skin, for precise motion detection, with flexible options of body setup based on the patient's situation. VoicingElder used the original Kinect sensors working with infrared cameras which suffered from latency and joint detection issues.

VoicingHan developed the avatars at four developmental stages: child, teenager, adult, and elder. Each avatar had two design options: one with plainclothes (shirt and pants), and the other with fashion and accessories. Each avatar offered 4 ethnicity choices: African, Asian, Hispanic and Caucasian. In total, VoicingHan offered 64 options of avatars and 5 environments, including beach, mountain, living room, Europe and empty space, reflecting the palliative care patients' bucket lists. All the avatars were connected with wireless motion capture sensors, with the option of partial (single arm or upper body only) or full body connection. The participant was able to choose any developmental stage in life and customize other elements such as gender, ethnicity, and outfits.

The VoicingHan intervention consisted of one session each using the Perception Neuron motion capture system, Autodesk Maya and Unity. Concretely, the Perception Neuron ® MoCap system was used to synchronize gestures and movements onto an avatar in a virtual environment (PN),

with minimal latency. 17 body sensors wirelessly embed motion data visualized onto an AXIS Neuron software program. The device uses easily adjustable straps and provides a real-time view of each motion capture session. A Logitech® wireless headset and a SALSA unity asset was used for the lip sync process. Patients were given the option of full-body or partial body setup. Full body setup consisted of a chest strap, groin strap, right and left hand straps, right and left arm straps, and right and left foot straps.

Figure 19: Avatar Full Body setup using Perception Neuron®.

Figure 20: Avatars and Environments.

Perception Neuron® is a portable and relatively affordable motion capture device originally developed for video games and biomechanics research. 9-axis sensors wirelessly embed motion data visualized onto an AXIS Neuron software program. The device uses 10 easily adjustable straps and provides a real-time view of each motion capture session. The system can be modified with hardware and software add-ons for advanced motion capture applications. VoicingHan's main hardware utilized Perception Neuron pro Motion Capture® device and a Logitech® wireless headset. Software modifications used to create avatars and environment options included Unity3D and Autodesk® Maya®.

VoicingHan includes 5 environments that can be chosen by the patient (beach, mountain, European attraction, living room, and empty space) and 64 customized Avatar options, including four male and four female avatars at four developmental stages: child, teenager, adult, and elder, and 4 ethnicity choices. The Avatar sessions were conducted by a team including artists, research assistants, a palliative care physician and nurse. Participants chose either partial or full body connection with the virtual avatar. The partial body connection (upper body only or arms) is still powerful for seriously ill patients in wheelchairs or beds, allowing them to interact with the avatar using their upper body or arms.

Figure 21: VoicingHan project in a private setting at family room, Inpatient Unit,
Palliative Care. Photo: Holly Ashton.

A conceptual topic related to the VoicingHan technology is digital immortality and thana technology. Carla Sofka coined the term "thana technology" to describe the intersection between

death and technology (Lee & Kim, 2017, 27p). VoicingHan explores thana technology in a palliative care setting, inspired by *Han* and the Korean shaman ritual "*Kut*". Mortality is a recurrent topic in the hospital setting, and a particular population to discuss mortality are patients receiving palliative care. Palliative care underscores the need to support patients in coping with the many facets of life-limiting illness and intends to improve quality of life by relieving physical and emotional pain, with spiritual care. Palliative care treats death as a part of the life process, and provides support through the difficult process of transition (Kister, 2006, p. 54).

Life reviews have been often used in palliative care, to help the patients integrate memories into a meaningful whole, providing a balanced view of the past, present and future. Life review has demonstrated improvements in cancer survivors treated with curative intent, and in patients at the end of life (Kister, 2006, p. 115)(Lee & Kim, 2017, p. 28).

The Korean concept of *Han* can be understood in the context of mortality. As previously stated, *Han* is a paradoxical state of consciousness that combines an extreme state of grief with a great hope and desire for overcoming a situation that seems almost impossible. *Han* drives the process of mourning related to tragic experiences (Song, 2004, p. 209). The Korean people show eternal optimism, even in the face of tragedy. This is the powerful healing aspect of *Han*. *Han* is connected with a paradoxical attitude of being hopeful, even in the most frustrated situations. The VoicingHan project facilitates grieving, mourning, accepting, sharing and honoring our Han through storytelling.

As in the VoicingElder project, all VoicingHan avatar storytelling performances were screen-captured as movie files. The avatar video became an important source of communication and relationship building, as well as a way to preserve elements of family legacy for patients in the palliative care setting. The avatar video as family legacy can support a continuous relationship between the bereaved and the dead, helping the bereaved to move forward, reconstruct meanings and restructure their lives (Bassett, 2015).

The question of mortality in using the avatar virtual body has paradoxical aspects. The virtual body is immortal, however the participant's story makes the virtual body mortal in a palliative care setting, as written in Publication 2:

"The avatar as a digital body is, in fact, free from illness. It is non-biological, computational, and in a way, "immortal." However, the participant's life story consistently makes the avatar "mortal", especially in the palliative care setting where the participants are facing the issue of life's end. Ironically, the avatar obtains mortality while it is being humanized through personal storytelling." (Ryu et al 2019, p. 175)

Using a wireless motion capture device, the participant's motion data can be also captured as the legacy data of each patient, along with sound files of stories. The archived motion capture data can be reprocessed in real time simulation by using an avatar body, after the participant's death, which is similar to a Korean shaman enacting the voice and behavior of the spirit during *Kut.*

5.3. Quantitative research implementation

The primary objective of the VoicingHan project, in collaboration with the VCU palliative care team, Dr. Egidio del Fabbro and Dr. Danielle Noreika, was to explore the therapeutic benefits and determine the feasibility of delivering an avatar life review platform for patients with active cancer. This feasibility study enrolled 12 patients receiving outpatient palliative care, and was funded by a VCU Massey Cancer Center Grant. During the avatar life-review sessions, patients were prompted with structured life-review questions conducted by the artist to help engage in reflection and meaningful life stories.

Following the primary objective of VoicingHan, in collaboration with medical professionals, a quantitative method was applied to evaluate the feasibility and accessibility in the context of clinical studies. It consisted of measuring patient adherence and the acceptability of an avatar-facilitated life review intervention for ambulatory patients with cancer, in clinical terms. This quantitative research was the core of Publication 4 "Feasibility of Delivering an Avatar-Facilitated Life Review Intervention for Patients with Cancer" (2020).

5.3.1. Quantitative methodology

VoicingHan enrolled a team of experts in medical care that intervened in the research design using a quantitative methodology for gathering and analyzing data regarding patient responses to the therapy. Avatar life-review sessions were conducted from June to Aug 2019, in the VCU palliative care outpatient clinic, at Virginia Commonwealth University's Massey Cancer Center.

This feasibility study proposed to enroll 12 patients receiving outpatient palliative care for one session each. As a single arm intervention, a sample size of 12 was sufficient to establish feasibility. Feasibility and acceptability was explored through semi-structured interviews and patient's satisfaction with the study using a Likert scale. Following the Avatar session, a member of the research team conducted a face-to-face interview that consisted of open-ended questions to elicit detailed responses. Questions sought to understand participants' attitude about the intervention, perceived effectiveness or lack of it, barriers to engagement, and challenges faced throughout the session.

The outcome measures included: recruitment rate, number of subjects eligible, resources (e.g. cost), time scale, acceptability of the intervention, any barriers to data collection (e.g. number of forms and questions patients are able to answer per session), response rates, adherence, and the participants' perspective on recommending the study to others. Other process issues were included such as the potential for disruption of clinic flow and size of room constraints that may overwhelm patients or inhibit the patient narrative. Other questions concerned equipment acceptability and ease of use to patients (they would be attached to sensors) and whether there was a sufficiently broad selection of avatars available for patients, based on age, ethnicity, etc. Patient demographic data was recorded at the time of enrollment.

5.3.2. Procedure

VoicingHan participants first completed an array of self-reported questionnaires to assess physical, spiritual, and psychological well-being and elicit relevant demographic and medical information. Following completion of the questionnaires, the provider or research assistant escorted patients into a separate room that accommodated full-body movements and equipment setup (projector, laptop, and MoCap device).

Live demonstration

Before the session, patients were given a brief two-minute tutorial demonstrating the motion capture software's ability to detect and project range of motion and lip-synchronization. In this live demonstration, the artist as the mediator addressed a question to the avatar on screen, for example, "what is your name?". The participant responded as the avatar on screen, using the present tense. Patients were given the option of full-body or partial body setup. Full body setup consisted of a chest strap, groin strap, right and left hand gloves, right and left arm straps, and right and left foot straps. Partial body setup accommodated only the upper body (hands, arms, and chest strap), single arm, etc.

Live Demo with the artist as a mediator and a team member (Holly Ashton)
- Explain what the patient will be doing today in a life review session, telling the story of their life through an avatar, from childhood to elderly.
- Open game/scene.
- Be in an environment.
- Connect with the avatar, establish the communication will be directed at the avatar on the screen.
    - Say Hello and wave to the avatar.
    - Demo a conversation, asking for a name, age, and what they are doing in the environment that they are in.

Session setup
- Set up the neuron mocap sensors on the participant.
- Check sound is working with lip sync
- Start recording the screen capture and video/audio recording
- Ask if they prefer a location

Avatar life-review session

The session followed a semi-structured format. Patients began at the "child" avatar stage, progressing to "teenager", "adult", and ending in the "elder" stage. Life review questions and prompts began by situating the virtual body in the chosen virtual environment and were adapted to the selected developmental stage. The Avatar sessions were conducted by a team including the artist, research assistants, palliative care physician and a nurse. The artist and a PC

physician provided oversight within the supportive care clinic and the artist and research assistants facilitated the questionnaires.

The VoicingHan avatar life-review session used the Perception Neuron ® MoCap system to synchronize voice, gestures, and movements onto an avatar in a virtual environment. VoicingHan included 5 environments that can be chosen by the patient (beach, mountain, city, living room, and empty space) and 64 customized Avatar options, including four male and four female avatars at four developmental stages: child, teenager, adult, and elder.

Patients selected avatars from different age groups, genders, and ethnicity during their sessions, allowing them to retrieve specific, positive memories of different lifetime periods and facilitating autobiographical memory. Each avatar has two design options: one with plain clothes (shirt and pants), and the other with delicate fashion and accessories. Each avatar has 4 ethnicity choices: African, Asian, Hispanic and Caucasian, simply making variations of skin material colors. This allows 64 options of avatar choice the participants can make for their life story. A minimalistic aesthetic of avatar design stimulates the participants' imagination and playfulness to relate virtual bodies with significant ones in their life stories. In this playful engagement, participants act out representations of themselves, significant others (family members, friends, etc.), or fictional characters, shaping and reflecting their life story in a personal and engaging way.

Based on each patient's preferences, VoicingHan provides some bucket list environments such as beach, mountain, European attractions, and also everyday settings including a living room, and an empty space, within which to perform their chosen avatar. In this drama of performing the avatar, the patients can experience their life stories as "thick" documentation, developing new perspectives and revealing deep memories and feelings.

The session used a semi-structured interview format with reference to autobiography life-review. Patients began at the "child" avatar stage, progressing to "teenager", "adult", and ending in the "elder" stage. Life review questions were adapted to the developmental stages. Patients' avatar narratives were screen recorded, edited, and processed as movie files to create a legacy document (these movie files would be used later on for the qualitative analysis).

Each Avatar session lasted between 20 to 40 minutes. Breakdown time, which included saving the Avatar video file and unstrapping patients, averaged 6.2 minutes. The total patient visit time (length of time to complete questionnaires, patient setup, avatar session, breakdown, and post-session survey) averaged 67.45 minutes.

<u>Avatar video</u>

Patients' avatar narratives were screen recorded, and processed as movie files to create a legacy document. Brief surveys were given to all participants upon completion of their VoicingHan life review session in order to assess impact on quality of life, satisfaction with the VoicingHan experience and recommendations for improvement to the experience.

<u>Life-review questions</u>

Childhood Questions
"What's your name and how old are you right now?"
"How are you where are you"
      "how did you get there"
      "who are you there with"
      "what do you hear, what's your plan for the day"
"Are you going to school right now"
      "Favorite subject"
"Who's your best friend"
"Do you have a brother or sisters"
      "Tell me about you parents, your family"
      "Do you have Grandparents"
"What do you want to be when you grow up"
      "how did your parents feel about that"
"Do you go on trips a lot , favorite trip"
"Do you have any of your own pets*** animals brought up"
"What's your favorite toys"
"What type of home do you have"
      "Do you like your neighborhood"
"Favorite sports or hobby"

"Ask to see activity movement"

Come back to the environment

"Can you swim"

"show me how you swim"

*** Would you like to grow up?

Teen Questions

Say hello to the avatar

"How old are you now?"

"How's your friends"

"How's your parents"

"How's your School"

"Favorite subject now?"

"College or trade school?"

"What would you like to be when you grow up"

"Would you like to travel"

"Are you dating someone"

"have you had a First date or kiss"

"First job"

"Any unpleasant things going on"

"Anyone you admire any mentors on your life"

*** would you life to grow (do you want to switch to the adult avatar?)

Adult Questions

Say hello to the avatar

"How old are you?"

"what are you doing for work"

"Are your parents proud of you"

"Marriage?"

"Children?"

"Do you travel"

"Close friends"

"do you have a Car and drive"

"Hobby?"

"How are you taking care of yourself"

Elder Questions

Say hello to the avatar

"How old are you?"

"What's the best thing about being at the age you are at now?"

"how's your family"

" Do you haveGrandchildren, do you see them?"

"retired?"

"What's your life like now"

"Regrets?"

"How has the time changed?"

"What do you miss about the good old days?"

"Hobby?"

"Friends?"

"Biggest Success"

"What failures lead to successful moments?"

(Let them know this is their last question) "If you could give some wisdom or advice to yourself, your children or your grandchildren, what would it be?"

5.3.3. Quantitative data analysis

VoicingHan sessions were held at VCU North hospital in downtown Richmond, which has diverse patient populations. In the VoicingElder session at Gayton Terrace Senior Living, all the participants were Caucasians and wealthy. In the VoicingHan, out of a total 12 participants, about 50% of participants were black and 50% were white.Sometimes, their life stories were dramatically different, representing disparity between the racial status. 5 participants were younger than 55 years old, and 7 participants were older than age 55. 5 participants were male and 7 participants were female. All of the participants had more than high school education, except one person.

The primary outcomes assessed feasibility of delivering an avatar-life review intervention as determined by adherence to intervention, recruitment rate, acceptability and comfort of study procedures, equipment, and questionnaires, and patient's perceived benefits.

1. Adherence
   - Number of patients able to complete baseline questionnaires, Avatar-session, post-session survey and follow up questionnaires.
   - Follow-up questionnaires response rate (+- 2 month)
2. Recruitment efforts
   - The proportion of patients that enrolled was divided by the number of patients contacted and approached to participate.
3. Acceptability of study procedure and patient's perceived benefits
   - Length of time required to complete a battery of questionnaires (ESAS, EORTC QLQ C30, and Facit-sp), and demographic survey.
   - 5- item Likert post-session assessment to capture acceptability of the study and patient's perceived benefits. Responses ranged from 1= strongly disagree to 5= strongly agree.
   - Technical barriers

Patients' perceived benefits of the study and acceptability of the intervention were measured by a customized post-session questionnaire. Patients were asked to provide a rating on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) for 5 statements (Table 2). Patients were also provided the space and time to give feedback for any challenges or barriers encountered during the Avatar Session. This was documented and transcribed by the research team.

VoicingHan: Post-Session Questionnaire

1. This experience was beneficial/positive
2. I would participate in this experience again
3. I would recommend this experience
4. This experience helped me to reflect on my past, present, or future hopes
5. I was able to easily engage with my Avatar

Table 2: Post-session questionnaire rated on a 5-Item Likert Scale.

Secondary outcome measures included: 1. Evaluating the length of time required to setup equipment prior to patients entering the room, 2. Determining the average avatar session length of time per patient, 3. Breakdown of equipment, and 4. Unintended consequences. Equipment setup time was defined by the time it took to preload the Avatar System, charge the MoCap device, and sanitize equipment prior to patient's entering the room. Patient setup time included a brief Avatar tutorial demonstrating the range of movements and lip-syncing capabilities, strapping a partial or full-body connection to patients, and device and software calibration. The Avatar session time began at the start of the semi-structured interview to the patient's last response or as determined by the facilitator. These measures were documented by the research team.

5.3.4. Results and limitations

The results of quantitative analysis were published in Publication 4 (Dang, Noreika, Ryu et al, 2020): Feasibility of Delivering an Avatar-Facilitated Life Review Intervention for Patients with Cancer. 17 patients were approached by the palliative care staff, and 12 patients were recruited. 1 patient did not feel well on the day of intervention and opted out. 11 out of 12 patients completed the intervention. Total time of intervention was 67 minutes on average.

According to our post-survey, we found all patients agreed or strongly agreed with all questionnaires. In the Post-session agreement/ disagreement statement survey in detail, there were 6 statements for ratings (1= Strongly Disagree, 5= Strongly Agree).

1. This experience was beneficial.(4.64)
2. I would participate in this experience again.(4.55)
3. I would recommend this experience.(4.55)
4. This experience helped me to reflect on my past, present, or future hopes.(4.45)
5. I was able to easily engage in my Avatar.(4.64)

The participants said they would participate in the Avatar life review session again, would recommend it to others, found the experience beneficial in supporting reflection on past, present and future hopes, and that they were able to easily engage with the avatar. After one month, ESAS scores were unchanged or improved in 80% of patients, supporting the result that Avatar

facilitated life-review was feasible with a high rate of adherence, completion, and acceptability by patients.

Time duration for session and setup were important factors in measuring the feasibility of VoicingHan life-review in hospital settings. The VoicingHan team tried to run every process as quickly as possible which made our mindset a little rushed, but luckily it did not disturb the participants. The average time for patient setup (Mocap, lipsync) was 14 minutes. We had to sanitize all the sensors and equipment between participants, as the Mocap sensors and wireless headset touched the participant's skin. The duration of the Avatar session was about 30 minutes per participant. The participants enjoyed the life-review session and we didn't want it to end quickly, however, the facilitator (from the medical team) asked us to stop the session before the patients were tired.

It is interesting to note that pre-session questionnaires took 16.25 minutes, before Avatar session, whereas post-survey after the session took less than 1.27 minutes which demonstrates the participants didn't have enough time to respond in post-survey, as they already spent more than one hour, at the clinic. Total time including mocap setup, demo, avatar session, questionnaires, etc. was a little more than 1 hour.

In open ended responses, the participants noted their emotional response as cathartic, or something not negative. The participants' comments included "never having been in this position [diagnosed with cancer], it was helpful to think about how it has affected me… the structured questions were helpful", "It was a useful tool to prompt people to start thinking of issues that we don't want to talk about." A young adult participant responded specifically to using the elderhood avatar, saying: "eye-opening" but not unduly distressing. During the session, she was unable to tell the story with elderly avatar, saying "she is not gonna make it to this age".

The Avatar sessions were facilitated successfully, despite minor errors and recalibration of motion capture sensors and avatar system. All sessions were successfully recorded as a video file and edited and exported to a DVD disc as a legacy document.

The VoicingHan Avatar intervention was technically feasible, with a completion rate of more than 90%. There were no significant changes for spiritual well-being or HRQol, between pre-test and

post-test. Most participants showed improvements in their Total FACIT-SP scores. Also, ESAS scores for well-being showed improvements or no change in 9 out of 11 patients.

Life-review therapy has proven to improve quality of life for elderly and end of life patients. This is the first study of using Avatars for life-review for cancer patients. Most of the other narrative intervention projects happened with inpatients, whereas VoicingHan happens in an outpatient setting. We concluded that the VoicingHan avatar life-review intervention was feasible in the supportive care clinic (outpatient) and acceptable for patients with cancer.

This study has several limitations that need to be discussed further. Our sample size of 12 was appropriate for a feasibility study, but there could be bias involved in the patient selection process contributing to the high adherence and acceptability rate. The patients were approached by the clinic team and selected. Generalizing avatar life-review sessions in other clinics can be challenging, as it requires specific technical expertise and space. We were lucky to have a large procedure room available for avatar sessions, to accommodate all the equipment, facilitators, the patient and family members. Even if Avatar intervention requires technical skills, we found it can be trained by minimal effort, and facilitated by a palliative care nurse.

Using avatar virtual bodies for life-review therapy would enhance supports for engaging psychological, spiritual, and physical domains. Future studies using this therapeutic model need to follow a theoretical framework to test the efficacy of this novel intervention for mitigating spiritual, existential, and psychosocial distress among patients with advanced cancer.

5.3.5. Reflections

This section introduces the artist's reflections about the clinical research process, as it could be useful for the reader to better understand the context of arts and health research.

5.3.5.1. Clinical study

This collaboration was my first experience with medical experts in the context of clinical study and offered an exciting challenge as an artist, as I had to translate the potential of the Avatar

system in storytelling, performance and wellbeing to palliative care expectancies, procedures, and new regimens of scientific validity. It was a worthy endeavor as I was able to understand different perspectives of looking at my avatar life-review platform, different value systems and also many connections between art and medicine. Starting from the VoicingHan collaboration, I started thinking about Korean healing rituals, in the context of healthcare and medicine.

As shown in the name of the project, the VoicingHan project started from my interest in the Korean emotional concept of *Han*, and its connection with Palliative care. The VoicingHan project was realized, based on shared interests and themes across disciplines. In my first meeting with the VCU palliative care teamDr. Egidio Del Fabbro and Dr. Danielle Noreika in 2018, they deeply understood the Korean emotion concept of *Han*, as an emotion their patients are going through, and also understood the importance of spirituality and life-review for seriously ill patients which helped our collaboration in an exciting way. Although we had different backgrounds, we shared the idea of *Han*, life-review and spirituality, and mortality, in understanding human experience. The VCU palliative care team was also interested in life-review as a legacy document of the patients, as well as new avatar technology to facilitate life-review. They believed in my avatar life-review system and were willing to use it on a regular basis with patients if this study became successful.

The palliative care unit was extremely hard to access, as it was a place for seriously ill patients. This unit was extremely busy with diagnosis, diverse therapy sessions, etc. The medical team wanted to find out the feasibility of running the avatar life-review in this palliative care hospital setting, as the initial step. In order to have access to palliative care outpatient and inpatient units, a very complicated immunization screening process was required for all the staff and assistants which took about 6 months to complete, and this permission didn't last long. In order to have full access to the palliative care units, without limitation, I received an affiliate appointment as associate professor in the palliative care department at the VCU School of Medicine.

5.3.5.2. Clinical setting

As an artist, I always had enough time to set up equipment and technology and do several rehearsals before the performance happened. My digital performance always ran with perfect settings including interactivity, lighting, sound, etc, in an arts gallery or performing stage.

However, the situation in the clinical setting was very different. I expected there would be a room dedicated for the VoicingHan session in the clinical space, so we could set up and test before the sessions and get everything ready, but that was not available.

After months of screenings and verifications, my assistant and I got ID for access, and were invited to a clinical space located in VCU North hospital associated with the nationally recognized Massy Cancer Center, however, the clinical area was small. My collaborator Dr. Egidio del Fabbro was using the rooms and office temporarily on certain days. We didn't know which room would be available for VoicingHan life-review until the last minute. Once we figured out which room, the team had to set up the equipment and technology very quickly, since there was no time to waste. The rooms in the clinic were not appropriate for digital projection or performance. They were mostly small, without having the area for the participant to perform freely, and hard to accommodate the participant's family members or friends at the session, along with VoicingHan team members. Luckily, we found a large surgical room, filled with a lot of medical equipment, chairs, etc. The room was messy, but it had a large wall to project the avatar and space for the participants to perform freely. Every day, we had to move from room to room, based on the situation, and quickly set up technology and make it work for the participants. There was hurry and urgency in this process. Medical team facilitators kept checking the art team if the session was ready to go, while the participant was waiting outside. There was not enough time for perfect setup. Sound was not right. Projection was not right. The environment was not immersive, with medical equipment around. As an artist, I have always pursued the perfect setting for visual and sound presentation, however, this was not the case in a clinical setting.

Honestly, I didn't think the participants would enjoy the VoicingHan avatar life-review experience happening in this chaotic environment. The patients were sent from the doctor and came to the room which was barely prepared. Surprisingly, however, the patients were very cooperative and supportive, except for one case of a man who had teary eyes and an emotional breakdown just before coming to the session. He said he just wanted to get this done, however, his life story unfolded beautifully during his life-review session and he became immersed in his own storytelling. Everyone had a serious illness but was very open-minded, really wanting to help and support this research.

In their post survey, it was surprising to see all the participants' positive responses. There were 5 questionnaires that most of the participants strongly agreed for all items: "The experience was beneficial". "I would participate in this experience again and recommend it to others". "The experience helped me to reflect on my past, present, or future hopes". "I was able to easily engage in my Avatar".

I am trying to understand why patient responses were so positive. Even though the VoicingHan avatar sessions took place in the middle of a chaotic clinical setting, they still offered an effective and immersive life-review for the patients. VoicingHan did not use a VR headset for full immersion as in video games (Brown & Cairns, 2004). Instead, we used mixed reality, with projection on an available wall, so the participants could see physical space, as well as projection.

Even if it was not full immersion, I think sound played an important role, in inviting the participants into virtual reality. Once the participants wore a wireless sound headset with a microphone, they started hearing environmental sounds from the beach, mountain, room, etc. I think these sounds played a big role in orienting the participants to a virtual environment, as well as body interaction, even if there were lots of distractions around the projection. When they synced movement with the avatar, they seemed to have been pretty immersed in the virtual body and environment, despite some technical errors and glitches.

Most of all, VoicingHan sessions were fun for everyone. We all knew the participant was NOT a child, but they had to act like a child and talk like a child with a child avatar, for example. It was an imaginary space, time and storytelling that we spontaneously immersed into. Even if it was a short time, around 30 minutes per session, a great level of intimacy was built between the participant and team members in the process of sharing very personal life stories, in an imaginary platform.

As said in demographic information briefly, VoicingHan sessions were held at VCU North hospital in downtown Richmond which has diverse patient populations. We had about 50% black and about 50% white ethnic backgrounds, and life stories were dramatically different between patients. One black man's life story was extremely miserable and made me think about how this kind of life story is possible in America. He suffered from poverty, lack of support, dysfunctional family… He had more than 10 kids, even if he was still young. On the date of his

avatar session, we tried to use Dignity life-review questionnaires, which did not work for him at all. One question asked about the value of his life, and I felt like it was a totally useless question for his situation. He refused to answer that question, however, he answered all other questions playfully, having recalled his life during the session.

5.4. Qualitative research implementation

After applying the quantitative clinical review, VoicingHan life-review audiovisual data were analyzed and assessed by a qualitative method based on the analysis of the narratives, in collaboration with a professor in VCU social work, Dr. Sarah Price. This retrospective study demonstrated the value of the VoicingHan project in the context of life-review processes for end-of-life care, this time, through the lens of social constructionism, developmental psychology, and performativity. This collaboration with a social work professional was an exciting opportunity to continue my interest in conducting qualitative research and was crucial to understand the meaning-making process of life storytelling that happened during VoicingHan avatar life-review sessions. This research direction was very different from the initial clinical study, exchanging a lot of ideas and concepts within the team around the topic of life review and performance. This collaborative qualitative analysis was the core of Publication 5 "Embodied storytelling and meaning-making at the end of life: VoicingHan avatar life-review for palliative care in cancer patients" (2021).

5.4.1. Theoretical framework

In this section, theoretical, analytical, and methodological frameworks for VoicingHan qualitative study are introduced, such as life-review therapy, embodied storytelling, and distancing, as key concepts for theory and methods.

5.4.1.1. Life-review therapy

The concept of life-review has been explained earlier for the project VoicingElder, in Ch. 3.2.2.

Although VoicingElder was called "avatar life-review", it was an open platform for free storytelling, not being facilitated by semi structured life-review questionnaires. Life-review is an important theoretical background for the VoicingHan project, as the project facilitated life-review for cancer patients, with questionnaires, using avatar virtual bodies.

For senior center and palliative care, life-review (Butler,1963) is a well-established process used both with the older adult population and for terminally ill patients at the end of life to examine their lived experiences and reconstruct meaning of their lives. Butler wrote that people can gain a sense of integrity over their lives by engaging in sense-making for life experiences, meaning psychologically preparing for their own death. It is connected with the developmental psychology of Erik Erikson's (1959) integrity in the old age stage of life. Traditional life review therapy has occurred between therapist and client, based on trust relationships, which is quite challenging to build, due to the time, costs, etc. As written in Publication 5 (Ryu & Price, 2021), traditional life review therapy is a way for the therapist to guide and engage the client in the life review process in order to help the client to "reauthor" their lived experience, constructing meaning and significance in a therapeutically beneficial way. Building up a trusted relationship between the therapist and client is essential to realize this process and requires significant time commitments, which is often not often feasible, due to demands of medical treatments, counseling, tight schedules, and costs (Ryu & Price, 2021, p.3).

VoicingHan avatar life-review offers a new form of life-review, providing the playful and therapeutic possibility of constructing a new perception of one's own life stories. It offers the conversation between physical and virtual bodies in the mirrored performance format, so the participant can enact their life stories as if happening here and now, in a dramatic reality. *Avatar Virtual Body* provides playful speech and body modality for the participants, to create their embodied storytelling performance, in a virtual environment. Although Traditional life-review uses audio recording or interview as the primary means of the therapeutic process, VoicingHan facilitates dramatic reality by using body movement and speech, to enact life events for life-review. VoicingHan avatar life reviews were recorded as a screen recording format so the participants could review and share it with their own family and friends. This exploration moves beyond traditional methods such as audio recording and interview and offers totally new features in the life-review process. Publication 5: Embodied storytelling and meaning-making at the end of life: Avatar life-review for palliative care in cancer patients (Ryu & Price, 2021) articulated the critical difference between VoicingHan life-review and traditional life-review.

VoicingHan life stories are different from traditional life-review, in a way spontaneously inspired by the participant's choice of avatar and virtual environment. The participants choose to perform any stage in life, gender, ethnicity and environment, acting out their life events as if happening right now in the present tense (Ryu & Price, 2021, p.3).

It is interesting to see the aspect of life review was more about meaning making, rather than focusing on personal history or fixed identity, linked with therapeutic effects. Inspired by the nature of social constructionism, the participants re-authored their life narratives with potential therapeutic benefits and personal spiritual transformation. Human desire for sense making was explained through social constructionism, in Publication 5: "If knowledge is a social construction, it is subject to continuous change (Lincoln & Guba, 2013). By extension, if self-knowledge is also a social construction, then it would also be subject to continuous change if not through lived experience, then in reflective perception." (Ryu & Price, 2021, p.3).

Erikson's psychosocial developmental theory is also important in understanding a VoicingHan role playing platform. The virtual body avatar passes through the developmental stages (child, teen, young adult, elder), and their corresponding challenges, allowing for spontaneous re-authoring of life events in each stage of life, as written in Publication 5 (Ryu & Price, 2021, p. 4). The life-review starts from a child avatar, then the avatar grows to teen, young adult and finishes as an older adult, answering questions about friends, family, and surroundings in a casual way.

5.4.1.2. Embodied storytelling

The notion of embodied storytelling was an output of the VoicingElder project and was fully developed for VoicingHan, and its strength demonstrated through data analysis and interpretation, as presented in the Publication 5 "Embodied storytelling and meaning-making at the end of life: VoicingHan avatar life-review for palliative care in cancer patients" (2021).

In the embodied storytelling method, the avatar lip-syncs with the participant's speech and precisely mirrors body motion, and facilitates the embodied storytelling for the life-review process. Based on phenomenological understanding, we know that a person's cognition is strongly influenced by aspects of their body (Valera, Thompson & Rosch, 1992). It shows the

strong potential of embodied storytelling and emerging cognition when the agent uses the body dynamically in a storytelling process. The process of embodiment activates complex emotions, cognition and memory processes, through gesture, expression and voice (Elam, 1991). The body communicates on an unconscious and conscious level (Jones, 2007), which is connected with kinaesthetic consciousness. As argued in Publication 5:

> "Husserl's phenomenological investigations eventually led to the notion of *kinaesthetic consciousness*, which is a consciousness or subjectivity that is itself characterized in terms of motility. Both its movement capabilities and its distinctive register of sensations play a key role in human perception and experience. Embodiment entails emotional experience (Burkitt, 1999). By facilitating speech and behavior, the VoicingHan avatar operates embodied storytelling which relates to emotional experience, triggering different aspects of memories. The relationship between emotion and memory is critical in therapeutic modalities, and can be explored by embodied storytelling shaped by the VoicingHan process (Uttl, Ohta & Siegenthaler, 2008)." (Ryu & Price 2021, p.4).

The VoicingHan avatar offers a dynamic form of embodied interaction and storytelling, as the virtual body provides diverse looks, and bodily feelings to facilitate a diverse spectrum of self-perception. Social Psychologist Darly Bem (1972)'s self-perception theory suggests the potential of avatars to impact real life and self-perception. This embodied storytelling method relates to psychodrama's action methods, as written in Publication 5:

> "This embodied storytelling facilitated by VoicingHan is connected with psychodrama's action methods which place emphasis on both speech and behavior. The founder of psychodrama, Jacob L. Moreno (1953), has criticized talk therapy as relying on only speech. He thought that action, body movements and dynamics could tell more about the difficulties in interpersonal relations than speech itself (Djuric, 2006)." (Ryu & Price, 2021, p.4)

In Interactive design, different modes of body engagement with avatars can facilitate diverse emotional states, perceptions and behaviors which supports the embodied storytelling method. The bodily movements and engagements alter the emotional and physical state of the participants (Lehrer, 2006) (Mueller, 2016). This alteration of speech and body perception related to altering body modalities needs to be studied further, in the context of embodied

storytelling. VoicingHan currently offers a variety of body interfaces, from partial (single arm or head) for critical patients lying on the bed, to full body interfaces for active patients.

5.4.1.3. Distancing

In VoicingHan, the participants' re-authoring and meaning-making process is supported by a distancing effect, facilitated by the avatar virtual body and environment. It allows the participants to explore difficult memories or express something they could not express in their real life. The VoicingHan avatar works as a digital puppet to aid physical and emotional healing, based on a dramatic reality and distancing (Bernier & O'Hare, 2005).

Dramatic reality is a powerful method of healing because it provides a way to re-experience pain, sometimes overwhelming pain, through the safety of distance. Drama therapist Robert Landy defines "aesthetics distance" as a balance of affect and cognition. When at aesthetic distance, an individual is able to be playful, responding spontaneously to new experience and revisiting old experience as if for the first time (Landy, 1996 & 1997). Landy adopts Thomas Scheff's (1979) three feeling states in terms of distance: under distance, over distance, and aesthetic distance. Under distance is impulsive, out of control, flooded with feeling, and over distance is characterized by too little feeling, causing a wide separation between the actor and role. As a technique of drama therapy, distancing creates a space—dramatic reality—in which to explore one's memories or life problems by consciously engaging with role-playing and re-enacting them. Facilitated by a therapist, this journey through dramatic reality can have transformative effects.

In drama therapy, patients and therapists use the distance created by an artistic pursuit such as performance, storytelling, music or dance to guide the patient to make sense of their life experiences (Landy, 2006). Penzdik (2006) describes the role of the therapist in drama therapy as transporting the patient through dramatic reality. Dramatic reality is defined as "the manifestation of imagination in the here and now" (Penzdik, 2006). Johnson (1991) likewise uses a concept called *playspace*, which he defines as "an enhanced space where the imagination infuses the ordinary." The content of the role playing or dramatic performance—whatever the patient is exploring in dramatic reality—is transformed through this passage. The patient may have explored difficult memories or expressed something they could

not express in their real life. Once a patient leaves dramatic reality, they integrate dramatic reality into their real life.

This transformation offered by dramatic reality has been described by Landy (1997) as distancing. Landy writes, "Drama therapy is a powerful method of healing because it provides a way to re-experience pain, sometimes overwhelming pain, through the safety of aesthetic distance. In its most pure sense drama therapy is play, a representational process of moving in and out of the looking glass" (Landy, 1997). In Landy's description of the looking glass, he references the same idea as dramatic reality. In drama therapy, there is an aesthetic distance between the patient and the object or process before them. Jones (1996) also identifies distancing as a crucial component of drama therapy (Jones, 1996).

With regard to this distancing effect, one form of drama therapy that is particularly important is puppet therapy. Puppetry and the concept of the puppet as a psychodynamic object is in the background of VoicingElder and VoicingHan, as I have explained in Chapter 2.1. In avatar life-review systems, the puppet represents parts of the self. By acting out their complex emotions using the puppet, the patient re-creates their internal state in an external form, helping to craft a more coherent self and resolve "splits" (Gerity, 1999). Holmes (1993) similarly suggests that puppets can help patients achieve "autobiographical competence" (Holmes, 1993). White & Epstein (1990) suggest that puppets help patients to create "thick" stories that incorporate lost or fragile memories, as opposed to the "thin" stories of the self, via distancing.

5.4.2. Narrative analysis procedures

After the initial quantitative study, the IRB amendment was made to add a new component to the research study based on the completed life histories which emerged from the VoicingHan project. An IRB amendment was obtained for the retrospective qualitative analysis of the movie files which included Dr. Sarah Price, a social worker and qualitative researcher, onto the project team.

We recognized the potential benefit of analyzing the VoicingHan avatar stories that were recorded during the VoicingHan avatar life-review sessions. The narrative analysis showed that each avatar story demonstrated an emotional, psychosocial development as well as retrospective meaning-making. The narrative data analysis was conducted based on the digital

stories as artifacts of the VoicingHan project which offer a narrative lens of human experience crafted by those engaging in the study, all of whom were impacted by a life-threatening illness.

Dr. Price had no previous contact with or information regarding the original project participants but had access to the completed digital Avatar interviews which contain detailed life stories presented in Avatar technology, along with spontaneous participant reflections on the project which occurred during the course of the filming, but none of which were personally identifiable. Participants selected Avatars of their own choosing (not necessarily demographically representative), selected character names, and retold their stories from different age points of their lives, with the freedom to play with details and descriptions of events. Thus, there was no way that the videos could be identified back to the participants through this additional component of the research, which was a condition for the IRB amendment.

Using a narrative construction framework, the VoicingHan Avatar digital stories were viewed as artifact data emerging from a constructed narrative life review. Unlike oral histories, the VoicingHan digital stories are a combination of life events and creative exploration by participants; thus, each participant constructed a life review which revealed meaning making, rather than personal information and identity. The digital stories were viewed as observational data, using the following primary anchors to guide observation and initial qualitative coding:

Observational Themes related to Instrumental Satisfaction:

- participant experiences with the process
- participant notation of positive aspects of the process
- participant struggles with challenges of the process

Observational Themes related to Psychological Satisfaction:

- From Life Review (Butler): Individual autonomy over meaning-making narratives.
- From Psychosocial Development Theory (Erikson): Primary themes of Integrity vs. Despair; developmental themes from specific ages chosen/represented by avatars
- From Social Discourse Analysis (Foucault): Dominant and Subjugated Discourses emerging within the life stories

- From Narrative Therapy (White and Epston): Life story reconstruction, including psychological benefit from reconstructive play (the value added of Avatar technology)

During the narrative qualitative analysis were recorded observational themes, noted by video clip "timestamps" and/or transcribed dialogue.

Data clips (by timestamp) or quoted dialogue were coded under the primary themes listed, with room for emergent themes and sub-themes to be identified throughout the coding process. The coding scheme and sample data and/or transcription clips were provided to the research team to review as a validity check.

Qualitative data and analytical methodology

Social Constructivism (Lincoln & Guba, 2013) was the main theoretical concept that guided the methodology for the retrospective qualitative analysis of the VoicingHan avatar videos. Videos were analyzed by nine primary themes, and four additional themes, as explained in publication 5 "Embodied storytelling and meaning-making at the end of life: VoicingHan avatar life-review for palliative care in cancer patients" (2021).

Nine primary themes drawn from these guiding theories were used as the anchors for a template analysis. Four additional themes related to participant instrumental and psychological satisfaction, spirituality, and transformation were added to the template, as these were implicit conceptual components of the project either in the artistic design of VoicingHan (spirituality; transformation) or echoing the quantitative measurement (psychological satisfaction, instrumental feasibility). Each video was considered as a stand-alone performance narrative, including elements of psychosocial development in childhood, adolescence, adult and older adulthood, and narrative construction/reconstruction as characteristic of life review including elements of retrospective meaning-making and reauthoring of the narrative.

Dr. Sarah Price, a professor of VCU social work, joined this retrospective analysis and completed the initial observational analysis of the videos by coding them using the template structure, as one that was outside of the life review sessions. Then it was reviewed by the artist who had designed the avatar and collected this video data. This iterative review process promoted credibility as explained in detail in Publication 5. Transcribed units (with pseudonym and time stamp) were retained under each template theme, then subsequently verified by the

project team. The purpose of this joint review was to develop a holistic understanding of the process as objectively and accurately as possible by external review (the qualitative researcher) and the internal review of the project team to assess the construction and meaning-making made evident in the emotions and behaviors of the cancer patients during VoicingHan life review.

Three phases of qualitative analysis were conducted. The first phase was about how a video narrative can shape a recognizable person by a researcher who was outside of life review sessions. The second phase was about the therapeutic possibility of life review and narrative reconstruction. The third phase of analysis was to find therapeutic evidence of life review and meaning-making in VoicingHan stories.

5.4.3. Narrative analysis results

In this chapter, I present the qualitative analysis of the VoicingHan project based on the avatar videos which emerged as the artifacts of the feasibility study as discussed in Publication 5: "Embodied Storytelling and Meaning-Making at the End of Life: VoicingHan avatar life-review for palliative care in cancer patients" (Ryu & Price, 2020).

This chapter explains the main points of analysis regarding the three phases of the study, based on the avatar narrative. I will also add my own reflection and memory related to each participant that is not included in the avatar life narratives themselves, to give context about the research process.

As explained in Ch. 5.3.1.2, after the initial feasibility study, Dr. Sarah Price, a qualitative researcher who was not a part of the VoicingHan feasibility study and sessions, joined the team and completed the initial observational analysis of the videos. Units and coding, as well as themes and sub-themes were iteratively reviewed with the artist who had collected the data and designed the interactive system. This joint review was conducted in order to promote a holistic understanding of the process, without preconceptions, and to make it as objective and accurate as possible. Transcribed units were verified by the artist, using pseudonyms and time stamps.

During the avatar life-review session, I was busy facilitating and managing technical aspects of the avatar system, so couldn't pay much attention to the stories themselves. I was more focused

on the participants' playful engagement using the avatars. This analysis has taught me how those playful aspects of an avatar have contributed to the meaning-making process of life stories. The lens of narrative therapy, developmental psychology and social construction were great frameworks for interpreting and analyzing avatar life stories.

Three phases of qualitative analysis were conducted. The first analysis was to see if performance narrative can shape a recognizable person observed by a researcher who hasn't met this person. A short summary of each "character" was developed and shared with the artist to see if the avatar video narratives can construct a recognizable version of the participants. The second analysis explored the therapeutic possibility of life review and narrative reconstruction in VoicingHan avatar video narratives, by observing the aspects of psychosocial development; narrative reconstructions of meaning; restorying of dominant and subjugated discourse; and writing down the examples of these aspects.

The third analysis was about how the first analysis and the second one were impacted by the instrumental experience and/or psychological satisfaction for participants of the VoicingHan Avatar system.

Analysis 1: Narrative Inquiry and therapeutic possibility

Through the analysis of the VoicingHan avatar narratives, a brief person description was created, reflecting the narratively constructed self as perceived by the external observer who had no contact with the participants. Here are some examples also included in Publication 5 (names were changed in order to get privacy and anonymity):

> Ellison began her narrative with passive engagement over surroundings and choices; through restorying and "de-romanticizing" her life experiences and focusing on her own decisions within those experiences, Ellison finally characterized liberation over the events of her life. She experienced the performance narrative as liberation over her illness and her resistance to illness re-defining her remaining time in life.

> Odile identified with her avatar as representing all that she wanted to be right now; her performance was joyful and filled with laughter in spite of difficult events; throughout her narrative she characterized herself as "being free by rising above."

Tyson described himself as someone who "did what he needed to do" and acknowledged that it wasn't always what others thought he should be doing; he lives life and depicts his avatar as pragmatic and hedonistic, enjoying life now, "because I don't want nothing else than death."

Kaitlyn disengaged often and wasn't sure if she could take this seriously; she needed to be redirected back to talk to her avatar, but when she did she discussed her parentified upbringing ("they had their playtime while I worked to take care of the family") and reminisced about how formal structures, like her Catholic faith, gave her a container for making meaning of her life.

I physically met all participants at the avatar life-review session and helped them to facilitate their life-review, providing the questionnaires, based on the flow of their life stories. Even if one single life-review session, intimacy was built greatly, due to very personal stories being shared, we quickly built trust and intimate relationships throughout life-storytellings and listening/responding physically and virtually. It was interesting to see a similar personality come out of this analysis, from someone who hadn't actually met the participants, which, I think, demonstrates the power of personal narratives.

Analysis 2: Therapeutic Possibility: Life Review and Narrative Reconstruction

Retrospective sense-making and retrospective meaning-making are the essence of life-review therapy, as exemplified in the avatar life narratives, which offered examples of agency, meaning-making and social reconstruction. For example, Tyson told a story about "reworking my life", through boxing events, to fight like his biological father who rejected him but in fact, taught him to be competitive.

I remember Tyson very clearly. When he first came to the avatar session room, he was teary-eyed as if he had just heard some kind of bad news about his clinical condition, and he wanted to get the session done as quickly as possible. He came with his friend and it seemed he really needed someone who could mentally support him. His friend was sitting in the room, witnessing his story with laughter and tears. Tyson was very anxious at the beginning, but once he was connected to the avatar and beach environment, he relaxed and seemed to enjoy listening to the sounds of the beach in a virtual environment. I found he closed his eyes many

times during his storytelling, and seemed to immerse into the sounds from the beach. I was shocked by his stories, because his life had been extremely miserable, something I had never heard before. This was the first time I had access to a representative from a poor, black community. In my memory, the most joyful part of the story was the automobile stories. He and his friend had great fun, talking about their first driving experience. He refused to answer the last dignity question about the value of life. I also felt the question was not appropriate. His life didn't have room to think about the value of life. It was all about survival. I think now that life-review questionnaires should be different for individuals and adapted to their own circumstances.

Retrospective meaning-making is also an important aspect of Narrative Therapy. For example, Odile talked about the death of her son, initially avoiding this topic but eventually recalling details, and that seemed to help her grasp its meaning. "I say God took one and brought back two, that's what I say, my granddaughters." Her voice was firm and there was no hesitation in saying it. Sophia also tried to find meaning in her negative life events. When she talked through her older adult avatar about any benefits from her lived experience, she said, "There is some stability coming to the age where you don't have to struggle with the decisions; it just is what it is. The things that happen when you're young are very stressful; I don't care what anybody says."

Some unexpected responses against usual assumptions were very interesting, such as "first kiss" or "beach trip". For the question about "first kiss", "I lived on the street; I just did what I had to do." For the question about "beach trip", "no, there were just a whole lot of bugs and a bad marriage."

Analysis 3: Avatars and Meaning Making: Instrumental and Psychological Influences

VoicingHan avatar narratives were supported by reports of instrumental connection and psychological satisfaction by the participants. During a live demo of using the avatar, participants learned about looking at the avatar and talking through the avatar. During their initial connection with the avatar, some participants joked about the avatar and the virtual environments:

> …("Avatar, you look like I do now!"; "Oh, lucky you...you have hair!"; "well look at you, you've got hips there but you still don't have a butt!"). Some said ("the fingers are kind

of creepy"), ("why are the trees moving?"). Often, the participants used the background environments, as prompts for their story. Also, participants laughed and joked about avatar system errors ("look, I sit down and my hand disappears!) and ("She can go on standing, but I need to sit down.")...

A psychological connection between the participant and avatar was evident. For example, Jordyn stated, "I'm talking to my younger self here but I can only talk about this in the present...maybe the avatar helps that." When some participants had a problem with connecting with the avatar, some motions like swimming were helpful to sync the physical body with the avatar virtual body. There was also a sudden break that happened during the avatar storytelling, when the participant was unable to return to the previous immersive state. For example, there was a psychological break in Sophia's case when someone entered the room during the avatar life-review session: "I found it very distressful and distracting, when she walked in just then...who was that anyhow...I was in my place and that just blew it all out...if anyone walked in, it would be the same. OK, I'm not ready anymore but let's go on." Sophia and her avatar were never able to reconnect after this breaking point.

Unlike the traditional life-review process, in VoicingHan life-review I did offer non-directive, non-scripted and flexible prompts mostly motivated by environments and situations that the avatar was in. Supporting person-centered care, avatar life-review took very little prompting for people to engage the avatar, going to areas of developmental challenge and resolving them spontaneously through a combination of memory and story. When I facilitated the avatar sessions with the participants, I was focused on their playful and performative engagement with life stories, and was not thinking about the meaning-making process in their life storytelling. Working with Dr. Sarah Price, who is an expert in life-review and end-of-life care, grounded in methodological frameworks of life-review and narrative therapy, social construction, and developmental psychology, I was able to see the meaning-making process clearly happening in the participant's life-storytelling. I have realized the therapeutic potential of embodied storytelling, and how it can facilitate the reconstruction of self-narratives and spontaneous engagement with the developmental stages of life via avatar virtual bodies.

VoicingHan avatar life-review narrative analysis was focused on the meaning-making process and the psychological impact of the intervention on participants, whereas most interventions for end-of-life care usually deal with pragmatic effectiveness. Avatar life-review sessions included

spontaneous feedback observed from the avatar videos and were proven to be effective in supporting participants psychologically as well as socially. The narrative analysis results support that the VoicingHan intervention can be situated in the therapeutic benefit of life review therapy in terms of Keall, Clayton & Butow (2015) and Haber (2006).

5.5. Korean interpretation and *Cheong*

I would like to finish this chapter by introducing my Korean emotional perspective and cultural analysis of the avatar life-review experience. In this section, some of the VoicingHan and VoicingElder life review sessions are considered in the context of the Korean emotional concept *Cheong* as it relates to empathetic attitudes, hybrid body perception and mimicking behaviors. As discussed in Ch. 2.2.1, Cheong can be a useful concept to explain the complex relationship between virtual and physical bodies.

In VoicingHan, the avatar is constantly shifted into different identities by the speech and behavior of different participants, even if they have the same look. The avatar body plays the same role as a shaman's trans body in *Kut*, as it invites a person to act and tell a story through the shaman's body. Although the avatar's appearance may not precisely match the participant's, the speech, behavior, and stories transform the identity and spirit of the virtual body which has a connection with the Korean shaman ritual *Kut*.

Mrs. T's avatar selection process and hybrid body perception during the VoicingHan life-review session can be interpreted with *Cheong*. When the session started, Mrs. T was excited to navigate all of the 64 avatar options and ended up choosing a young adult African American female avatar wearing a blue dress. The following are Mrs.T's responses to her avatar selection process (looking at avatar on screen):

> "Oh look!"
> (Avatar switches to white male character)
> "Oh, homeboy. That's a bro. (big laughters)
> (Avatar switches to a small black boy)
> "Oh there he goes. Hey!"
> (Avatar switches to a small white girl)

"Hey girl! Look at Gia, my niece."

(Avatar switches through all child skins)

"Oh…very cute...oh...look at him! Aww, this is really neat yall!"

(Mrs. T is asked if she wants to be a kid)

"Yeah I don't want to be a kid."

(Avatar switches through all elderly male skins)

"Does he got grey hairs? Is that what he got, grey hairs?" (laughter)

(Avatar switches to elderly black woman)

"Hey! I like her. She's jazzy, yeah! With her purple on!"

(Environment changes to the beach, Mrs. T notices ambiance)

"Oh, I can hear it!"

(Environment changes to the living room)

"Oh, the beach was so much nicer. You should've heard the sounds!"

(Camera zooms in on elderly avatar)

"Yeah! That's what I'm saying! That's my girl right there! She's got on pearls; she's got a little hat on! You know I keep a hat on my head."

(Avatar changes to middle aged black woman and environment changes to Europe)

"Oh she is cute...I like her. Yeah, we can keep her."

The Korean emotional concept, "*Cheong*" may explain what is happening in this case, in the relationship between the physical and the virtual body. As explained in Ch. 2.2.1, *Cheong* can be explained with *Sam-Taeguk*: three structures of yin/yang as the foundation of Korean philosophy. *Yul-Lyeo* is presented in *Sam-Taeguk*, as a repetitive circulation of three kinds of energy - sky, earth, and human, representing a Korean nostalgia for Infinite oneness, in swirling motion (Woo, 2010).

Based on observation of the avatar selection process, Mrs. T was a person full of *Cheong*. She was very empathetic with every avatar and related each avatar with her family members or relatives. Starting from *Cheong*, Mrs. T was able to fully immerse into the virtual body and the space she chose. Such a powerful immersion made her forget about her chronic pain, shown in the following case. She used her painful left arm a lot during her storytelling, accompanied by altered body and pain perception. We witnessed her hybrid body perceptions between the physical and virtual bodies, and reduced pain. During her story, she performed as a young

African American woman wearing a blue dress who was spending a nice time with her family at Virginia Beach. Excerpt from Mrs. T's story:

> Mediator: Where are you?
>
> Mrs. T: "Huh? Where am I? Umm…I am at the beach. I am at Virginia Beach. Yea!"
>
> (Mrs. T begins trying to correct her painful left arm position of the avatar, as the avatar's arm appears to be submerged into its body)
>
> Mrs. T: "I lost my arm, but it's coming back. There it is! Coming back, coming back."
>
> (After the sensor position has been corrected, Mrs. T started her story again)

Figure 22. VoicingHan project at VCU Palliative Care. Photo: Holly Ashton.

Mr. E.'s case also demonstrated another case to show hybrid body perception and different pain sensations. Mr. E, a 50ish white man, entered the room, using leg crutches. One of his legs was in pain. Interestingly, he chose to use a black man avatar which is a different racial identity, for his life storytelling. He said it would be interesting to talk about his life story as a black man, and was immersed into the mountain virtual environment instantly, as a black boy avatar. During his storytelling, he dropped his crutches several times, and ended up not using them while telling his story. Connected with the avatar virtual body, he seemed to have forgotten about discomfort in his leg and kept dropping his crutches. Eventually, he put his crutches on the wall, and told his story quite playfully, standing on one leg, immersed into a virtual body.

When he used the elderly avatar, Mr. E spoke about a playful imaginary story, celebrating his 80th birthday barbeque party at his daughter's house, which indicates a great hope in his current cancer treatments. Connected to the virtual body of the elder man avatar with gray hair, he was able to freely imagine a meaningful future in his life story. Excerpt from Mr. E's story:

> (On the screen, young adult avatar was changed to an old man avatar with gray hair)
>
> Mediator: How old are you now?
>
> Mr.E: Wow look at me. I am dead! (Mr. E Chuckles)
>
> I am 80...will be 80 in August 19th. My Kids gonna have a big party for me, going over my daughter's house. She is living in Minneapolis. So we gonna go over there.
>
> All my other kids will fly in, coming in. We gonna celebrate, we gonna have a big barbecue..

Cheong is encouraged by the VoicingHan avatar because it is facing and mirroring the participant. In Publication 3 "Performing virtual bodies" (2020), I wrote about the specific orientation of the VoicingHan avatar setup where the physical and virtual body face each other, thus promoting a *Cheong* relationship. I realized that *Cheong* is encouraged in my avatar life-review projects as when a participant tells their story she or he is looking at the avatar's virtual body as it lip-syncs and mirrors her or his movement. They tell their story while watching and witnessing their digital reflection through an active state of speaking and moving their bodies. This creates a kind of self-dialogue, allowing the participant to tell their story and actively listen to their story as told through their virtual body. In fact, the nature of unconditional love shown in *Cheong* is connected with the concept of "unconditional positive regard" in Carl Rogers' person-centered therapy (Rogers, 1951; 1961). Unconditional positive regard is a basic acceptance of the person no matter what they say. Avatar interactive body mirroring and mimicking the participant can be understood as unconditional positive regards. As I noticed, the participant is face to face with the avatar virtual body, and it constantly echoes what the participant says via lip-sync. The fact that there is a slight delay in the lip-sync, due to time for audio processing in computing, has the noticeable effect that the virtual body listens, confirms, and acknowledges what the participant has spoken, supporting him or her with unconditional positive regard (Ryu, 2020).

Thinking retrospectively, *Cheong* was also presented in the VoicingElder sessions, where the participants tried to connect with the avatar virtual body, by mimicking the avatar's malfunctioning behaviors. In this case, the participants tried to mimic the avatar's error behaviors. For example, Mrs. C, in the first part of her story, when she touched her heart -"*This is a true story and it's been with me in my heart, heart, heart, ..* (standing up) *there, heart"*. The Kinect sensor couldn't detect her hand correctly and came up with unexpected posture and motion of the avatar. Instantly, Mrs. C started copying the avatar's autonomous behaviors. Technically, the avatar was designed to follow the user's body movement, but in this case, her physical body mimicked the avatar's motion, showing a longing for connection related with *Cheong* (Ryu, 2020).

During most of the VoicingHan sessions, an emotional connection like *Cheong* emerged quickly between the participant and the avatar, and was maintained after spending about 30 minutes telling personal life stories. For example, after her life-review, Mrs. V wanted to wave and say bye to her avatar as if it was another person in the room, but she couldn't, because the avatar connection was turned off so quickly. This frustrated her. An excerpt from Mrs. V's remarks, after her story:

> "Thank yall so much, I appreciate yall doing this! This was something new, different. Very exciting, the questions! I'm a people person, and I love people. How about that one? How about that?"(watching the avatar on screen she used).
>
> (Avatar is about to be disconnected)
>
> "This was nice though, different. I enjoyed yall! The questions yall asked were really deep, really something, but it's all true! You know?" (laughs)
>
> (All of a sudden, the avatar suddenly disappeared from the screen, in the process of taking off the mocap sensors from Mrs. V's body. She is a bit sad.)
>
> "I tried to wave at her but…" (saying in frustration)

Interpreting VoicingHan and VoicingElder sessions from a Korean emotional perspective offers a pathway to assess the avatar life-review aligned with transcultural theoretical principles of

healing ritual that guided its design. This perspective provides an additional angle for understanding the avatar life-review experiences, on a personal, emotional and cultural level.

The perspective of the Korean healing ritual offers new insights for understanding the emotional work that the Avatar platform helps to perform and supports the results of feasibility study and qualitative analysis of VoicingHan.

Although the methodological frameworks may differ, the viewpoints of clinical study, social science, and Korean culture help to explain the VoicingHan experience from multiple perspectives. There are no contradictions between the Western and Korean approaches in evaluating the therapeutic benefits of the avatar life-review, and the avatar platform worked well for the participants coming from diverse cultural and socioeconomic backgrounds.

Chapter 6. Conclusions

This chapter discusses the lessons from the journey of Embodied Avatar Performance (EAP) projects: VoicingElder, and VoicingHan avatar life-review. My working hypothesis, outcome, conclusions, and further research directions are revisited. This chapter also discusses the evolution of the technologies involved throughout the research process and how the interactive modality has changed, supporting different aspects of embodied perception. Further on, this chapter discusses the necessity of further studies on embodiment and immersion in performing virtual bodies, specifically on active engagement of the human consciousness, and in the end addresses the importance of transcultural and transdisciplinary research in HCI and VR, AR, MR.

6.1. Embodied Avatar Performance to foster well-being

The main objective of this research was to design the embodied avatar performance that assisted life review processes in a playful way (which I called "avatar life-review"), to foster well-being and therapeutic effects for diverse populations. To accomplish this aim, I have centered my research on developing an interactive system following the principles of person-centered therapy (Rogers, 1951). Since its beginning, the EAP platform has evolved to work with diverse populations, improving its interactive features, versatility, and customization.

My research, open to the community, was shaped as practice-based research and implied a transdisciplinary collaboration with many professionals in different fields. First, in VoicingElder, the artist worked with a team of gerontologists and a computer scientist. Later on, in VoicingHan, I collaborated with a medical team expert in oncology and palliative care, and a social worker. In this journey, I also have had the support of research assistants and collaborators that helped me during the research process in the two projects.

VocingElder and VocingHan have explored the person-centered approach to promote playful and spontaneous engagement of the participants in the life-review process. Looking at the results, we can say that my main research question --Can avatar virtual bodies engage the participants' own memories and storytelling to improve their wellbeing? -- has been answered in

positive terms. The related question about how to design the digital avatar has been solved in an iterative process, with constant feedback of the participants and the different working teams, that have also enhanced my theoretical frameworks, and proved that the EAP can be used for health and care purposes. Moreover, in considering the questions of how to evaluate the digital avatar's effectiveness in helping the participant to be more emotionally engaged with their storytelling and how using the system may contribute to her or his well-being, the qualitative and quantitative methods used to evaluate participants' responses showed that the research objectives of avatar life-review have been successfully fulfilled. In VoicingElder, the results support the personal immersion, social engagement, emotional release, and meaning-making process during avatar life-review. In VoicingHan, the quantitative methods to measure feasibility and acceptance have shown positive results, although limited in representativity due to the small sample size.

In general, after applying quantitative and qualitative methods to evaluate the EAP it is shown that my working hypothesis in relation to the expected results has been confirmed, in the sense that the avatar virtual bodies have facilitated a playful and safe life-review process. By helping the participants' self-expression of emotions and deep memories, interactions with the avatar life-review have been experienced as an emotional release and a meaning-making process for the participants.

During the dissertation process, I constantly reflected on the theoretical aspects of my artwork, taking into account the quantitative and qualitative analysis of the participants' experience of the avatar life-review platforms and my personal impressions. Thus, I have incorporated two main concepts that are also a result of this research process, defining the avatar life-review as an interactive performance art system for embodied storytelling and distancing.

6.1.1. Embodied storytelling

"Embodied storytelling" has been explained theoretically in Ch.5.4.2, along with Husserl's phenomenological investigation and kinaesthetic consciousness. This aspect was also explained in Ch. 5.7. Qualitative analysis, in the third analysis of Avatars and Meaning Making: Instrumental and Psychological Influences. Qualitative studies demonstrated the psychological dimension of play and performativity between physical and virtual bodies in VoicingHan

life-review sessions, and have supported the meaning-making process in the cancer patients' avatar life-review narratives.

As written previously, when I facilitated the avatar sessions with the participants, I was focused on their playful and performative engagement with life stories, and was not fully aware of the meaning-making process in their life storytelling. Qualitative analyses in VoicingHan allowed me to understand what had happened in terms of embodied storytelling. I realized that my attention was ironically about the process, not about the story, which was connected with the theoretical framework of social constructivism we used for analysis, and how the person was shaped, re-constructed, and created, throughout the storytelling process, playing with both virtual bodies as mediators. Spontaneous involvement, which is connected with person-centered care, was the key for success in meaning-making and a therapeutic outcome that, in fact, was the core idea of Jacob Moreno's theater of spontaneity in Psychodrama. Working with Dr. Sarah Price, an expert when it came to life-review and end of life care, and grounded in methodological frameworks of life-review, narrative therapy, social constructivism, and developmental psychology, I was able to realize the meaning-making process happening in the participant's life-storytelling. I realized the powerful therapeutic potential of embodied storytelling, and how it facilitated the reconstruction of self-narratives spontaneously engaged with developmental stages of life via avatar virtual bodies, to demonstrate therapeutic potentials.

Dr. Sarah Price has noted that the avatar life-review took very little prompting for people to go to areas of developmental challenge and resolve them spontaneously through a combination of memory and story while engaging their avatar, compared with traditional life-review process. This interesting observation gave me an understanding of what the role of the avatar was, and what made the participant build "trust" relationships and become immersed into their developmental stages which usually takes more time and effort in a traditional therapy setting.

For future analysis, in order to evaluate the embodied storytelling more thoroughly, I believe that motion data needs to be analyzed, as well as the narrative. Qualitative analysis of the VoicingHan narrative did not include any aspect of motion that occurred in storytelling, except one incident when a participant mimicked swimming to be in sync with the avatar. There were a variety of motions and non-verbal expressions that were made during avatar sessions. In the future, these could be analyzed to understand the participant's meaningful experience in

embodied storytelling as a whole. Moreover, motion analysis will be very interesting for future research to understand the meaning of gestures and behaviors among participants.

6.1.2. Distancing

The main working hypothesis was that acting out through (or performing) the avatar virtual body facilitated one's own healing process and wellbeing in conversation with different versions (age, environment, or situation) of the self, with distancing effects. As I have explained in Chapter 2.1, puppetry and the concept of the puppet as a psychodynamic object and a virtual body serves as the backbone of VoicingElder and VoicingHan. By acting out complex emotions using the puppet, the participants recreated their internal state in an external form, helping to craft a more coherent self and resolve "splits" (Gerity 1999).

Distancing was theoretically explained in Ch.5.4.3 as a powerful method of healing, providing a way to re-experience pain through the safety of distance. Drama therapy has used this technique as a way of creating dramatic reality by revisiting old experiences as if for the first time (Landy, 1996 & 1997). This has been investigated in Mrs. C's life-review session at the VoicingElder project, which came out voluntarily as a special incident speaking about traumatic memory, demonstrating the power of the distancing effect. Ch.4.2.2 elaborated on the Korean emotional concept of Han in relation to traumatic memory and wishing virtual bodies as shown by Mrs' C's VoicingElder life review session, which demonstrated that nonwestern conceptions of emotions may fit western audiences as well.

During both VoicingElder and VoicingHan life-review sessions, traumatic storytelling was never encouraged by facilitators. In VoicingHan sessions, all the participants were cancer patients, dealing with enormous psychological distress. Their condition of illness was already traumatic and speaking about it was extremely hard. However, sometimes, the participants voluntarily talked about illnesses during the VoicingHan life-review session. Especially when they used the elderly avatar and imagined their life in old age, a female participant was unable to continue her story, as she was in tears with the possible assumption that she would never have an elderly life. Speaking through an avatar, it was easier for the patients to speak about their own illness from a distance.

Using the methods of embodied storytelling and distancing effects, the avatar life-review platform facilitated a playful and safe life-review process for the participants, and as a result, facilitated the meaning-making process of the participants' life stories. It was also received positively in terms of feasibility and acceptability, even in the middle of a busy clinical setting.

My working hypothesis additionally mentioned the involvement of emotions and deep memories, and how they were related to therapeutic effects. I acknowledge that this aspect needs further investigation. A beta test was conducted during VoicingElder sessions in which the sentiment response system did not promote emotional stories, as the audio-visual response was not obvious enough. However, the audio response occasionally shifted storytelling to different aspects. For example, the sound of rain caused the telling of a life story about playing in the rain. How people could be made to engage more with emotion in life storytelling will be researched further, with the constant development of emotional AI and sentiment analysis technology. Deep involvement in memory was demonstrated by Mr. W's storytelling in VoicingElder when he used a child body avatar, allowing him to speak about a memory from more than 80 years ago. The recall process in avatar life-review, using embodied storytelling and distancing effects, is clearly different from traditional life review processes.

6.2. Interactive modality and embodied self-perception

From Parting on Z, to VoicingElder, to VoicingHan, the EAP interactive modality has been constantly updated, with advances in motion detection and lip-sync technology. Virtual bodies have incorporated different techniques and methods interfacing with physical bodies, resulting in different aspects of embodiment across the evolution of the platform. As new theoretical concepts and aims were introduced, VoicingElder and VoicingHan incorporated the motion detection technology, which facilitated mirrored movement between the physical and the virtual body, supporting the process of embodied storytelling. Additional customization aspects were implemented and updated, as the new projects were designed to work with diverse populations of ethnicity, gender and age, in the context of community and healthcare settings. The following list shows the technologies adapted for use in the three iterations of the EAP platform.

1. Virtual Puppetry, Parting on Z:
    -No motion detection technology.

- Lip sync via Audio volume detection. Audio response (volume) on facial expression, and minor body limb movements.

-Weight balance connection with the virtual body, via Wii Fit.

-Text displays from the database, based on audio inputs (speech or instrumental sound).

-Pre-animated sequences of virtual bodies. Different motions of the virtual body are activated by pressing a Wiimote button.

- 2 Avatars resembling Korean traditional masks. Simplified human anatomy: two arms, one body, no legs.

2. VoicingElder:

-Microsoft Kinect (Virtual sensors) for upper body motion detection, with latency, about a half second delay

-Lip sync and random eyes

-Eyebrow interaction, based on the user's neck posture

-8 Avatars: Human anatomy, doll-like appearance.

3. VoicingHan:

-Perception Neuron Wireless Mocap sensors (physical sensors attached on skin, with accurate detection of joints. Full body motion detection.)

-Lip Sync and random eyes

-64 Avatars: Human anatomy but with a simple, cartoon-like appearance (2.5D)

The interactive modalities have changed and encouraged different aspects of speech/body engagement between physical and virtual bodies in ways that are not yet studied. For example, Virtual Puppetry Parting on Z focused on lip sync audio interaction and weight balance. In contrast, the Kinect sensors used for VoicingElder supported the use of dynamic arm motion in the upper body. By focusing on these upper body movements, lip syncing was not so heavily emphasized. The precise motion capture sensors of VoicingHan encouraged full body actions, gestures, and behaviors, with minimal attention to lip sync. Diverse approaches to speech, body modalities, and configurations may facilitate targeted engagement of the body and voice in embodied storytelling to enhance diverse therapeutic outcomes.

Interactive game designers know that incorporating body movement can alter the emotional state of players (Lehrer, 2006), but prior to my EAP research, that insight has not been applied

to storytelling and life review. Different modes of body engagement with avatars create different emotional states, associations, perceptions, and behaviors. VoicingHan offered diverse body interfaces, from partial (single arm or head) for bedridden patients, to full body interfaces for active patients. A hybrid reality and perception occurs between the physical and virtual body, shaping different embodied states with different self-perceptions and body sensations, which may result in altered pain sensations, as explained in Ch. 5.8.1.

<u>Avatar representation</u>

Along with the interactive modality, the aesthetic design of an avatar representation is also important for hybrid body perception, as research has shown that avatar representation impacts the person's experience in virtual environments. Participants prefer avatars that resemble them in some way, which leads to identification with their avatar and more positive feelings about their virtual experiences (Klimmt et al., 2009; Trepte and Reinecke, 2010).

In VoicingHan, four ethnicity options were provided for the participants, and most of the participants selected the skin color closest to their own skin. However, there were gender and racial switches in two cases. A white man selected a black man avatar, saying he felt comfortable telling his life story as a black man. A young white woman selected a male avatar with a neutral skin tone, and said she felt like it was the closest representation of her. The VoicingHan project provided both casual and formal clothing style choices. Preferences for clothing styles varied, and participants appreciated the option to choose between them.

An avatar can be represented as the actual self, an ideal self, a perceived self, or an alternative self, reflecting the physical (gender, ethnicity, age, etc.), socio-cultural or psychological conditions of the participant. Altering the participant's avatar representations can also lead to behavioral and motor changes (ex: change of height, weight, gender, age, etc.), creating a hybrid body perception in the embodiment process. Husserl's phenomenological investigations eventually led to the notion of *kinaesthetic consciousness*, which is a consciousness or subjectivity that is itself characterized in terms of mobility. Both movement capabilities and a distinctive register of sensations play key roles in human perception and experience. The embodied perception study could greatly contribute to understanding the virtual self, and its physical movements and motor behaviors.

This research has demonstrated that the avatar storytelling platform has significant potential to enhance the patient's experience of care, being an innovative and patient-centered organization. Starting therapy is often a difficult process, especially when telling one's story involves trauma, grief, or other adverse experiences. This technology provides a medium through which patients can tell their story within a safe space (Landy, 1997). Avatars and environments can be customized to the participant's preference. Moreover, the avatar storytelling performance can be screen-recorded to review and share with patients, therapists, or family members.

The VoicingElder and VoicingHan projects have shown that virtual avatar bodies support the embodied storytelling and distancing effect that encourage participants to tell their life stories playfully at a safe distance, but more research is needed to explore the relationship between virtual and physical bodies. For instance, researchers may wish to explore the impact of diverse avatar representations (varying body size, shape, gender, age, and ethnicity, which could trigger many future studies in self perception and body image, as well as diverse ways to integrate the physical and virtual body.

6.3. Performing virtual bodies: a transcultural dialog

Through this research, I have developed a conceptual tool which I call "performing virtual bodies," to explain the virtual body experience based on a transcultural perspective. "Performing virtual bodies," inspired by Korean ritual and emotional concepts, was explained in Ch.4.2. Based on the discussion about Korean emotional flow at Ch. 2.2, virtual body experiences were discussed as phases of wishing, facing, creating, and performing virtual bodies.

This investigation of "performing virtual bodies" has been developed from a transcultural perspective in the belief that we can better understand human experience through multiple perspectives and cultural backgrounds. It supports the embodiment process of my embodied avatar performance works, and its performativity. Performativity has been discussed in the context of self-perception and identity, mostly through the physical body. However, in the digital age, we need this idea of performativity to enrich our discussion of virtual bodies, and the relationship between physical and virtual bodies. Speech, behaviors, emotions, and cognitions

mediated by virtual bodies bring new discussions on the formation of the self and identity. Jillian Cavanaugh noted in her book "Performativity" that actions, behaviors, and gestures are both the result of an individual's' identity, as well as a source that contributes to the formation of one's identity, continuously being redefined through speech acts and symbolic communication (Cavanaugh, 2015).

One highlight of this research is that it aims to introduce nonwestern cultural perspectives incorporated into the artistic design and performance process of technology, in order to better understand and analyze human experiences mediated by technology. I have designed the embodied avatar performance platform in conversation between Western and Korean concepts, based on the Korean traditional shaman ritual and western therapeutic concepts such as drama therapy and person-centered therapy. I tried to demonstrate that diverse cultural traditions can be integrated into digital media design processes to enhance theoretical and methodological frameworks in the fields of HCI and VR AR MR. I believe that it is important to bring cultural diversity into the design and analysis for human computer interaction and extended reality.

Bringing my own cultural tradition into digital media design and understanding its experience in transcultural perspectives, I expect I have opened new ways to enhance not only the field of HCI and VR, but also the way we all understand digital technology and the human experience. The core spirit of my projects has been transcultural and transdisciplinary, encompassing the Korean healing ritual and Western therapy and medicine.

6.4. Transdisciplinarity

The VoicingElder and VoicingHan projects have helped to demonstrate the real potential of transdisciplinary collaborative projects, involving professionals from the disciplines of art, medicine, gerontology, social work and computer science, exploring multi-dimensions and various points of view around the topic. The avatar life-review projects have been presented in prestigious venues and have been published in Impact Factor Journals in the areas of clinical medicine, performing art, digital media, and Arts and Health, demonstrating the potential of transdisciplinary endeavors to deepen each field of study with new knowledge and discovery.

In this research, The Korean emotional concept "Han" played an important role in transdisciplinarity, and became a central ground to bring the arts, a Korean healing ritual and palliative care together. Transdisciplinarity integrates the natural, social and health sciences within a humanities context, transcending their traditional boundaries (Choi, Pak, 2006). Based on the philosophical conceptual basis of *Han*, this collaborative research was transcultural and transdisciplinary from the beginning, asking how *Han* can play out in the life-review process in palliative care in a clinical setting. Han helped to transcend boundaries between Arts and Medicine, as a core concept to link and support both fields.

Avatar design and production was primarily developed as an art project, in regular conversation with medical teams. Medical professionals highly respected the artistic process of avatar production and enthusiastically expressed their appreciation for the avatar artistic and design progress. During the avatar life-review sessions at the outpatient clinic, as an artist, I facilitated the entire life storytelling process for the patients, with emphasis on creativity, playfulness, spontaneity and empathy, in the context of "performing art" rather than "therapy". The patients became artists and performed their story for themselves and others, in a transdisciplinary fusion of performing art and life-review therapy. The goal of transdisciplinary research is to extend knowledge and generate new processes by creating novel solutions that go beyond individual disciplines (Bernstein & Bernstein, 2015; Thompson Klein, 2004). In VoicingHan life-review sessions, the form of life-review was changed by the added avatars, as was the entire attitude of processing life-review.

A quantitative method was used to analyze the VoicingHan life-review sessions for feasibility. Medical professionals and artists worked together, within the framework of medical science, in order to facilitate clinical journal publication. Quantitative data was collected for testing the clinical feasibility. But this quantitative approach, tracking numeric data such as time duration, number of persons, and using Likert scale surveys only captured a part of the participants' experiences.

To fill this gap, a secondary qualitative analysis of the video narratives (primary audio portions) was conducted, in collaboration with a social work professor. This professor Dr. Price introduced "Social Constructivism" (Lincoln & Guba, 2013) as a central philosophical concept applicable to this research. The idea of play, spontaneity, and performativity in the context of drama therapy and performing arts was merged with the social science concepts of narrative therapy,

developmental psychology, and Social Constructivism (Lincoln & Guba, 2013). In this transdisciplinary effort, research methodology was constantly shaped and transformed together beyond disciplines, and it was a tremendous learning experience for me as a researcher.

The interpretative analysis of a Korean cultural perspective was elaborated based on observations and phenomenological reflections by the artist, based on each participant's actions, behaviors, emotions, and discussions before and after the sessions, allowing integration of my thoughts regarding the VoicingElder and VoicingHan sessions within a transcultural perspective. Along with analysis on clinical and social science, it added a different angle and a new insight, and a holistic understanding of the participant's experiences in multiple dimensions across a transcultural milieu.

As a whole, the VoicingElder and VoicingHan research process was transcultural and transdisciplinary, involving philosophical discussions, artistic creations, life-review sessions, multiple and transformative research designs, methodologies and analyses which have contributed to a holistic understanding of the human experience as facilitated by the avatar virtual bodies.

6.5. Contribution to the fields

Embodied Avatar Performance (EAP) is primarily a contribution of digital creative media art and design practices in the realm of arts and health care. It connects many different fields: from Arts to HCI, to the fields of avatars, virtual reality, performing art, drama therapy, therapeutic puppetry and life-review therapy. VoicingElder and VoicingHan were designed for the aging population and terminal cancer patients; but I believe that EAP may be fruitfully applied to different communities, with different cultural and social backgrounds, particularly within underrepresented populations, for communal healing and reflection.

There has not been much work for creative art and live performance practice using the avatars which can impact and inspire diverse fields of study such as medicine, computer science and social science. This technology has been extensively researched in the Humanities and Social Sciences (Doyle, 2008), but that research has not put enough weight on aspects of artistic creation of the avatars and their virtual environments, or experimentation with interactive

modalities and performativity which have a tremendous potential to proactively shape human experience. Moreover, researchers often use downloadable, pre-made, generic-looking human avatars, thus missing the whole creative process of avatar conception and interactive design. The process of creating and performing an avatar system for community purposes is still underexplored.

Prior studies suggest that in order to have a substantial impact on the participants' mental health, life review requires a substantial investment in time (6 weeks or longer), scope (birth to present), intimacy (guidance and close listening by an empathetic other), and evaluation (analysis and synthesis for meaning making) (Haight 2000). This limits its appeal, accessibility, and affordability. The avatar-based life-review platform aims to offer a new, safe, and effective intervention of life-review in a palliative care setting, that may be achieved in fewer sessions. Patients use avatar virtual bodies and environments for telling their life stories safely (i.e., with some psychological distancing), in a non-directive and empathetic environment, facilitating a therapeutic life review process.

In the book *Art, Technology, Consciousness* (2000), the visionary media artist and theorist Roy Ascott introduced the concept of moistmedia (fusion of biological and virtual) as a transformative art concerned with the construction of a fluid reality. Ascott envisioned psychoactive potential and the nature of consciousness in interactive art, and new ways of constructing reality and re-defining ourselves with a newly evolved perception. EAP takes this spirit of transformative art into diverse fields, working with computer science, medicine, gerontology and social work. EAP explores the intersection of arts, health and virtual reality, and proposes a proactive role for artists, in the process of creating, performing, sharing and understanding human experiences mediated by VR AR MR technology.

6.6. Further research directions

The anthropologist Marcel Mauss wrote about "Techniques of the body" (Mauss 1973), describing complex physiological, biological, psychological, social and cultural dimensions. He explained that techniques of walking, swimming, marching, digging, etc. were specific to determinate societies. It is time to discuss techniques of virtual bodies as it is highly manifested in digital society and daily life.

The embodied experience offered by mainstream VR products provides merely one out of many possibilities for potential embodied experiences. We need to explore further to access a variety of techniques, modalities and methods for investigating what I call "performing virtual bodies". With advances in interactive and simulation technology, potential modalities to integrate virtual and physical bodies are expanding and can be designed for diverse therapeutic outcomes to support ongoing investigations of the relationships between physical and virtual bodies in VR, MR, and AR environments, while taking into account cultural and social differences and backgrounds.

As a form of Embodied Avatar Performance, avatar life-review opens a path to continuously exploring innovative ways of conducting life-review therapy from an embodied perspective. We have seen that life-review becomes especially valuable for old age and end of life care, in order to understand the meaning of the lived experience. Patients with life threatening illnesses go through enormous psychological distress. Significant psychosocial needs of these patients remain unmet (Onyeka 2010). Life-review is one form of psychosocial care that can strengthen coping strategies with chronic illness (Kralik 2004). The life review process invites people to discuss their past (Weiss 1995, p168) in ways which focus on meaning and psychological resolution of past challenges, and often results in a legacy for loved ones (Weiss 1995; Overcash 2004; LeFavi & Wessels 2003).

Another next phase of EAP design will further explore sentiment responses in continuous speech, precise body detection, and advanced VR/AR technology, incorporating advances in extended reality and other innovative technology. The contemporary art direction of the embodied avatar performance will be explored as well, suggesting a new language of digital media performance using extended reality.

The conceptual direction of my EAP research will continue with mental health, life-review therapy, and the storytelling platform for underrepresented populations, exploring therapeutic outcomes, methods, and quality of life for all kinds of communities. Further research on hybrid body perception and sensation could lead to collaboration within the area of physical medicine and rehabilitation, and help us understand pain sensation and its management in clinical settings.

The use of virtual reality (VR) in the treatment and assessment of psychiatric disorders is also gaining popularity, as it provides an innovative way to deliver clinical services (Norcross, Pfund & Prochaska, 2013). VR is showing promise as an effective tool for the treatment of psychiatric disorders, with the strongest evidence for anxiety disorders (Carl et al., 2019). Additionally, it appears to be safe and tolerable for patient populations (Fernández-Álvarez et al., 2019). While adult patients have been the primary focus of the clinically focused VR literature base, there have been a number of studies demonstrating its potential in child and adolescent patients (e.g., Kahlon, Lindner, & Nordgreen, 2019; Maskey et al., 2019; Parrish, Oxhandler, Duron, Swank, & Bordnick, 2015). Avatar testing on an 8 year-old patient at the Virginia Treatment Center for Children during the summer of 2021 suggested the potential of avatar storytelling for child patients with mental illnesses, both for Inpatient and Outpatient units. Talk therapy, a tradition in the mental health care setting, has limited therapeutic methods and possibilities. Ideas of embodied storytelling and distancing effects via avatar virtual bodies need to be explored as an alternative form of talk therapy in mental health care settings, incorporating various methods from therapeutic traditions to healing rituals.

Finally, I would like to further explore virtual bodies to support storytelling platforms for underrepresented populations, promoting minority perspectives and cultural diversity. This will contribute to cross-cultural empathy and to our understanding of the concerns and stories of diverse communities by facilitating VR as a tool for diversity, equity, and inclusion. Based on transcultural and transdisciplinary spirits, I believe the area of extended reality and virtual bodies research could promote a broader understanding of the human experience, which in turn could contribute to the humanization of technology and a better future for us all.

Chapter 7. Publication details

- **Publication 1:** Ryu, S. (2017). Avatar life-review: Virtual bodies in a dramatic paradox. *Virtual Creativity, 7*(2). Bristol, UK: Intellect Ltd, 121–31. doi: 10.1386/vcr.7.2.121_1

Abstract

This article will examine ongoing avatar life-review projects, in the light of drama therapy concepts and methods, exploring a hybrid model of avatar/drama therapy in a virtually mediated environment. The avatar life-review platform will incorporate techniques/methods of drama therapy and psychodrama such as role playing, role- reversal, doubling and mirroring as a hybrid therapeutic model between VR and theater. It will address multiple states of self in dramatic paradox, especially for people with traumatic memories, disabilities, memory loss or mental health complications.

Keywords

- **Publication 2:** Ryu, S., Noreika, D., Dang, M., & Del Fabbro, E. (2019). VoicingHan: between Mortal and Immortal. In Park, J., Nam, J., Park, J. W. (Eds.), *Proceedings, 25th International Symposium on Electronic Art*. Asia Culture Center, Gwangju, Korea, 174-180. ISBN: 979-11-87275-06-0

Abstract

The VoicingHan project is an avatar storytelling platform designed for patients with advanced cancer receiving palliative care at Virginia Commonwealth University's Massey Cancer Center. A Korean concept, "Han" reflects a paradoxical state of consciousness combining an extreme state of grief with a great hope for overcoming a seemingly impossible situation. We situate Han in a special and holistic cognition found among patients in the palliative care program who confront the critical issue of mortality, and the human dilemma in connecting our physical and spiritual domains. VoicingHan supports terminally ill patients by using oral storytelling as an artistic medium, facilitating patients' interactive performances while promoting autonomous creativity to

support "patient activation" or "patient-centered care." In addition, the Avatar video, sound data of stories, and motion capture data will remain as an important patient and family legacy. This paper will discuss the VoicingHan project as an approach to dealing with mortality and potentially mitigating existential suffering for palliative care patients in the digital age.

Keywords

Avatar, Storytelling, Digital Immortality, Life-Review, Virtual Reality, Mixed Reality, Palliative Care, Thana technology, Embodiment, Korean Shamanism

- **Publication 3:** Ryu, S. (2020). Performing virtual bodies. *International Journal of Performance Arts and Digital Media*, Taylor & Francis, 1-17.
  doi: 10.1080/14794713.2020.1778899

SJR: Visual Arts and Performing Arts Q1 (2020)

Abstract

Following the technical advancement of cross-reality platforms – including virtual, mixed and augmented reality, the term 'virtual bodies' has become widespread. Despite its increased use, however, there has not been much investigation of 'virtual bodies' taking into account a cross-cultural approach that links traditional methods and digital outcomes. This article will demonstrate the methods of experiencing virtual bodies, in the context of Korean healing ritual, along with discussions of my avatar life-review projects, in the phase of wishing, facing, creating and performing virtual bodies. Since 2016, I have been working on avatar life- review platforms that have a mirrored body movement and lip- synchronization of live speech. This platform was implemented in two projects: in the Voicing Elder (2016), the avatar life-review for older adults at Gayton Terrace Senior Living, Richmond, VA; The Voicing Han (2019), the avatar life-review for cancer patients, at VCU palliative care, Massey cancer center, Richmond, VA. These avatar life-review sessions will be discussed as examples of wishing, facing, creating and performing virtual bodies, to proactively experiment, design and facilitate emotional and therapeutic experiences. It will enrich the potential of technically mediated bodies in digital space, supported by the constant development of virtual, interactive and simulation technologies.

Keywords

Avatar; virtual bodies; Korean shamanism; healing ritual; life-review; art and medicine; mixed reality

Abstract

Background: Life review, a narrative-based intervention, helps individuals organize memories into a meaningful whole, providing a balanced view of the past, present, and future. Examining how the content of memories contributes to life's meaning improves some clinical outcomes for oncology patients. Combining life review with other modalities may enhance therapeutic efficacy. We hypothesized a life review intervention might be enhanced when combined with a kinetic, digital representation (avatar) chosen by the patient. Our goal was to determine the feasibility of an avatar-based intervention for facilitating life review in patients with advanced cancer.

Methods: We conducted an observational, feasibility trial in a supportive care clinic. Motion capture technology was used to synchronize voice and movements of the patient onto an avatar in a virtual environment. Semistructured life review questions were adapted to the stages of child, teenager, adult, and elder. Outcome measures included adherence, recruitment, comfort of study procedure, patients' perceived benefits, and ability to complete questionnaires, including the Edmonton Symptom Assessment System (ESAS) and Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being Scale (FACIT-Sp).

Results: Seventeen patients were approached, with 11/12 completing the intervention. The total visit time of a single intervention averaged 67 minutes. The post-intervention survey found all patients agreed or strongly agreed (Likert Scale 1–5) they would participate again, would recommend it to others, and found the experience beneficial. After one month, ESAS scores were either unchanged or improved in 80% of patients.

Conclusion: An avatar-facilitated life review was feasible with a high rate of adherence, completion, and acceptability by patients. The findings support the need for a clinical trial to test the efficacy of this novel intervention. Clinical Trial Number NCT03996642.

- **Publication 5:** Ryu, S., & Price, S. (2021). Embodied storytelling and meaning-making at the end of life: VoicingHan avatar life-review for palliative care in cancer patients. *Arts & Health: An International Journal for Research, Policy and Practice*. Taylor & Francis, 1-15. doi: 10.1080/17533015.2021.1942939

Abstract

This article presents the VoicingHan project as a new form of life-review mediated by a virtual body-digital avatar promoting the reconstruction of self and identity through play and performativity. Whereas traditional life-review uses interview as the primary means of the therapeutic process, VoicingHan life-review is mediated by a virtual body avatar with self-guided participation in one's own life stories through embodied storytelling performance. The VoicingHan study enrolled 12-patients receiving outpatient palliative care at VCU Massey cancer center, from June to Aug 2019. The storytelling performances were recorded via avatar video format and distributed to participants for review and/or sharing. The present study considered the avatar videos as qualitative data emerging from these individually constructed life review narratives. In this article, the benefits of VoicngHan life-review were demonstrated by analyzing the avatar video narratives, based on theoretical and developmental frameworks. Through the lens of Social Constructivism, this qualitative study deepens our understanding of human-avatar interactions to engage life review processes and the role of creativity, play and performativity within the liminal space of a life-threatening illness.

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ANNEXES

1.VoicingElder

1.1. Production timeline

Production Management

Lead: Semi

Assistant manager: Zach Kurth Nelson

Avatar / Virtual Environment

Lead: Anne Lantz

Assistants:

      Aurora Cooper - texturing, blendshapes

      Matthew Sagaser - design, research, modeling, animation

      Ashleigh Starky - animation

Unity / HCI

Lead: Omri Glaser

Assistant: Ze Huang

AI(speech recognition algorithm) / HCI advisor: Stefano Faralli

Sound

Lead: Zach Kurth Nelson

Assistant: Thomas Marlowe

Documentation (video /web /avatar performance disc to be distributed to the senior user)

Web Design: Ze Huang

Video editing: Thomas Malrowe

Writings (publication / grant)

Lead: Semi

Assistant: Neal Swisher

Production schedule:

The week of 1/12 - 1/25/2016: head tracking with lipsync, testing with first avatar

The week of 1/26 - 1/31/2016: completing the first avatar (with motion, random eyes, exploring lipsync illusion)

The week of 2/1 - 2/8/2016: completing the second, third avatar (head track, lipsync, motion)

The week of 2/9 - 2/15/2016: shifting between avatars

The week of 2/16 - 2/22/2016: implementing 3 male and mask avatars

The week of 2/23 - 3/8/2016: adding items and game feature, sound

March:

connecting with a speech recognition algorithm, developed by Stefano Faralli (Dept of Computer Science, Univ of Rome, Italy)-- exploring visual acoustic feedback based on speech contents/ emotions (facial expression, generative sound...)

Exploring Avatar customization(hair style, outfit..)

April: testing

May: ready to work for 10 life review sessions at Gayton Terrace Assisted Living.

May, June, July: 10 life review session at Gayton Terrace Assisted Living

1.2. Time-sampling non-participant observation checklist

This is the form of non-participant observation checklist we used for VoicingElder sessions observations. The Gerontologists used this form for observation of VoicingElder life-review sessions.

(Sample)

Date: 5-4-2016

Time:11:00 am

Location: Gayton Terrace senior living

Theme: memorable moment about movie

story about cary grant

Telling a story about her father getting angry

Observer will use the checklist to record behaviors (verbal and non verbal) at three points during the VocingElder program.

Beginning (clam, grateful, inspired, excited, sitting up straight, open palms, looking at screen, interacting with the avatar)

Midpoint (anxious/scared, tired, sad/depressed, lips puckered)-telling a story about her father getting angry. Transitioned into a story about her childhood. Her father was an engineer...

End (Hurt, tearful/weepy, crying)

1.3. Unstructured open observation field notes (sample)

What to observe during participant observation:

Verbal behavior and interactions (tons of voice, social interactions, and initiate interactions)

-Animated tone of voice

-using voice & hand movements to demonstrate emotion.

-after she finished, the group surrounded her & supported her & offered positive feedback & validation.

-she said the program helped her connect with those emotions, releasing them -helped to have anonymosity.

Physica Behavior (using body and lanugage to communicate emotions, what behavior indicates about feelings)

-Chose the avatar girl in turquoise- younger

-using lots of body language to connect with avatar

-ended the story in tears

1.4. Story transcription and after talks (sample)

Here I present the entire story transcription of Mrs. C's story about her father that was told on 5/4, 2016, during the VoicingElder avatar life-review session.

As described in my field note 3.4.4, this story is significant as it demonstrates potential personal immersion with an avatar which can help emotional release of the participant. The transcription of conversation happened after Mrs. C's story, with gerontologists-Tracey and Jenny, an artist myself, senior center director, Vikky and the resident audiences. which are helpful to understand the therapeutic value of the VoicingElder system.

I know we all remember the famous, savvy, sophisticated movie stars. Archobile en glitch who was better known to us as Kerry grant. Wow what he made of his life is just amazing. He was born in England as archoble maclich. His father put his mother in a mental institution. This may Kerry very sad. He had earn living as young teenager, and he decided going to bodfield. There was a man who had All troops of people who worked in bodfield and that's where Kerry learned a lot about a lot of his very basic fundamental tricks – must say, but he was always animated. This was what made him a good actor. He could do anything.

The Famous director, you know what I mean, Alfred Hickok, wow was he something? He really liked Kerry because Kerry can play wonderful, happy, comedic roles and then he can play sad roles with psychological problems. Well those are hard, aren't they?

My story is about psychological problems. I always admired arhoble(Alfred Hickok)? Because he made a new life for himself. I don't think he was as truly happy as some of the characters playing in the movies. He was only nominated for one Oscar. That was a movie about a journalist to find his lovely bride. They can't have childrens and they adopted a lovely girl and then when she dies, oh he is heartbroken, just heartbroken, heart broken, heart heart broken, well something. So the end of movie, he deicded to leave his lovely bride and wife. Then, all of sudden, they have chance to adopt another child and this changes their life again and they were sweet and lovely and happy ?.

In my life, I had Very sad time. This is a true story and it's been with me in my heart, heart, heart, .. (standing up) there, heart. So I was a little little child tiny. My father was an engineering professor. He had a little tiny room in his basement that he called it cubbyhall. And he would go to the cubbyhall, to grade his papers he taught metalogy and other engineering courses. So one night I thought I am going to go down there and surprise my daddy. How about that? Ya, I am gonna surprise my dad so now this is a kind of old house and stairs with the basement with cold, very very cold steps. I tip-toed and tip-toed down to basement steps. I stood at the door to his cubby hall.

"surprise----surprise!!" I was so happy. My father reach to me and said "don't ever do

that again". Arm was that that that that…..I was so heartbroken. I ran up the stairs. My mom didn't know what could happen. Ohh I was hear heart heart broken inside. I hided behind the mirror. Those one to close the door. And I looked in the mirror. I said to myself "who who are you?" I was very frightened. My mother talked to my father and they agreed he should apologize. He was top(?) at the moment of course, he didn't really want to hurt me. He didn't understand me I was just a li-------ttle girl. He was a strong man, strong and really strong. So next day we went down to the basement and sat in the recreation room in the basement and I sat on his laps on his laps and…he talked to me he talked to me he talked to me. Talk b aba b aba b aba……..I am sorry.. b aba b aba b aba ba ba remember I was a little little girl little little girl. Only 4   I did not understand anything about anything anything I didn' t understand it. I went back upstairs. I have a feeling that into this left a whole---- in my heart. And many times since my father dies, 30 some years I have wanted to wanted to for-give him I know someday I will see him in heaven.   I also know in the 50s parents won't like thinking about children's feeling. And his mother was very very strict. So I don't know maybe he just didn't understand anything about children. .   or I don't know

 I was never ver close to my father I really wanna forgive my father. I know if he were here today, he would say oh my goodness I can't believe this is one tiny incident in your life. Why are you hanging onto this? I wanna let go. I wanna let go. I wanna say ERASE that from my mind. Erase that.I have been through worst things. I have deep feelings AND love for crist and I pray. so I ? HELP UPP MY PRAYERS. And say "help me to forgive me father. I have learned what it means to say . forgive them for them know nothing to do..(crying)

(After story)
Thank you thank you
Being a childhood with curious.
Tracey: I am glad that is such a great way to look at it.   What else other than curious , as a little girl.
Mrs. C: See we were never close, never close.   I think that Even though he sat me down on his lap and said he's sorry but I was not able to take that in. because There was no understanding.   He did what he though right, but there was no understanding.
Tracey: how do you feel after telling the story?

Mrs. C: I am feeling better. I knew I would. Vikki called up this morning.Ni was just thinking the other day. Wonderful voicingelder teachers are going to come back. When she calls this morning, boy that's great!   TI hought last time when I aws I might tell this story, but like I said, I've been tying for years to do something… and see today I cried. I very very seldom cry. See this is wonderful. I said this before last time. This is such a good release. This is a such a good release to say.

I don't want this in my life anymore. I tried that before. Father has been gone for years, and years and years… he's gone for years.

Tracey: but you connected with this. You were raised with difficult stories. It is very brave. It is so healthy.

Vikky: Incredible energy..

Mrs. C: I 've seen many psychiatrists. REALLY.   MY first marriage.   He was alcoholic. Now I think about my life. I was never be able to truly into such attention to people I mean, man because It is like I am sure that 's part of that trusting .so so reject also…
Oh thank you thank you

Semi: my childhood, my father was so strong and oppressing as a daughter.. There were so many struggles… but the way he expressed his love was not working at all. So many things in my mind Unexpressed, unresolved… stay here… I really wanna tell somebody…but how can I say "do you wanna hear my father story?"… and then that is very weird.. I tried counseling. But it was not working.

Mrs. C: IT IS PROCESS.. boy it is the process.. I do have one DIFFERENCE … My father died. It has been over30 years. Your father still alive?

Semi: my father is alive

Mrs. C: see that makes it a lot harder.   Because You feel like you are .. oh my god I can't say anything bad about my father, you think about all good things.

I have a lot of good things come to my father..   he was smart,there are a lot of good things. He did not know much about children.   Like I said before, in the 50s, parents did not think much about all the nuances of children. It was a different world. This program was amazing. I hope You have nothing but success. It could really help so many people. When I talk with a psychiatrist, it is hard because you are talking to them . this way you have anonymity of . Being able to not disclose yourself. You can just tell a story . but you don't need to disclose yourself. I think this thing is fabulous.

Semi: I always have pain in my mind. I can use it..

Mrs. C: You developed it, you developed it. Look at all the people You can help.

Big success to you, big success to you. It would be worth it. It would be worth it. It really would. You are welcome you are so welcome.

Jenny: I have to tell you you are a great storyteller. You have a beautiful voice. Use a whole body

Mrs. C: thank you (hh)thank you thank you

Semi: almost like drama

You are really using puppet body

Most people use it and go away. You are one who uses a puppet body to bring you to a different world.

Mrs. C: Ya, Right right right

Semi: You need to be a professional performer later on. You are already

Mrs. C:Thank you thank you MY GOODNESS, thank you… ya

Semi: Your story was amazing.

You know the true story is always so much more than ..

Another older adults resident: we are in lunch hours

Semi: oh…

1.5. Field notes (sample)

<u>5-4-2016</u>

Conny was amazing. She came back. I thought what she said two weeks ago was not true since she didn't come back last session.

I thought everyone tried to talk nicely in front of me and disappeared but it was not true. Conney came back and said she will tell a sad story today. I was so glad to hear since it is the first time. She said the avatar is not connected with her body. I asked her to stand up . After connecting, I asked her to sit down on the chair. Oh, today we provided chairs, so users can sit and talk. I guess it is a more comfortable position. I guess it helped the user's talk.

Conny 's voice was so strong. Almost like a professional actor. She chose a young adult female avatar. What if she chose a man avatar looking like her father? What would be my choice if I want to talk about the story of my father? I think I would like to choose an old man avatar looking like my father. I can't wait to perform it… telling my story about

my father. I really want to play my avatar in front of the public. Rather than private. I don't know why.

Conney was talking about small things. One small incident of her father's response during her childhood. Conny said he met a psychiatrist and it was not working.
Me too, counseling was not working for me. After I talked about all the negative parts of my life story to the counselor, I felt so ashamed, terrible.   I did not feel well at all. I did not feel refreshed. It was so painful. I felt like I was a failure. I would rather not talk about the negative part of my story, but I would like to express and explore my negative memory space, with an avatar why?
I want someone to listen to my story. I want the public to listen to my story. (even if negative?) why?   I want them to listen to all my pain/sadness/ happiness… I would like to share. Is it because of group consciousness/playfulness? Is it because I was transcendent?

(Reflection note about Ms. C's father storytelling)

Mrs.C's story was so powerful..
When she walked into the theater where the avatar life-review was set, she said "I am going to tell a sad story today". It was surprising to hear it, since all stories told by residents had been positive so far. I knew telling a sad story would be even harder in this unintentional "public" theater environment.

As usual, I assisted her to wear a wireless microphone and to sit on a chair, facing the avatar projection screen. This time, her body was not instantly connected with her chosen avatar- about the age of a 30-40 looking woman. It could be due to the reflection of jewelry she is wearing, her sitting posture, or color of her clothing.. I asked her to stand up for a few seconds, to register her full body for the Kinect sensor. The chair provided comfort and safety for the older adult users, but also created confusing body information in their inclined seating posture.

With a seated position, her story started with her memory about movies, actors and directors of old time, then migrated into memory of her father. Her voice was firm, sounded like a professional actor, working with her avatar lips. She tried to control her

avatar motion, using her arm, body, and hands. In the middle of her storytelling, she was speaking "In my heart", trying to make her avatar touch her heart. Since finger detection had not been implemented yet, it was a challenging motion for the avatar- not quite detecting Mrs.C's hand on her chest. All of sudden, Mrs.C standed up, and spoke several times of "in my heart", searching for the avatar's heart until acceptable. Honestly I didn't expect the older adults to use their body this much for their storytelling. I noted their hands work as another speech organ. However, now with the avatar system, their entire upper body functioned as a secondary mouth. Limitation of avatar body performance (yet with lip-sync illusion) created a semi-interactive relationship between virtual and actual body, demanding high works and challenges for the user. As a creator, I felt a strange sense of guilt when the avatar couldn't support the user's full emotional expressions. The older adult users wanted to express love and feelings in avatar motions of kissing, hugging or touching hearts. There was something beautiful about their wishes, struggles and humor in their relationship with the avatar.

Mrs.C was working hard to express herself through the limited condition of the virtual body. Her story had a dramatic flow of emotions from humor, happiness and to sadness, eventually speaking about a small episode about her father when she was 5 years old. Her story was ending with a sentence, in repeat but with different voices: "please help me to forgive him." The first one seemed to belong to the avatar, firmly acting out, but the second one was different- Mrs.C's voice, acting in-weeping and trembling. It was surprising to see her tears.

Everyone was silent for a while: residents, gerontologists, staff.. silence after silence.. strong empathetic feelings in nothing. For the entire week- last week, I couldn't stop thinking about my father.

1.6. Forms

Semi-Structured Interview Protocol

These questions would provide a common foundation that interviews could follow initially. As respondents give more information, each interview will follow what individual respondents deem important.

<u>Questions for Older Adult Puppeteers</u>

- What words would you use to describe the feelings and emotions associated with using VoicingElder? What words would you use to describe the feeling when you first started to speak through your puppet? Did your feelings change the more time you spent telling your story?
- Describe the process of using the virtual puppet, how did it change as you spent more time telling your story?
- Did you feel a sense of harmony with your puppet? (i.e., did you feel the puppet was telling the story?).
- What were your reasons for choosing your puppet design?
- Would you participate in a VoiceElder session again? Would you recommend it to others?
- How do you think your family members will feel about watching your story being told through VoicingElder?

<u>Questions for Family Members of Puppeteers</u>

- How do you feel about watching your loved one's story being told through VoicingElder?
- Did you learn something new about your loved one in this experience?
- What feelings and emotions do you think your loved one experienced while they were telling their story through the avatar?
- Would you recommend the VoiceElder program to others?
- Is the video of your loved one telling their story through the puppet something that you will share with other family members?

Time-Sampling Non-Participant Observation Checklist

Participant #_____

Date _____

Time_____

Location_____

	Beginning	Mid-point	End
Happy Emotions			
Calm			
Joyful			
Loving			
Happy			
Grateful			
Inspired			
Pleased			
Excited			
Uneasy Emotions			
Nervous/Tense			
Anxious/Scared			

Bothered/Uneasy			
Confused			
Apathetic			
Bored			
Angry Emotions			
Hurt			
Tired			
Frustrated			
Irritated			
Sad/Depressed			
Tearful/Weepy			
Body Language			
Sitting up straight			
Slouching			
Weak Smile			
Strong Smile			
Laughing			
Lips puckered			
Frowning			
Arms Crossed			

Legs Crossed			
Hands Clasped			
Open Palms			
Tapping Fingers			
Tapping Feet			
Shaking leg(s)			
Crying			

PARTICIPANT SURVEY

Thank you for participating.

Your responses to this survey are kept strictly confidential. No individual survey will be reported, as all reports will reflect aggregate information. We will use aggregate responses for research, programmatic and curriculum improvement purposes.

Please answer all questions as truthfully as possible.

1) Age _____

2) How do you classify your gender?
❑ Male
❑ Female
❑ Transgender/sexual

3) How would you best classify your race/ethnicity?
❑ African American

❏ Latino/a

❏ Asian American

❏ White/Caucasian

❏ Native American

❏ Multi-racial, please specify

❏ Other, please specify

4) Highest grade of school completed.

❏ Less than high school

❏ High school

❏ Technical School

❏ Some College

❏ College graduate

❏ Graduate (masters)

❏ Postgraduate (doctorate)

❏ Currently a student

5) How was your overall experience with VoicingElder ?

Excellent   Very good   Good   Fair   Poor

   1   2   3   4   5

6) How likely are you to recommend VoicingElder to others?

Very Likely   Likely Unsure   Unlikely   Very Unlikely

   1.   2   3   4   5

7) In general would you say that your health is?

        a. Excellent

        b. Very good

        c. Good

        d. Fair

        e. Poor

The next questions are about activities you might do during a typical day. Does your health now limit you in these activities? Please circle the best response

8) <u>Moderate activities</u>, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf:

Yes, limited a lot   Yes, limited a little   No, not limited at all
      1   2   3

9) Climbing <u>several</u> flights of stairs:

Yes, limited a lot   Yes, limited a little   No, not limited at all
      1   2   3

10) During the **past 4 weeks**, how much did <u>pain </u>interfere with your normal work (including both work outside the home and housework)?

Not at all A little bit   Moderately   Quite a bit   Extremely
1   23 4   5

11) During the **past 4 weeks, have you felt calm and peaceful?**

All of the time   Most of the time Some of the time A little   None

of the time   of the time

1   2   3   4   5

12) During the **past 4 weeks, did you have a lot of energy?**

All of the time   Most of the timeSome of the time A little   None

of the time   of the time

1   2   3   4   5

13) During the **past 4 weeks, have you felt downhearted and depressed?**

All of the time   Most of the timeSome of the time A little   None

of the time   of the time

1   2   3   4   5

14) During the **past 4 weeks, has your physical or emotional health interfered with your social activities (like visiting friends and participating in activities)?**

All of the time   Most of the timeSome of the time A little   None

of the time   of the time

1   2   3   4   5

Below are five statements with which you may agree or disagree. Using the 1-7 scale below, indicate your level of agreement

5. In most ways my life is close to ideal

Strongly   NeitherStrongly

agree agree/disagreedisagree   7   6   5

4   3   2   1

6. The conditions of my life are excellent

Strongly   NeitherStrongly

agree   agree/disagreedisagree   7   6   5

      4   3   2   1

7. I am satisfied with my life

Strongly   NeitherStrongly

agree   agree/disagreedisagree

  7   6   5   4   3   2   1

8. So far I have gotten the important things I want in life

Strongly   NeitherStrongly

agree   agree/disagreedisagree   7   6   5

4   3   2   1

9. If I could live my life over, I would change almost nothing

Strongly   Neither   Strongly

agree   agree/disagreedisagree

  7   6   5   4   3   2   1

1. What did you like most about VoicingElder experience?

_____

_____

_____

_____

_____

_____

_____

_____

_____

2.   Do you have any recommendations to improve the VoicingElder program?

_____

_____

_____

_____

_____

_____

_____

_____

THANK YOU!

FAMILY MEMBER SURVEY

Thank you for participating.

Your responses to this survey are kept strictly confidential. No individual survey will be reported, as all reports will reflect aggregate information. We will use aggregate responses for research, programmatic and curriculum improvement purposes.

Please answer all questions as truthfully as possible.

1) Age _____

2) How do you classify your gender?
❑ Male
❑ Female
❑ Transgender/sexual

3) How would you best classify your race/ethnicity?
❑ African American
❑ Latino/a
❑ Asian American
❑ White/Caucasian
❑ Native American
❑ Multi-racial, please specify
❑ Other, please specify

4) Highest grade of school completed.
❑ Less than high school
❑ High school
❑ Technical School

❑ Some College

❑ College graduate

❑ Graduate (masters)

❑ Postgraduate (doctorate)

❑ Currently a student

5) Relationship to VoicingElder participant?

❑ Spouse

❑ Parent

❑ Grandparent

❑ In-law parent

❑ Sibling

❑ Aunt/Uncle/Cousin

❑ Friend

6) How was your overall experience watching your loved one participate in VoicingElder ?

Excellent	Very good	Good	Fair	Poor
1	2	3	4	5

7) Do you think that your loved one gained a valuable experience by participating in this program?

Not at all	A little bit	Moderately	Quite a bit	Extremely
1	2	3	4	5

8) How likely are you to recommend VoicingElder to others?

Very Likely   Likely   Unsure   Unlikely   Very
Unlikely

   1   2   3   4   5

What did you like most about VoicingElder experience?

_____

_____

_____

_____

_____

_____

_____

_____

_____

   1.   Do you have any recommendations to improve the VoicingElder program?

_____

_____

_____

_____

_____

_____

_____

_____

_____

THANK YOU!

1.7. Avatar images (sample)
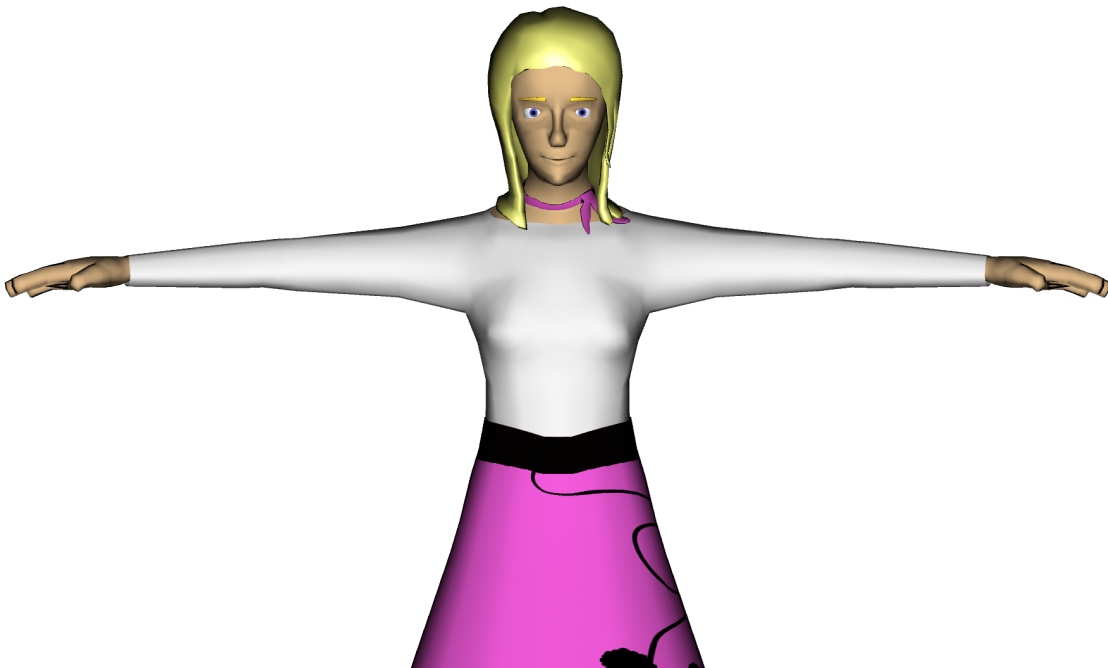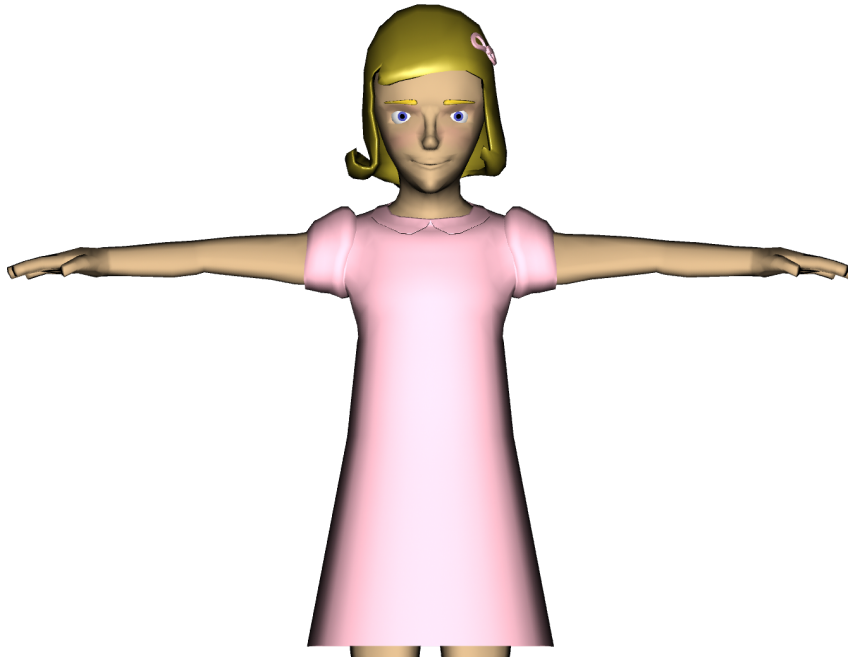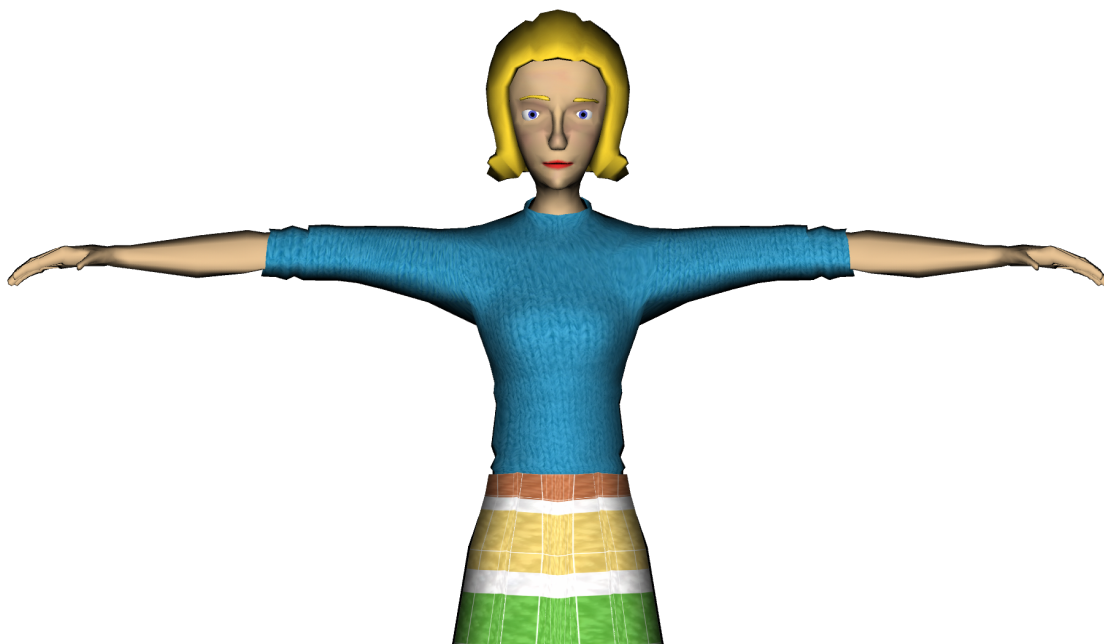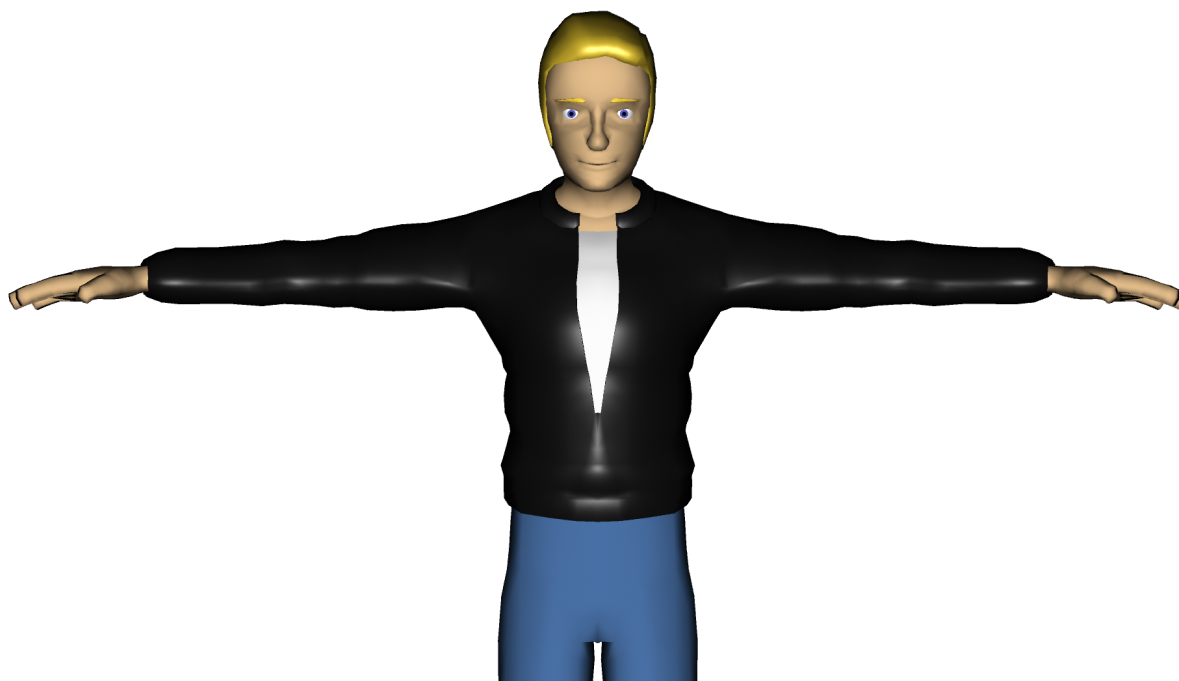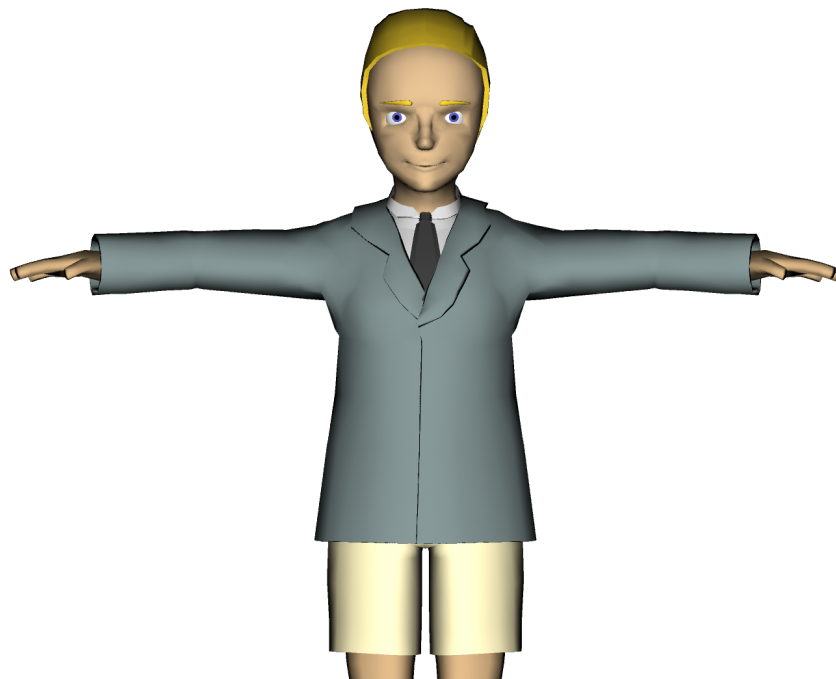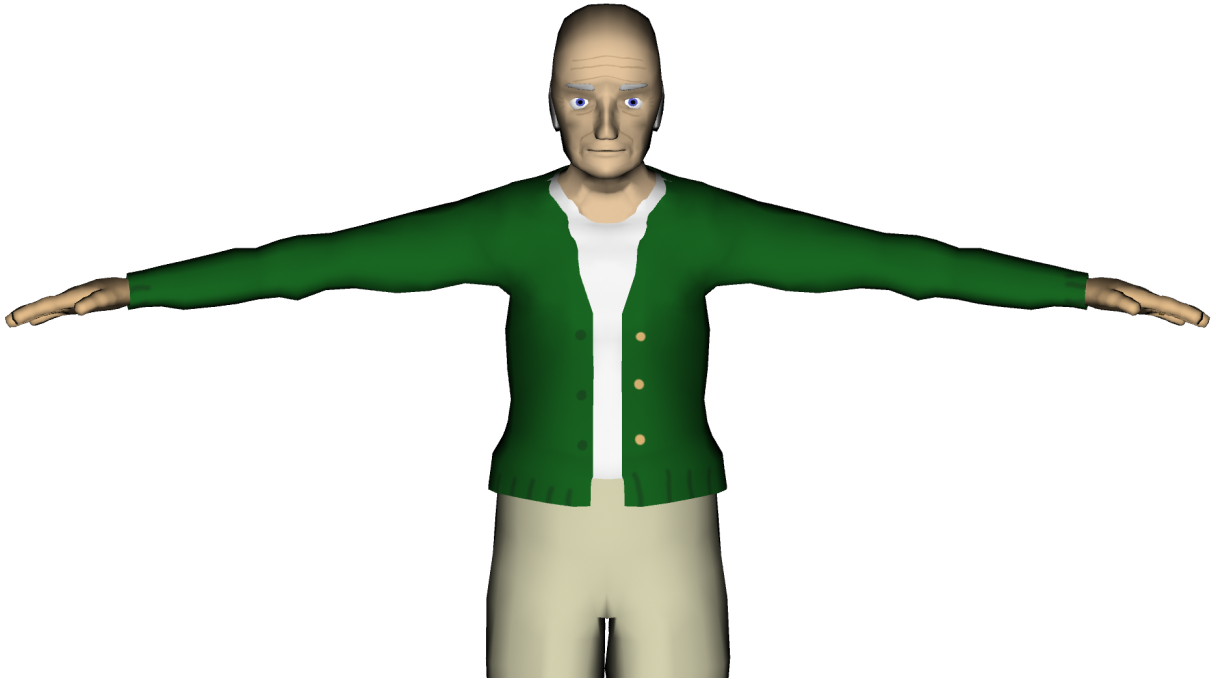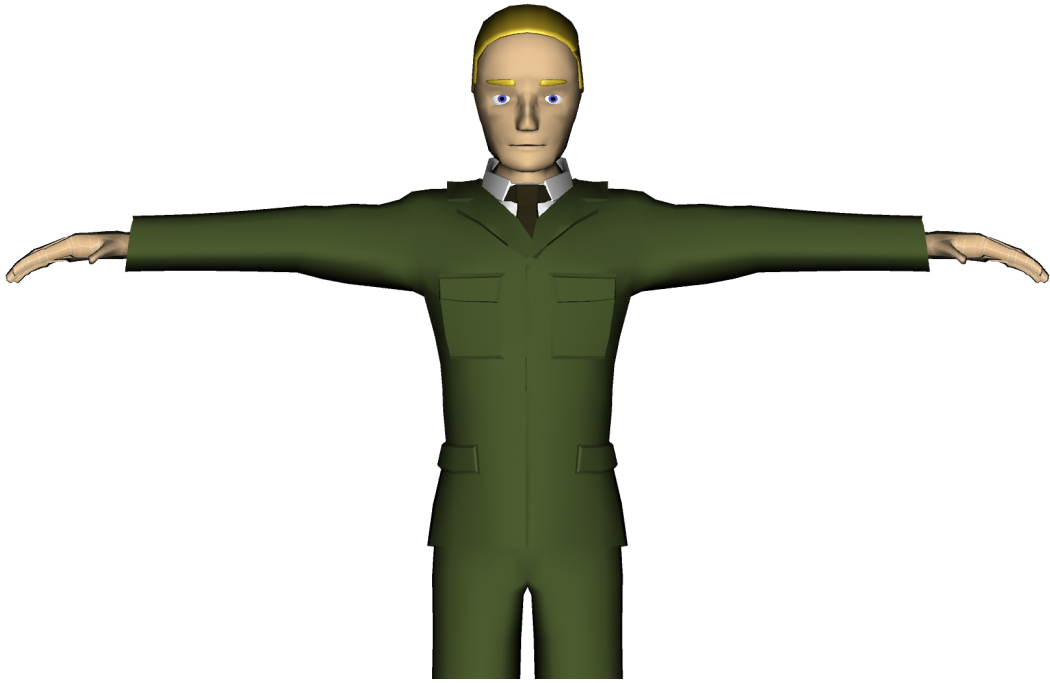
2. VoicingHan

2.1. Population

Study subjects were ambulatory oncology patients seen in the supportive care clinic at a National Cancer Institute (NCI) Designated Cancer Center. Inclusion criteria included 1) metastatic or locally recurrent cancer 2) age 18 years or older, 3) ability to ambulate, 4) ability to understand and speak English, 5) a history of at least 2 prior visits to the clinic, 6) at least one ESAS score ≥3 for pain, depression, anxiety, or well-being. Prior to the intervention, the physician or clinic nurse approached patients and informed consent was obtained. The Massey Cancer Center and Institutional Review Board (IRB) at Virginia Commonwealth University approved the study.

2.2. Patient selection

Upon IRB and contract completion, we recruited patients to participate in the avatar life-review intervention. Prior to the intervention, patients were approached by the physician or clinic nurse and informed consent was obtained. Inclusion criteria included 1) metastatic or locally recurrent cancer 2) age 18 years or older, 3) the ability to ambulate.

The study withdrawal procedures were set as usual in clinical studies. A patient may decide to withdraw from the study at any time. Participating is voluntary. However, a patient may be removed from the intervention for one of the following criteria: (1) unwillingness or inability of the patient to comply with the protocol requirements, (2) disease progression that prevents further administration of intervention, (3) general or specific changes in the patient's conditions that renders the patient unacceptable for further treatment in the judgment of the investigator.

Inclusion Criteria

This study will enroll adults diagnosed with metastatic or locally recurrent cancer. Individuals will be recruited from Massey Cancer Center (MCC), a national cancer institute. MCC treats hundreds of patients a year providing an ample sample to enroll study subjects.

- Participants must be 18 years of age or older
- Patient participants must have metastatic or locally recurrent cancer
- Participants must be able to understand English

- Participants must be ambulatory
- Ability and willingness to sign a written informed consent document

Exclusion Criteria

- Participants who cannot understand written or spoken English
- Any prisoner and/or other vulnerable persons as defined by NIH (45 CFR 46, Subpart B, C and D).

2.3. Quantitative data

Feasibility of Delivering an Avatar-Life Review Intervention to support Patients with Active Cancer (Preliminary)

Characteristics		Consenting Participants (n=12)
Age	24-34	3 (25.0%)
	35-54	2 (16.7%)
	55- 64	5 (41.7%)
	65+	2 (16.7%)
Gender	Males	5 (41.7%)
	Females	7 (58.3%)
Ethnicity	Caucasian	5 (41.7%)
	African American	5 (41.7%)
	Other	2 (16.7%)
Education	Less than High School Education	1 (8.3%)
	High School Graduate	6 (50.0%)

	College Graduate/ Advanced Degree	5 (41.7%)

Table 3: Demographic Characteristics of Study Population.

Variables		Average Time (Minutes)	Std. Deviation	Median (Minutes)
Pre-session Questionnaires	n=12	16.25	8.29	12
Patient Setup	n=11	14.00	3.84	13
Avatar Session	n=11	29.27	7.27	27
Avatar Breakdown	n=11	6.18	2.82	7
Post-session Survey	n=11	1.27	0.47	1
Patient's Total Visit Time	n=11	67.45	12.40	64

Table 4: Technical feasibility outcomes as measured by length of time.

Statement	Mean (n=11)	Std. Deviation
This experience was beneficial	4.64	0.50
I would participate in this experience again	4.55	0.52
I would recommend this experience	4.55	0.52
This experience helped me to reflect on my past, present, or future hopes	4.45	0.69
I was able to easily engage in my Avatar	4.64	0.50

Table 5: Post-session agreement/ disagreement statement ratings (1= Strongly Disagree, 5= Strongly Agree).

2.4. Qualitative data

The completed digital stories in avatar video were the qualitative data source. A secondary retrospective qualitative data analysis was conducted based on the digital stories as artifacts of the VoicingHan project which offer a narrative lens of human experience with a life threatening illness. A qualitatively trained researcher, Dr. Sarah Kye Price worked with Semi Ryu for gathering data.

Dr. Price had no contact with or information regarding the original project participants. Dr. Price had access to the completed digital Avatar interviews which contained detailed life stories presented in Avatar system, along with spontaneous participant reflections on the project which occurred during the course of the filming but none of which were personally identifiable. Participants selected Avatars of their own choosing (not necessarily demographically representative), and retold their stories from different age points of their lives, with the freedom to play with details and descriptions of events. Thus, there was no way that the videos could be identified back to the participants through this additional component of the research.

Instrumental Satisfaction	Psychological Satisfaction	Life Review: autonomy over meaning-making	Erikson: industry vs. inferiority (school age)	Erikson: identity vs. role confusion (adolescent)	Erikson: Intimacy vs Isolation (young adult)	Erikson: Generativity vs. Stagnation (middle adult)	Erikson: Integrity vs Despair (later adult/EOL)	Narrative Inquiry: evidence of retrospective meaning making	Foucault: Reauthoring:Dominant vs. Subjugated Discourse	Spirituality	Transfor-mation
Everett (1300-14:30) has trouble picking a background, "you do it" but then feels free to reject what is selected	Everett (5:55-6:00) notes that she got lost in her reminiscing and "told a little story right there" laughs	Everett (9:18-10:37) Talks about not wearing her glasses when she was little; she	Everett (13:15-13:48) discusses not having a childhood; "I'm alright with it now but I was mad about it"	Everett (3:56-5:55) talks about fending for herself that if her Grandmother had not died, "I didn't know life	Everett (6:35-7:0 0) With prompt of "wine" Talks about going out, loosening up, meeting	Everett (20:30-21:45) describes that she lied about her age to start working; she had to start this	Everett (16:30-19:00) Recalls a cruise at the prompt of 'boat' and goes from "it was fun" to "someon	Everett (10:30-12:30) talks about dancing with joy, remembers an embarrassing moment and now makes it	Everett (15:40-16:30) discusses the reaction she has to "fish" and deconstructs the romantic notion of	Everett (27:00-27:30) Talks about being in church, praising God, overcoming her fears related to	[listener impression: Everett, "I'm not like that anymore" in moving into the final question. Liberation over

when it doesn't resonate with her story (beach to forest) then begins to talk about the beach and it comes back [Everett needs to be refocused to looking at the Avatar several times] Owens (2:45-2:50; 3:36-3:50) notes she is "trying to straighten herself out" as she gets used to the Avatar; doesn't know if its her or the picture,	spontaneously Owens (28:40 - 28:53) Gets excited and begins waving her arms, enjoying seeing herself and thinking about upcoming travel that excites her and makes her laugh, "Hawaii" Owens 35:11 - 35:25 says how much she liked this, how much her daughter and grandchildren would enjoy it, "it was fun; it was something different"	can't see now. Reminisce about her Grandmother chiding her and choosing to not wear them (blames vision now on choices of past) Everett (28:32-29:10) "When it's time for me to go, let me just be having fun" Owens (5:10) retells a childhood story, "It was funny but not so funny." Owens,	Owens (4:48-5:10) discusses an event when she was 5, waiting on the bus and her Aunt almost got left behind.) Owens (9:52-10:45) tells a story about talking in school, being sent to the hall, and having her mouth taped but recalls it in a funny manner. Owens (13:00 - 13:12) described having a good childhood because	I know now, but today it's all done" Everett (14:00- Describes herself as a "bad teenager" and starting at 19:58 exands on this and says "I did everything from A to Z" Everett (19:18-20:28) recalls being a teenager and moving to Modesto, states that she was sent away so "she wouldn't end up dead" but this led to her meeting her spouse	men Everett (20:28) describes meeting her husband, having a child Everett (22:00-22:48) describes one teenage friend until she messed with her boyfriend during a time when she had to travel to be with her Mom Everett (24:21-24:07) describes her best times with her husband, notes she would like to get back together but he is remarried	generativity time before she was ready. She had a HS diploma. "I kept my job, it's one thing I did do" Everett speaks about travel (26:23- "I would get up and just leave...I didn't have no means in life, but I would go, I was trying to find me" Owens (18:20-19	e died on there" so they could not complete the tour. Moves to a thought of how to get motion sickness patches, prepare for a future trip" Everett 23:39 - 24:00) asserts integrity over aspects of her earlier life she isn't proud of. Everett (27:20-28:00) Talks about not giving in to despair about death; looking for relationship, travel,	into a funny memory. Everett (14:30-15:53) discusses the beach has no meaning for her since she lived in San Diego all her life. Everett (23:29-24:00 In struggling to remember first kiss/first date makes note that she was on the street, "today I'm not like that but I had no guidance; I did what I had to do"	"beach" with a story of her catching a fish and upsetting her husband; she reauthors why the beach is just a place with bugs. Everett (23:29-24:00) recasts the romanticized idea of "first date" and "first kiss" with a blunt acknowledgement of living on the street, "whoring" and doing what she had to do. Reauthors her life as asserting	sickness and death) Everett (29:00-30:00) talks about God being the most important thing in her life (then health, then kids, then herself) as her final words. Owens (23:45-24:00) Talks about reading her Bible (was prompted about religion) Kathleen (9:10-9:30) Talks about growing up in the Catholic church, learning about God and	her life narrative as liberation over her illness] Owens 24:30 says she gives a lot of advice to others now Owens 29:55-30:00 talks about wanting to be free, to rise above Trish 31:00 evidences tranformation in her approach to money and it's importance, even as she visualizes her future. Susan (36:10-36;15)

"makes me look worse". Owens (6:00-6:20) is asked to stand up, "What do you want me to dance?" Owens 13:55, "I want to stay with this Avatar; she's like I am now." Owens 14:39, "I can only stand for a certain time." Owens 31:33-31:50 has fun moving her Avatar arms in strange directions, "oh, look at this!" Owens	and she concludes, "I'm a people person, and I love people" but this was nice, different, "I enjoyed this and I enjoyed you all" Kathleen (9:30-11:00) talks about being nervous and tense, but becomes engaged and relaxed when asked to "do sports" and then comments on whether or not she can take this seriously. Trish (00-1:20) describes the beach background as	25:20-26:20) Talks about being funny, having a loving family, being "the funniest Grandma" and gives them words of wisdom to stay strong, follow God, listen, don't be disrespectful, stay in your place, don't talk when grown people are talking Tyler (2:58-3:29) recalls that he fought in school, was sent	she behaved and did what her parents said" Tyler(:31-:48) recalls enjoying fishing even when he was young and now when he has anxiety attacks. Tyler (2:20-2:58) Remembers playing football and boxing, since he used to fight a lot in school Tyler (15:30-15:50) talks about learning to drive. Kathleen (4:25-4:52) talks	Owens (5:50-5:54) "I loved her and she loved me" as her understanding of how her great grandmother was her primary caregiver ("my mom came to get me and she said, I'll keep her…") Owens (5:10-5:30) describes how her mother would come to visit, but would give she and her sister the same gifts, just different birthdays, 'that's how she	. "We really had a good time in spite of when we fought" Owens 11:13 - 11:30 talks about having a boyfriend at 16 whom she did not marry ("I loved my momma too much") but stayed together with through his military service, 11:50-12:10 "We stayed together a long time, I'm a one woman person" and is her husband now.	:00) lied about her age to start working early; worked first at ice cream store 22:00 - 23:19 Talks about her job at MCV, many years, making jobs for her, and makes meaning from her work Tyler (9:35-10:20) Began working out of need, after dropping out of school;" did what I needed to do" (9:48) hated it, worked at Dairy Queen	meaning in life) Everett (28:00-Talks about her oldest son's imprisonment, her youngest son doing good, but knowing she could go with him if she wasn't able to care for herself." Owens (9:00 - 9:20) talks about her dog, caring for her dog and having companionship. Owens (17:40-17:55) answers question about her children and says she had	Everett (26:40-27:00) In discussing trying to find "me" says, "I didn't find it until I was old!" and laughs, "once I got old and settled I finally let everything go" Owens 5:20 - 5:54 remakes meaning of being cared for by elder family member as love vs. need Owens 20:20-21:02, "I say God took one brought back two, that's what I	agency when needed, no matter the social contract. Owens (10:40-11:01) reauthors being shamed in school as a story she can now laugh at where she overrides the teacher her personality wins out, "I'm still talking; I'm a people person" Owens (20:20 - 20:45) reauthors her grand-daughters as gifts coming from her son's sudden	liking it. Trish(8:25-8:35) describes not knowing her grandparents, "they're in heaven." 10:35-10:43 describes that she and her brother take the bus to church every Sunday, "others go when then want."	wants her younger Avatar to be braver.

33:44-34:21 has fun moving her arms and legs, noting how the Avatar moves with her. Kathleen (10:30 - 10:450) disengages and wonders if she can take this seriously; she is encouraged to play and re-engages. Kathleen (15:00) needs to be reassured; is nervous and wasn't sure it was working. Kathleen (17:00 - 18:00) there is	"very relaxing" Susan (17:00) breaks her concentration on her story, "I found it very distressful and distracting, when she walked in" (indicating someone had entered the room where the filming was talking place). She was reassured, but her vocal tone remained upset and her verbalizations more brief for several minutes. Later at 18:40-18:57, she resumes talking about its	away to camp and then learned it was a "home for bad kids" and later got connected with a coach for boxing which he said reworked his life. In this he tells about being in the olympic trials. Tyler (6:43-8:17) talks about his real father, being born on his birthday but he didn't take to him. "He hurt me, real bad" and I	about being a tomboy and shifts from discussion of play to learning to take care of her younger siblings Kathleen (5:45-6:35) recalls the conundrum of being unable to make lasting friendships due to family move and her value to family caregiving while her parents "worked all the time" or "had their own playtime" out on weekends while she	did it'; notes she and her sister did not live together. 3:55-4:00 Tyler recalls his father had a lot of kids; 4:41-4:43 Notes that he was raised with certain siblings with whom he is the closest, a sister had his heart Tyler 5:45 - 5:56 talks about his mother and the holidays. Tyler 6:06-6:34 Step father taught him how to be a young	Owens 32:50-33:50 Describes a ring that her husband gave to her that said "Love"; tells a story where she shows her ring to someone who asked and he took it and she never got it back. Tyler at 5:00 when asked, "what was the best part of your childhood" says, "Having sex" and clarifies that he was 7 years	but did it so my son would have pampers and milk on the table. Tyler talks about his kids, 12:57-13:07, all doing well in terms of their college and jobs. Tyler 15:50-16:23 talks about working as a truck driver; notes that he saw the world. Talks about a story about people mooning him in a car, describes it as a funny	a son and has a daughter and grandchildren, "but no longer is my son her, and that's another story and we're gonna leave that alone." Owens (19:40-21:16) continues to mention her son's death as the worst challenge of the family, "he was a well loved boy". At 19:45 mutters, "stun guns" and then finally tells a story of being on the basketbal	say, my granddaughters"; and "he wasn't by himself, not totally" as sense making of tragic loss Kathleen (4:25-6:30) recalls her family of origin's lack of availability and recasts that through the lens of being an older sibling caregiver. Kathleen (25:55-26:15) Makes meaning of "a good life" as family and relationship Susan (26:00 -	death Trish (24:00 - 24:15) revisits the subject of money, "It used to seem like it was the most important thing but not so much anymore") Trish (26:00-27:07) reflects that the people she now admires the most are those caring for her in her illness Trish (30:20-30:40) makes up a story about doing things on her own, even if		

backchannel communication around her movement (i.e. playing sports) 21:00 having instrumental conversations about movement vs. nervousness Trish (2:00) laughs when she mistakes her ages of past for current Trish (12:52-12:57) Laughs when family member (husband) tries to address questions to "her"	disruptiveness, "Who was that anyhow...I was in my place and that just blew it all out...if anyone walked in, it would be the same. OK, I'm not ready but lets go." [Note that she remains very descriptive, less conversive again for several minutes] Susan 29:20- When asked if she's ready to go on to the next part says, "I'm tired! This is fatiguing! Has anyone said that before?	look like him and have his ways but he would never want to be with me. My Mom stepped up for us to eat, sleep well and have what other kids have.' She met a nice guy (his step Dad) who raised him, "My real father did nothing for me." Tyler (17:20-17:34) describes his Mom as his hero. Kathleen: recasts	remained home Kathleen (2:30-3:20) Describes her family, "it's nice" with parents and 8 siblings ("they're all mean to me") then says, "no, we all get along. It's all good.". She later asserts this is true. Trish (4:05-5:08) Describes early school as liking lunch and recess, having a good friend, and liking her bike and hula hoop,	man, how to make money instead of selling drugs; kept me active with sports. Tyler (11:00 - 11:15) talks about friends who would box with him. Katheen (1:03-2:55) describes her blended family structure as an oldest child, trying to reconcile past events (death of sibling) with present experiences over which there	old. Tyler (9:30-9:48) Talks about dropping out of school and getting a job because he was a young father, "I didn't want to do what my father did to me." Tyler 11:50, "I had 15 kids, so you know what my dates were like." Tyler 12:08-12:37 Talks about his first kiss, "it was amazing" and it leads to something else, "I	moment. Kathleen (19:30-20:00) Describes her husband, learning to drive truck from him, being highly generative in both running stores and in meeting people and talking (important to her). Kathleen (20:10-21:17) Describes her children and grandchildren as highlights of her adulthood and notes her daughter as her best friend @ 20:47 while her	I court with others,being killed, dying in his friends arms (not alone) . Owens (21:10-21:20) talks about not being able to ID her son after his death; it was too much for her. Renarrates for integrity. Tyler @ 13:41, "I don't want to do nothing but death" Kathleen (23:00-23:20) Discusses finding meaning and having fun with her grandchil	27:39) Describes family structures, from both her & her spouses's families of origin; notes dysfunction and chaos in his family but describes him as a good father, although they are divorced now. Susan (31:45-32:20) Encourages younger self to "set goals" because she wasn't secure in herself when she was younger; "I think it's from not having	others are not available, "I can do it on my own" Waters (13:00 - 13:52) Speaks to his college avatar self and says, "Here's what you should have known: the only thing that's important in life is to figure out who you are, and make good choices about that. Your grades are your grades, your learning in your learning. That only happens once and		

as adolescent avatar but it doesn't actually happen.	We've gotta get this done…"	herself as a caregiver to siblings (vs. someone who had disrupted friendships vs. moving	which she begins to do with her Avatar.	is/isn't control. Family takes the place of friends. (14:07-14:57	was like nine years old"	sons "have gone on their way" (20:50) and notes they don't know what to say to her now that she's sick."	dren in the present.	strong parenting"	if you miss that boat, you miss that boat. It's sort of an arduous way to figure out who you are, by doing everything you don't like."		
Susan (00 - 1:15) works with the theme of the mountains, no snow, trying to adjust to age	Julienne (3:45-3:51) describes it as "weird" to talk to one's past self as if young, but she redirects quickly back to Avatar character. She is laughing.	Trish (32:00) avoids talking about regrets [again note that family appears to be present])	Trish (6:48-7:30) Describes liking to be outside, being a tomboy, not being able to go many places with family because they are so many of them. Trish (7:50-8:00) "My mom doesn't do anything, she just stays home with us and cooks"	Recalls becoming closer to her Dad once she remarried, even though he was still busy, talking about every life and how to prepare for jobs/careers).	Kathleen (12:00-13:20) talks about "starting to like boys" but her father didn't believe in dating, "very old school" so didn't have a boyfriend, "and you didn't want to make {Dad} mad	Kathellen (22:05-22:40) notes that her daughter has taken good care of her, "stepped up" since she's been sick in a way her sons did not; praises her grand-children.	Kathellen (23:44-24:30 Imagines herself older, still living with her daughter, looking forward to her grand-children graduating from high school.	Susan (33:35-24:40) "There is some stability coming to the age where you don't have to struggle with the decisions; it just is what it is. The things that happen when you're young are very stressful; I don't care what anybody says"	Waters (28:00-) talking about the virtual reality emerging and says, "There are tremendous things yet to come, if we don't blow ourselves up or if the glaciers don't melt or any of that. It's just amazing how bad things have		
Susan (7:04) talked about enjoying swimming, encouraged to do so for movement and to adapt the avatar.	Julianne (17:20 - 17:48) is recounting her adolescence to young adult decisions around career/relationship/dreams/responsibilities and says, "I can't keep talking to my younger self here;	Julianne (23:46-25:40) gives advice to her children based on her own life lessons, "We've had to confront this in lieu of my	Susan (3:18-4:00) Notes that home is my	Trish (10:55-11:00 says, "I wish I were an only child" and then pauses and says, "well, not really."	Trish (15:48-16:52) Jokes and talks about boyfriend(s), hanging out and riding a four wheeler, "it's ok"	Trish (18:40-19:00) describes wanting to be a	Kathleen (25:15-25:48) Says that family and making jewelry together are the most important things, and that the thing she is most proud of is her daughter.	Julianne (14:50-16:00) as "16" talks about what one of her friends who went on to be			
Susan (18:04) needs to pause to blow her nose, apologizes for interrupti				Trish (14:15-15:35) Describe	Trish @18:10		Kathleen (26:10-26				

ng Susan (22:06) doesn't think any of the backgrounds are fitting, "we can just stay here" Julianne (1:47-2:27) has some technical challenges to hearing (buzzing) Julianne (8:20 - Begins having technical avatar challenges again, while that is happening she says to her projected self, "well, maybe its time to fast forward,	I can only talk about this in the present... maybe the Avatar helps that" [voice becomes emotional] (staff uses this as a cue to move on) Julianne (23:20-23:35) cannot imagine herself older; the staff apologizes. She says, "that's ok, that's ok...that's what this is for" and at 26:02 says, "this was good, it was really therapeutic. It's good to hear yourself speak these things out	diagnosis. I tell my children, come up with a plan and stick with it, focus on the end goal...they are a reflection of me and sometimes I went for the fun things, not the future things. My son told me, "we're here for a good time, not a long time" and I want to tell them, "yeah, but think about the long time and do the things that will help you have a	"stable", Mom doesn't work, has 3 siblings (2 older, 1 baby). Emphasizes "normal" family; describes selected memories Julianne (1:00-1:47 Begins at the beach, easily adapts to age 7, connects with sibling rivalry and ethnic background) Julianne (2:40-3.15) goes into present tense, talking about school and being the class	s her adolescent friends, roller skating, spending long times with friends as being fun, having a whole day without parents, "they knew where we were but it was ok" Susan (8:22-9:39) Describes life in a very large high school, including not seeing "cliques" at the time because she was in one Julianne (7:47-8:10	acknowledges there were difficulties and embarassments that she doesn't want to talk about. Susan (10:00-11:15) Talks about her boyfriend; remembering attraction but not a lot of details. "We did football games and high school kid kind of things" Susan (13:23-15:00) "I don't get along with my other at all, but I get along with my Dad"	teacher and help people, but thinking she won't make enough money. Describes an alternative of "marrying someone rich" to do what she wants to do. Trish (21:10), "I'm an adult, I guess I'll be in the living room." Trish (21:44; resumes 22:35) describes that she has her own store, is independent Trish (22:55) Describes her	:30) regrets relationship failures (re-marriage) and feels she should have just moved in with her daughter. Trish 27:30-29:22 Picks the background setting of Europe, "I finally got here" and imagines she is travelling by herself, enjoying food, finding "new and exciting things" Susan 29:55-30:50 Goes quickly through the things that she's	very successful in the dance circuit they were once in together but which Julianne did not pursue (hints, what persuaded not to pursue); she says, "I'm so proud of her...I loved dance, too, but I chose a different path of school, Mom, kids...but I chose my path and she chose hers and I am a champion for everyone to do that." [her expression is deep pride and support;	gotten; it's just sad"		

Avatar…" Julianne (18:00-18:20) laughs because her adult Avatar has hips, "but still no butt!" Phillips (15:00), "The longer that I did this, the better I got" Waters (27:25-27:30), "This has been interesting...the fingers are kind of creepy"	loud" Phillips (:45) "She's happy with just HAIR" (noting she did not care about hair color, but vicariously related to her avatar).	good time over the longest time." (her diagnosis as opportunity to recreate meaning) Waters (28:50-29:58 What would your younger avatar say to your older avatar, "Well, duh, do what you actually wanted to do. Don't go the easy way [accounting]. Be more adventurous and more truly who you are. You	clown, uses movie reference of "Bronx Tales" as being the brown girl in the midst of Italian mafia. Julianne (4:18-4:22) refers to herself and her friends as "the tomboys" Julianne (4:40 - 4:50) talks about knowing she was different/looked different even when she was very young. Julianne (5:40 - 6:03) talks about her pet, note that when her dog died	Describes growing up in a single parent family after her parents separated, "it was just my Mom... and she worked a lot so we took responsiblity." Julianne (10:20-10:39 Names herself as 16 and describes all the things she is going; she notes that she is now in a more multcultural high school setting which in which she feels she belongs, "So now,	goes on to describe (14:35) that she doesn't take responsiblity for herself; she plays favorites; she doesn't like her relationship with her father. Susan (20:50 Describes her relationship and family very descriptively. Julianne (16:10-17:20) discusses her shift to a "different lane" from the arts/dance when she met her husband and	husband being caring for her, "I love him to death." resumes at 24:30, talking about her husband as truly her best friend.* [note that it appears he may be present in the creation of the Avatar] Susan (11:30-12:15) Describes wanting to be a Supreme Court Judge as a teen, esp. With family (Aunt) in DC; recalls feeling like she wants to go away to college but	still doing, hobbies, visiting places, "no desire to go to any beach because its so polluted now" Julianne (19:40-20:29) Talks about her children, pride in her son (away at school). "When I say I don't miss dance its because I poured myself into my kids. They are still gonna be here, even when I'm not. They're a reflection of me, it's super fulfilling	not remorse]			

		grow up with financial worries; it puts a fear in you. But if you do things based only on fear, the results won't be good. You can't be who you're not, so don't try!"	("she died from breast cancer") she was devastated because that was her best friend, and she missed school for an entire week. Waters: did not want to be a kid. Started at 7th grade	I fit in, even by the way I look" Julianne (10:51-12:08) narratives a story about sneaking out to a basketball game when she was forbidden to do so, having her Mom come after her "like a crazy person" but in the end laughing and going with her Mom out of love, "We've always had our times but we're close like that...we're still super close" (clearly happy/la	decided to pursue marriage and family. Phillips (7:30) when asked who she admires says, "Myself, of course, because I'm 15!" Waters (5:56), "Wow, this guy has hair!" when reappears at 19, young adult. Waters (7:00-8:00), "I was kind of a loner in college. I didn't particularly like my major (accounting) but you have to pick something, it was	parents cannot afford it. Susan (19:50-20:25 Talks about actually becoming a nurse, finishing college when she was older and starting to work. Susan (28:20-Pauses to think about herself in her mid-30's; describes her middle adult self as "getting restless" and unsure what she is going to do, finished college and young family.	for me; I did a good job." Julianne (21:30-23:30) When asked to project herself as retired and at an older age begins to be teary and says, "I don't see this yet; I don't see this because I don't know if I'm gonna make it to this, to be honest. When you get into abstract things like this you have to take a different perspective, and I can't think like that. I			

				ughing in recall, moving from past to present) Julianne (20:40 - 20:48) as "adult" Avatar reflects back and says, "I can see myself now, and it's like I'm turning into my Mom but that makes me so happy, because I love her so much" Waters: "My friends were more adventurous than I was" and (4:18) "I wasn't that good of a brother, I regret	easy and I knew I'd get a job. I regret that to this day. I should have taken the higher road but I took the lower road. I had depression back then but there weren't really good treatments back then." Waters (12:05-13:00) "I had people that I went to dinner with and stuff, but I didn't get close, I don't have friends that I kept after college. It was a bad fit for	Again, she wants to go back to school but she is a single Mom and money is a challenge. Julianne (17:00 - 17:20) talks about her adult shift from (early adult) potential success in arts/dance to a more settled adult move to "pick a path and a paycheck" with a mix of both certainty that this was her path, but acknowledging what could be.	have to be in the present, which is crazy because once I got this diagnosis, I was never able to think this far, ever. Is this a premonition for my life? Maybe...I haven't been able to put my mind there. Phillips (13:00) [what does it feel like to be old] "It's good to see I have hair!" Waters (25:07-25:50) "Well, this is like me know. I'm sick. It isn't					

				that" Waters (4:36-4:45) "My Dad was off doing his own thing; my Mom took care of us" Waters (19:20 - 19:40) "Growing up, my Dad was financially reckless so I didn't have much to draw on there"	me, and I was the wrong person for there, but I didn't change." Waters (14:45-15:51) describes his high school friends and how they had relationships and went on to their next steps but that "something happened" between high school and college for him where he disengaged and "I just kind of blew it. I had a girlfriend and then we broke up that summer,	[she notes she cannot talk about this as her past self; she has to do it through present] Waters (9:30-10:00) "I got a job right out of college; that part was great. But the job was mind-numbing, yeah. I had lots of hobbies, anything to get my mind off what I hated doing, which was work" Describes even got another advanced degree,	great. I'm in remission, but like anyone you never know how long. It's one day at a time, difficult to really plan too much because you don't know. That's really kind of my life right now." Waters (26:20-27:20) "Like Mark Twain says, it's never too late to be who you might have been" then followed by, "but given that I"m sick, I'm not sure				

					and she was at [college] which probably didn't help and she's chosen to go there over Harvard, I don't understand that." Waters (20:10-20:40) I get along with my girlfriend, life partner, whatever you want to call her. It's a good relationship.	even worse but paid better. Waters (16:51-18:55) Describes how he finally got help for mental health challenges, "Should have got that sooner" but describes the whole process, and how that defined his adulthood, "All these medications and poking and prodding at your psyche in different way...I was glad to have the help, but having	there is a might have been. I just focus on every day and try not to fall into an abyss or emotional quagmire."			

						that when I was starting college would have been really helpful, but they didn't even have the right kind of medications back then. But it's been an ever expanding process to manage depression, through my whole adulthood. It's like have a mirror put up in front of your soul" Waters (23:40-23:50) "With cancer, i can't really					

						work. But fortunately financially that's not a issue for us right now."					

Observation: Phillips--very superficial and distracted video; multiple ages of family members present. Phillips gives advice through her Avatar directly to the people in the room. Interview remains very superficial.

In general: Participants avoidant of topics that would implicate anyone in the room, or conversation shifts to talk TO them while talking about them; the entry of anyone else into the room disrupts the process (note the level of immersion this implies!)

Table 6: Developmental Life Review Stages, Themes, and Examples.

Developmental Stage	Developmental Conflict	Themes	Examples:
Childhood	Industry vs Inferiority	Childhood Lost and Rediscovered New Meaning to Old Actions	Ellison, describing a childhood lost, "I'm right with it now, but I was mad about it then." Tyson, "Eventually I took up boxing. I used to fight a lot at school, and that channeled it in a good way."
Adolescence	Identity vs Role Confusion	Seeing the emergent self	Sophia, "Friends are important to me. And in high school, that meant cliques where you were in, or you were out. I didn't see that then, though, because I was in one."

		Carving identity from adversity	Jordyn, describing her sense of responsibility: "After my parents separated it was just my Mom and she worked a lot, so we learned to take responsibility."
Young Adulthood	Intimacy vs Isolation	Following the heart	Jordyn, "I shifted into a different lane once I met my husband; it wasn't just about me anymore."
		Finding oneself after heartbreak	William, "I kind of blew it. I had a girlfriend and we broke up. Now I know it was depression but I struggled a long time after that until I finally figured out who I was and what was happening to me."
Older Adulthood	Integrity vs Despair	Affirming life choices and circumstances	Kaitlyn, reviewing the challenges of her life, "I see meaning now in love and family."
		Struggling to see the future	Jordyn (tearful): "I just can't see myself old, I just don't think it's possible." She later says, "its ok, though. It was very therapeutic to say that out loud."

2.5. Field notes (sample)

(3/19/2019)

<u>Avatar testing at Inpatient unit</u>

It was around 5:30 pm.
The patient's name was Katie- a white tall lady around 40s.
Walking was possible. So we did full body setup without using straps from the waist area.

When we attached the sensors on her body, we were confused between the left and right side, in the dark environment. We had to turn on the light to make sure each side had the right sensors!

The patient was very medicated and in a dream state.
She did radiation therapy just before. She was in almost a drillium state.

We did several calibrations due to the wrong sensor setup.
First avatar walked sideways.
The patient went through several calibration processes to fix the problem.

The avatar game system worked fine with lip sync and keyboards. First we thought it was not working. We didn't click the game screen, which was why the keyboard didn't work. We need to use an extended display of the window, in order to make an easy reset for the avatar.

The patient said she wanted to hear her own voice otherwise it was hard to speak.
It is true. How to make her hear own voice?
We can have another mic then use speakers? We can try.

The Patient seemed enjoy being in the environment. We need to start from neutral space to hear voices better.

She enjoyed being a child but talked as past tense as memory. Actually it was a longer talk.

In Previous case, short speech came with present tense.
Really becoming and embodying the avatar character but it ended up with short speech…..for memory, is it better to be past tense?

Is it better to use the upper body only?
Full body setup is complicated and the complication possibilities increase. But interesting.

When the body connection is messed up, try to move all body parts then It fixes the body. Interesting.

I thought the patient didn't move much but actually not.
In avatar video, we saw many motions

(3/6/2019)
<u>My self experiment:</u>
<u>Difference between avatar story and voice story:</u>

I used avatars a lot for more than hours, then did voice only story. I got tired quickly.
When I used the avatar, I didn't know I was tired.
It was fun, engaging, not lonely.
I was almost sync w body. I didn't care much about lipsync.
Lipsync was a little delayed but it sounded ok in the middle of process.
I was perfectly connected with avatar.

I used the past tense. It was a lot easier.
But being a teenager, I talk about the past.

Present tense was challenging.
I talked a lot; more than expected.

Voice story was the same kind of remembering process. But I got bored quickly, maybe because there was no one to listen. It is important to have someone listen and respond.

In the avatar life-review, I didn't feel bored.

Mirroring myself, maybe I was talking to myself.

I felt like someone was there to listen, even if nobody was there.

Body motion excited the story also sound and environment promoted the stories

2.6. Forms

1 Edmonton Symptom Assessment System

**VCU Massey Cancer Center
Supportive Care Clinic**

Edmonton Symptom Assessment System
(ESAS)

Date:_____ Time: _____

Please circle the number that best describes your average symptom over the past 24 hours:

No Pain	0 1 2 3 4 5 6 7 8 9 10	Worst Pain
No Fatigue	0 1 2 3 4 5 6 7 8 9 10	Worst Fatigue
No Nausea	0 1 2 3 4 5 6 7 8 9 10	Worst Nausea
No Depressed	0 1 2 3 4 5 6 7 8 9 10	Worst Depression
Not Anxiety	0 1 2 3 4 5 6 7 8 9 10	Worst Anxiety
No Drowsiness	0 1 2 3 4 5 6 7 8 9 10	Worst Drowsiness
No Shortness of Breath	0 1 2 3 4 5 6 7 8 9 10	Worst Shortness of Breath
Best Appetite	0 1 2 3 4 5 6 7 8 9 10	Worst Possible
Best Feeling or Well Being	0 1 2 3 4 5 6 7 8 9 10	Worst Feeling of Well Being
Best Sleep	0 1 2 3 4 5 6 7 8 9 10	Worst Sleep

Completed by: ☐ Patient ☐ Family

Assessed by (Signature/Credentials/ID#/ Date/ Time)_____
Print / Stamp Name: _____

2 EORTC QLQ C15- PAL

EORTC QLQ-C15-PAL (version 1)

We are interested in some things about you and your health. Please answer all of the questions yourself by circling the number that best applies to you. There are no "right" or "wrong" answers. The information that you provide will remain strictly confidential.

Please fill in your initials: ☐☐☐☐
Your birthdate (Day, Month, Year): ☐☐☐☐☐☐☐☐
Today's date (Day, Month, Year): ☐☐☐☐☐☐☐

	Not at All	A Little	Quite a Bit	Very Much
1. Do you have any trouble taking a short walk outside of the house?	1	2	3	4
2. Do you need to stay in bed or a chair during the day?	1	2	3	4
3. Do you need help with eating, dressing, washing yourself or using the toilet?	1	2	3	4

During the past week:	Not at All	A Little	Quite a Bit	Very Much
4. Were you short of breath?	1	2	3	4
5. Have you had pain?	1	2	3	4
6. Have you had trouble sleeping?	1	2	3	4
7. Have you felt weak?	1	2	3	4
8. Have you lacked appetite?	1	2	3	4
9. Have you felt nauseated?	1	2	3	4

During the past week:	Not at All	A Little	Quite a Bit	Very Much
10. Have you been constipated?	1	2	3	4
11. Were you tired?	1	2	3	4
12. Did pain interfere with your daily activities?	1	2	3	4
13. Did you feel tense?	1	2	3	4
14. Did you feel depressed?	1	2	3	4

For the following questions please circle the number between 1 and 7 that best applies to you

15. How would you rate your overall quality of life during the past week?

1	2	3	4	5	6	7
Very poor						Excellent

3 Functional Assessment of Chronic Illness Therapy- Spiritual Well-Being Scale (FACIT-Sp)

FACIT-Sp (Version 4)

Below is a list of statements that other people with your illness have said are important. **Please circle or mark one number per line to indicate your response as it applies to the past 7 days.**

	PHYSICAL WELL-BEING	Not at all	A little bit	Some- what	Quite a bit	Very much
GP1	I have a lack of energy	0	1	2	3	4
GP2	I have nausea	0	1	2	3	4
GP3	Because of my physical condition, I have trouble meeting the needs of my family	0	1	2	3	4
GP4	I have pain	0	1	2	3	4
GP5	I am bothered by side effects of treatment	0	1	2	3	4
GP6	I feel ill	0	1	2	3	4
GP7	I am forced to spend time in bed	0	1	2	3	4

	SOCIAL/FAMILY WELL-BEING	Not at all	A little bit	Some- what	Quite a bit	Very much
GS1	I feel close to my friends	0	1	2	3	4
GS2	I get emotional support from my family	0	1	2	3	4
GS3	I get support from my friends	0	1	2	3	4
GS4	My family has accepted my illness	0	1	2	3	4
GS5	I am satisfied with family communication about my illness	0	1	2	3	4
GS6	I feel close to my partner (or the person who is my main support)	0	1	2	3	4
Q1	*Regardless of your current level of sexual activity, please answer the following question. If you prefer not to answer it, please mark this box* ☐ *and go to the next section.*					
GS7	I am satisfied with my sex life	0	1	2	3	4

FACIT-Sp (Version 4)

Please circle or mark one number per line to indicate your response as it applies to the past 7 days.

	EMOTIONAL WELL-BEING	Not at all	A little bit	Some-what	Quite a bit	Very much
GE1	I feel sad	0	1	2	3	4
GE2	I am satisfied with how I am coping with my illness	0	1	2	3	4
GE3	I am losing hope in the fight against my illness	0	1	2	3	4
GE4	I feel nervous	0	1	2	3	4
GE5	I worry about dying	0	1	2	3	4
GE6	I worry that my condition will get worse	0	1	2	3	4

	FUNCTIONAL WELL-BEING	Not at all	A little bit	Some-what	Quite a bit	Very much
GF1	I am able to work (include work at home)	0	1	2	3	4
GF2	My work (include work at home) is fulfilling	0	1	2	3	4
GF3	I am able to enjoy life	0	1	2	3	4
GF4	I have accepted my illness	0	1	2	3	4
GF5	I am sleeping well	0	1	2	3	4
GF6	I am enjoying the things I usually do for fun	0	1	2	3	4
GF7	I am content with the quality of my life right now	0	1	2	3	4

Date:_____ Time: _____

Please circle the number that best describes your average symptom over the past 24 hours:

No Pain   0 1 2 3 4 5 6 7 8 9 10   Worst Pain

No Fatigue   0 1 2 3 4 5 6 7 8 9 10   Worst Fatigue

No Nausea   0 1 2 3 4 5 6 7 8 9 10   Worst Nausea

No Depressed   0 1 2 3 4 5 6 7 8 9 10   Worst Depression

Not Anxiety   0 1 2 3 4 5 6 7 8 9 10   Worst Anxiety

No Drowsiness   0 1 2 3 4 5 6 7 8 9 10   Worst Drowsiness

No Shortness of Breath   0 1 2 3 4 5 6 7 8 9 10   Worst Shortness of Breath

Best Appetite   0 1 2 3 4 5 6 7 8 9 10   Worst Possible

Best Feeling or Well Being   0 1 2 3 4 5 6 7 8 9 10   Worst Feeling of Well Being

Best Sleep   0 1 2 3 4 5 6 7 8 9 10   Worst Sleep

Completed by: ☐ Patient ☐ Family

Assessed by (Signature/Credentials/ID#/ Date/ Time) _____

Print / Stamp Name: _____

3. Publications

SEMI RYU

Kinetic Imaging, School of the Arts, Virginia Commonwealth University

Information and Knowledge Society, Universitat Oberta de Catalunya (UOC), Barcelona

Avatar life-review: Virtual bodies in a dramatic paradox

ABSTRACT

This article will examine ongoing avatar life-review projects, in the light of drama therapy concepts and methods, exploring a hybrid model of avatar/drama therapy in a virtually mediated environment. The avatar life-review platform will incorporate techniques/methods of drama therapy and psychodrama such as role playing, role-reversal, doubling and mirroring as a hybrid therapeutic model between VR and theatre. It will address multiple states of self in dramatic paradox, especially for people with traumatic memories, disabilities, memory loss or mental health complications.

KEYWORDS

Avatar
mixed reality
drama therapy
life-review
storytelling
role
paradox

INTRODUCTION

A few years ago, I was standing on a London stage giving a virtual puppet performance, titled *Parting on Z*.[1] In it, I played the roles of two lovers, caught in an impossible love situation, bidding each other farewell. Facing the screen, I acted the part of the female lover dressed up in a Korean costume, while the male lover was an on-screen avatar with my voice. During this performance, something unexpected happened. My voice and body started shaking. I was not acting anymore, and started weeping. I felt embarrassed to cry in front of a

live audience, but could not stop. I was overwhelmed by paradoxical relationship between my virtual and actual body.

I grew up in Korean Confucian society, with its rigid rules, constraints and dictates of emotional suppression for women. In my dialogue with my avatar, I felt as if I was saying farewell to my potential self on that screen. I felt longing and conflict between multiple versions of myself located in different realities: social and spiritual, material and immaterial, actual and virtual. The performance was about 30 minutes long and my sensation of grief gradually evolved. Then, I felt a strange sense of relief, as if some barricade had melted away. This experience gave me idea that my avatar could be used to explore multiple states of self and self-actualization, mediated by virtual technology.

Humanistic psychology understood self-actualization as a process that fulfils its full potential and from this, there is a tendency to develop a healthy state of being (Rogers 1961; Maslow 1962). Advanced virtual reality (VR)/ augmented reality (AR) technology allows the process of self-actualization to be augmented and expanded with virtual bodies and virtual realities, highlighting diverse states of the self and reality, exploring 'the virtual' as the full potential of human experience. Gilles Deleuze defines the virtual as a kind of potentiality that becomes fulfilled in the actual (1988: 96–100). Slavoj Zizek explains the virtual as an emergent radical shift in perspective demonstrated in quantum physics (2004: 4). In quantum reality, there is a moment where one can acknowledge paradoxical conflicts between multiple states and where a radical shift of perception emerges. It is akin to the principle of drama therapy and finding the moment of spontaneity, creativity and potentiality within a dramatic paradox. The exploration of multiple states of self and realities is a core aspect of drama therapy (Landy 1996) that has a long history of developing diverse methods, techniques and theories that can be useful to reflect on the experience of self in multiple realities and now contemporarily mediated by virtual technology.

During the *Parting on Z* performance, I was acting out multiple roles: the son of a royal family, the daughter of a prostitute and also the virtual and real actor. The virtual layer supported interesting relationships in a mixed-reality theatrical setting. My expanded relationship with a virtual body on-screen brought a new aspect of self-actualization, playing in between the space of the actual and virtual.

Since 2014, I have explored the avatar life-review platform for older adults, called the 'VoicingElder' project. I have held ten avatar life-review sessions at the Brookdale Gayton Terrace senior living centre in Richmond, VA, USA. In the sessions, participant residents chose an avatar and told autobiographical stories. They faced their avatars on-screen, and told the stories to themselves and others, speaking through avatars that lip-synced their speech and mirrored their body movements. When they shared emotional stories, the research team provided background visuals and sounds corresponding to their feelings, for example, happiness, anger, sadness, anxiety, fear, laughter, to enhance the emotional impact of their memories. Beautiful things have happened: a lady burst into tears at the end of her father's story; a gentleman had a conversation with a female avatar who is his elementary school teacher and tried to hug her physically on-screen. After each storytelling, without exception, the storyteller was surrounded by crowds including artists, residents and staff expressing deep empathetic connections. Currently we have started a new project called 'VoicingHan' – an avatar oral-history storytelling platform designed to facilitate memory and support the creation of

personalized narratives for individuals with trauma-related memories, such as combat veterans with post-traumatic stress disorder.

This article will examine ongoing avatar life-review projects, in the light of drama therapy concepts and methods, exploring a hybrid model of avatar/drama therapy in a virtually mediated environment.

DRAMATIC PARADOX

Drama therapist and theorist Robert Landy underlines 'paradox' as the heart of dramatic experience, calling it the 'dramatic paradox'. He explained that there are diverse layers of paradox in the human condition, such as mind/body, thought/action, subject/object and actor/observer (Landy 2001: 380). The fact that the actor and the role are both separate and merged, in a coexistence of fictional and nonfictional reality, is the most significant aspect of dramatic paradox (Landy 1996: 11). Diderot (1957) first wrote about dramatic paradox and explained that it is the essential complexity and mystery of the dramatic process in everyday life, theatre performance or therapy. Acknowledging paradox is a starting point for a new harmony, balance and healing. In my understanding of Korean ritual, paradox is not considered a negative; it is rather a positive driving force for change and transformation and a challenge to stimulate creative flow (Ryu 2014). For example, Han, the most important element of the Korean mind/emotion model, is a paradoxical state of consciousness that combines an extreme state of grief but with a great hope and desire for overcoming a seemingly impossible situation. It is a springboard for attaining a state of transformation.

Dramatic paradox is a key aspect of healing through drama therapy (Landy 1996: 11) as evidenced by the results of the 'VoicingElder' project. The paradox is manifested in many dimensions with the simultaneous existence of opposites. During the session the older-adult user faced the avatar on-screen, allowing him/her to be both the actor and the observer of one's own performance, and the storyteller/listener simultaneously. The set-up was a mixed-reality setting where we could see both the avatar on the screen and the participant in the space. The avatar was projected at a size similar to the user in order to create a balance between the virtual and the actual body facing each other. The standing screen was installed diagonally and the user sat on the chair in front. The mixture of on-screen avatar and the user facing each other offers a coexistence of different realities, supporting the notion of a dramatic paradox. The participant's experience in a mixed-reality setting is critically different from that of augmented or fully immersive VR, where boundaries are completely erased. The session was held in a public theatre, where there was an uneasy tension between the private and public. However, creativity emerged from these paradoxical tensions, gradually allowing the participants to become spontaneous storytellers.

The drama therapist, Renee Emnuah explains dramatic paradox at the level of human consciousness as

> […] a dual level of consciousness, which humans are capable of at a remarkably early age, is at place; the player exists simultaneously in the imaginary realm and the objective realm.
>
> (Emunah 1993: 5)

The mature psyche of the older adults supports a dual level of consciousness between the lived body and the biological body and between the ageless body

Figure 1: Residents watching a participant's avatar performance, June 2016. Gayton Terrace Senior Living, Richmond, VA. Photo: Brianna Ondris. © Semi Ryu.

and the ageing body (Fairhurst 1998: 258–75; Faircloth 2003: 81). It is common for older adults to perceive themselves a lot younger than their actual age, demonstrating an immaterial dimension to their self-perception. Their self-perception exists in the material and immaterial realms simultaneously as they manage creative tensions and paradox. In drama therapy, the actor finds a way to transform into a state of being that holds the opposite realities together (Landy 1996: 11).

During the avatar storytelling, the border between actual life and the fictional story is also dissolved as life memory is reflected onto the imaginary realm with playful energy. Even if the participant attempts to make up a fictional story around the avatar, it is related to real-life memory unconsciously. In multiple realities, such borders between fiction and the real begin to dissolve. Fiction begins to look like biography, autobiography and history (Gergen 2000: 116).

Digital culture fundamentally deals with paradox in an effort to join a human and a machine. This paradoxical marriage in digital virtual space provides new dimensions of the self, with emergent modes of paradox, transformation and realization. It is a new dimension of dramatic paradox.

MULTIPLE SELF-STATES: ROLES

Drama therapists describe the self in terms of roles as multifaceted elements of the social world. Robert Landy considers a role as a 'basic unit of personality containing specific qualities that provide uniqueness and coherence to that unit' (1996: 230). Many social scientists use the term role as a metaphor to analyse everyday psychological, social or cultural life (Goffman 1959; Brissett and Edgley 1975). The group of social psychological theorists known as the symbolic interactionists understand role as multifaceted and essential in building personality (Landy 1996: 21). The founder of psychodrama, J. L. Moreno, understood that roles are dynamically reshaped through interaction. The personality is developed as one plays out many roles (Moreno 1946; Johnson and Emunah 2009: 395). In the digital age, we see multiple states of self and roles embedded in our language of technology, such as the

'role-playing game', 'virtual', 'real', 'augmented' and 'avatar'. Our internal process of role-playing has been externalized through a digital apparatus and emerges onto the front stage of digital culture.

The 'VoicingElder' project supported role-playing by providing eight avatars – four females and four males – with representations of four developmental states: child, teenager, young adult and older adults. The participants related their memory by selecting an avatar and speaking through it, playing different ages and genders. The process of role-playing and acting out the diverse roles provided easy access to build new perspectives about one's life, memory and self- perception.

In Landy's role method, there are two steps before playing out a role: (1) invoking the role and (2) naming it. He describes that '[t]he invocation of role, is a calling into being of that part of the person that will inspire a creative search for meaning' (Landy 1996: 47). For this process, he uses the method of movement warm-up, asking people to focus on one part of their bodies and to allow a movement to extend and a character to emerge. Also, naming is important as it concretizes the chosen role. This allows people to immerse into fictional and creative reality, 'oneself' and 'not oneself' simultaneously. He considered 'the healing potential of role' as '[…] it positions the role taker or role player within the dramatic paradox of "me" and "not me"' (Landy 1993: 47).

The avatar provides easy access, with an instant transition into the avatar role, without warming up. It is a question about whether and how this process changes aspects of connecting with the role. The selection of the avatar role is quick and easy, supported by technology, but important parts might be missed, in building a deep connection with the role. We may come up with hybrid methods to invoke roles using both traditional and digital methods.

During the 'VoicingElder' session, it was interesting to observe that the female older adult users usually chose the same gender avatar in young adulthood. A blond haired female avatar with a turquoise sweater, in her 30s, became a popular choice among female participants. However, a male user enjoyed choosing a different gender and a younger age, such as childhood. In the second life-review session, Mr W, a 90-year-old man with a husky voice, created an interesting relationship with his avatar, attempting to make conversation with it on-screen. He started his life-review using a boy avatar to tell his story from elementary school. In the middle of the storytelling, he began looking for his teacher. I changed the avatar from a boy to a young woman, upon which he started a conversation with the avatar as if she were his teacher. He pleaded, 'why didn't you love me?', 'come close to me' and 'hug me'.

We paused the role-playing as we judged he was too immersed in the avatar. Then he stood up slowly with his walker, walked to the screen and tried to touch the avatar image. His own shadow in the projector light erased her image. It was a heartbreaking moment for the viewers. In virtually mediated environments, the role-playing and dramatic paradox can be more sophisticated, dynamically exposing a diverse relationship between the actual and the virtual body, conjuring up different aspects of healing.

During the session, we encouraged the older adult participants to name their chosen avatar by saying 'my name is ##, and I am ## years old'. They had the freedom to be a fictional character; however, most of the older adult participants used their real names for their avatars and were reluctant to be someone else. This aspect of the methodology was dramatically changed in my ISEA2017 avatar workshop, where the participants were mostly young
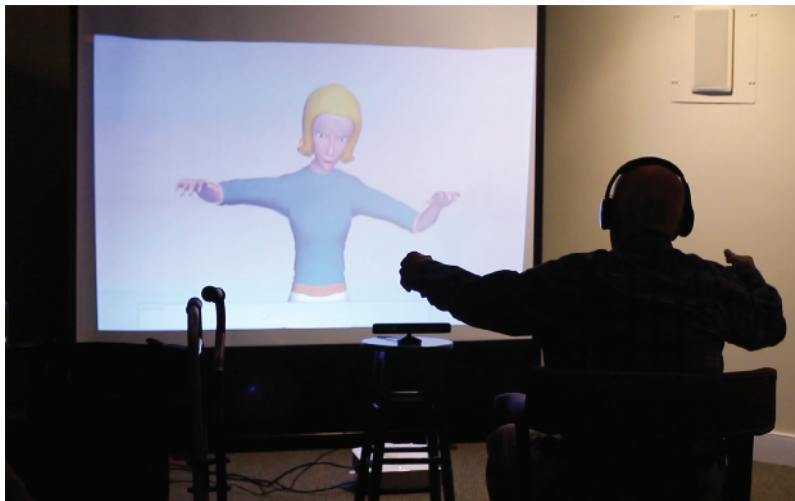
Figure 2: A participant who was trying to hug the avatar who he thought was his elementary school teacher, June 2016. Gayton Terrace Senior Living, Richmond, VA. Photo: Brianna Ondris. © Semi Ryu.

(20s and 30s) and were willing to create a fictional character with their avatar. There is a clear generational and cultural difference about how one responds to an avatar life-review platform that needs to be studied further.

The next project, 'VoicingHan', will explore the customizable features of an avatar that will bring forth different aspects of invoking a role. Also, it will dynamically explore the physical interfaces such as objects or props to add a new dimensions to the process. The avatar selection process will be explored via physical interface, for example, touching a cane for getting old, and a milk bottle for getting younger. Throughout the 'VoicingElder' sessions, we have learned that designing the avatar life-review system is important, but how the system can be used within which setting is crucial. Paul Dourish suggests some anthropological perspectives in his book *Embodiment: Where the Action Is*, emphasizing the importance of the setting where an interactive system occurs (2001). The setting might include many aspects such as space, time, set-up, props, instruction and scripts. There is much to explore in designing a mixed-reality environment.

MOMENT: HERE AND NOW

Jacob L. Moreno situates psychodrama in the 'theater of spontaneity', where individuals respond creatively to emerging situations. Moreno's term for those times when we are most spontaneous is being in the 'moment', which he describes as 'the experience of living in complete harmony and unity while staying connected to social realities of here-and-now' (Johnson and Emunah 2009: 402; Moreno 1953).

Landy describes the moment as a kind of 'aesthetic distance', adopting Thomas Scheff's (1979) three feeling states in terms of distance: under distance, over distance, and aesthetic distance. Whereas under distance is impulsive, out of control, flooded with feeling, and over distance is characterized by too little feeling, causing a wide separation between the actor and role. Landy describes

aesthetic distance as a balance of affect and cognition, which he relates to Mihaly Csikszentmihalyi's (1990) concept of 'flow'. When in 'flow' or at aesthetic distance, an individual is able to be playful, responding spontaneously to new experience and revisiting old experience as if for the first time. (1996: 148–49)

These states can explain the user's embodied state within the virtual body. Underdistance describes immersion: being there. Overdistance is being here. Aesthetic distance is 'here and now', related to Moreno's 'moment' in the theatre of spontaneity. Drama therapy facilitates this constant flow in mixed realities, supporting exploration of the self in diverse dimensions of feeling, role and distance.

During a 'VoicingElder' session, a dynamic personal engagement and emotional involvement emerged, witnessing the possibility of a virtual theatre of spontaneity. In the second session when Mrs C entered the theatre, she began, 'I am going to tell a sad story today'. It was surprising since previous stories told by residents had been positive. I knew telling a sad story would be even harder in this public environment. Mrs C told a story about her father, from when she was 6 years old. He had scolded her badly when she surprised him in jest. She acted out a wonderful dramatic performance identifying strongly with the avatar using broad physical gestures and an animated tone of voice. She concluded with a single sentence, repeated in different voices: 'help me to forgive him'. The first seemed to belong to the avatar, speaking forthrightly, but the second was different – it was Mrs C's voice, weeping and trembling. Her tears surprised us. She confessed that she rarely cries. She spoke of her experience as 'such a good release' and described a sense of 'anonymity' of being able to disclose something, not as herself, but as the avatar.

We do not know what exactly happened to Mrs C's consciousness during her storytelling. As a mediator, I fully observed her performance the entire time. I never imagined that she would end her story in tears. She looked confident, playful and humorous during the time of the storytelling, acting
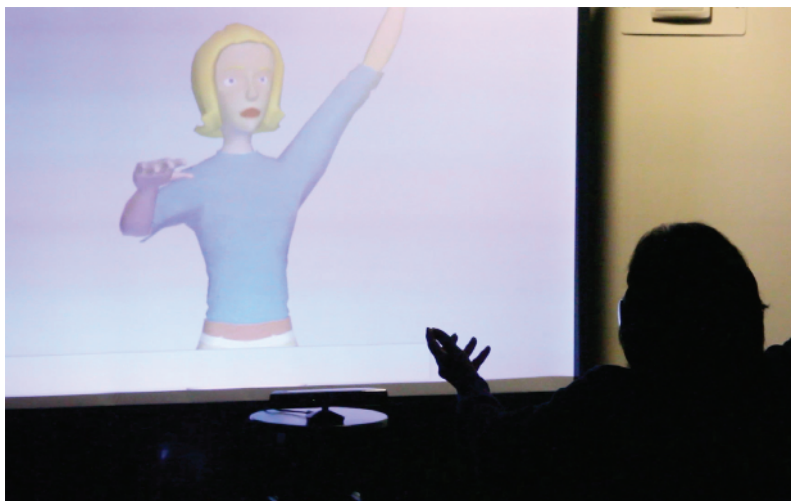
Figure 3: A participant telling her story dynamically using the avatar gesture, June 2016. Gayton Terrace Senior Living, Richmond, VA. Photo: Brianna Ondris. © Semi Ryu.

out of the virtual body with her animated voice, quite engaged with the audience. At the end of her story when she repeated the same sentence twice, the first speech was neutral and strong, 'acting out' as the avatar voice. However, during the second try, her voice and body were trembling and shaking, in the process of 'acting in'. She returned back to her actual body, transformed from the fictional version of her, to the real one. First, she was immersed in the avatar, and then, she returned back to her own body, with an important realization. Three stages of enlightenment in Korean Seon Buddhism support this process, which will be explained later. The dramatic paradox exists in the process of alternating 'acting out' and 'acting in', with a paradoxical state of embodiment. Embodiment describes how complex emotional states trigger memories that are crucial to the healing process (Burkitt 1999; Uttl et al. 2008). Paul Dourish (2001) defines embodiment as possessing and acting through a physical manifestation in the world, and also as phenomena that by their very nature occur in real time and real space, in the case of digital media. Embodiment is a form of participatory state in a broad perspective and has been critiqued as an ambiguous term in the discourses of digital media (Bayliss 2007).

Phil Jones writes about embodiment in drama therapy:

> […] On a general level embodiment concerns the way a client physically expresses and encounters material in the 'here and now' of a dramatic presentation.
>
> (Jones 1996: 113)

Susana Pendzik (2006) uses similar language, describing dramatic reality as 'the manifestation of imagination in the here and now'. In cognitive science, Varela et al. (1991) has discussed embodied interaction between a subject and a separate entity in a Buddhist world-view: mindfulness provides insight on embodied cognition, with an integrative model of mind/body, emphasizing the 'here and now'. The idea of highest engagement has always been connected with 'here and now', sometimes described as 'embodiment', 'the moment', 'aesthetic distance', etc.

In digital media, the frequently used terminologies to describe the most meaningful experience are 'embodiment', 'immersion', 'engagement' or 'presence' (Bayliss 2007: 1–6; McMahan 2003: 68–86). Although 'embodiment' and 'immersion' are common terms describing meaningful experience in virtual space, and often used interchangeably in casual parlance, they are associated with almost opposite concepts: 'here' and 'there'. As described before, embodiment is related to 'here and now' whereas the term 'immersion' (Salen and Zimmerman 2003; Calleja 2011) was commonly regarded as a 'being-there' experience. Dynamic experience in a game or virtual space is often described as 'total immersion', carrying a sense that 'you are there' in a virtual world (Heim 1994).

I propose a specialized usage of 'here and now' as it relates to a concept drawn from Korean Seon Buddhism, which might support what happened to Mrs C's storytelling. Korean Seon Buddhism has three stages of enlightenment: before you study Seon, you see mountains as mountains; while studying Seon, mountains are no longer mountains and rivers are no longer rivers; but once you attain enlightenment, mountains are once again mountains and rivers are again rivers (Kim 2000: 163–69). The beginning and ending sequences look the same but represent a different conception of reality.

In light of Seon, 'here and now' is a different dimension of 'here'. It can be regarded as a meta-state of here, 'once again here', as in the third stage of Seon. The same principle applies to the Korean concept of Han (한), meaning 'one'. Han shifts from a single one to an infinite oneness – meta-oneness. I interpret 'here and now' as 'once again here, and once again now', as a dynamic reflexive state, returning back to reality with a critical shift in perception, awareness and realization.

Korean ritual playfulness, called Shin-Myeong, is a kind of immersive experience. It manifests excitement – leaping to the sky, with astonishing power and speed of emotional transfer, which potentially changes collective consciousness in a group, from 'being there' to 'being there all together' (Collins 1995). However, the important part of the ritual is returning back to the 'here and now' again, manifesting the paradoxical nature of transformation, which supports Mrs C's case of acting out and acting in.

The state of Moo-A occurs in the climax of a Korean ritual. Consciousness moves to the meta-layer, with a shift of focus to the horizon (Odin 2001). Everything looks exactly the same, but a crucial difference is made in our perception and consciousness, which can be considered an ultimate state of embodied cognition in the 'here and now'. In other words, the 'here and now' is 'simultaneously here and there' or 'neither here nor there' in a quantum state of paradox. It is the state of dramatic paradox, providing routes to therapeutic metacognition.

CONCLUSION

With the advancement of speech technology, we are just beginning to explore digital orality. Water Ong (2002) distinguishes between primary orality, which is associated with oral cultures, and second orality, which is influenced by a co-evolving literate culture. A digital third orality promises to more richly address aspects previously underappreciated under the regime of literacy – such as emotion, memory, intuition, spontaneity and improvisation. In Theodore Sarbin's approach to drama therapy, the role-player eventually becomes a storyteller, making sense of his or her existence through stories that support my avatar life-review project's exploration of the third orality (1986).

Avatar life-review established a basic system to support drama therapy, allowing the user to be a spontaneous storyteller and actor, via lip-synchronization and full-body tracking. Our next phase of research will further explore sentimental response in continuous speech, precise body detection and advanced VR/AR technology, and develop a research protocol to facilitate avatar mixed-reality environments in therapeutic settings.

The avatar life-review platform will incorporate techniques/methods of drama therapy and psychodrama such as role playing, role-reversal, doubling, mirroring and soliloquy as a hybrid therapeutic model between VR and theatre. It will address multiple states of self in dramatic paradox, especially for people with traumatic memories, disabilities, memory loss or mental health complications.

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SUGGESTED CITATION

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Semi Ryu specializes in 3D animation and virtual puppetry based on Korean ritual and oral storytelling. Her artworks and articles have been internationally presented in screenings, exhibitions, performances and publications in twenty countries, including the Chelsea Art Museum, and the book *The Point of Being* (Cambridge Scholars, UK). Since 2014, she has been working on the project 'VoicingElder: Avatar Life-Review for Older Adults' to support memory and intergenerational relationships of older adults. Her next project is 'VoicingHan: Avatar Life-Review Empowering Selves' to support the creation of personalized narratives for individuals with trauma-related memories. Semi is an associate professor in the Department of Kinetic Imaging at Virginia Commonwealth University. A South Korean native, she earned a BFA from the Korean National University of Arts, an MFA from Carnegie Mellon University, and currently pursuing a Ph.D. in Digital Anthropology at UOC, Barcelona. For more information, www.semiryu.net.

VoicingHan: between Mortal and Immortal

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Abstract

The VoicingHan project is an avatar storytelling platform designed for patients with advanced cancer receiving palliative care at Virginia Commonwealth University's Massey Cancer Center. A Korean concept, "Han" reflects a paradoxical state of consciousness combining an extreme state of grief with a great hope for overcoming a seemingly impossible situation. We situate Han in a special and holistic cognition found among patients in the palliative care program who confront the critical issue of mortality, and the human dilemma in connecting our physical and spiritual domains. VoicingHan supports terminally ill patients by using oral storytelling as an artistic medium, facilitating patients' interactive performances while promoting autonomous creativity to support "patient activation" or "patient-centered care." In addition, the Avatar video, sound data of stories, and motion capture data will remain as an important patient and family legacy. This paper will discuss the VoicingHan project as an approach to dealing with mortality and potentially mitigating existential suffering for palliative care patients in the digital age.

Keywords

Avatar, Storytelling, Digital Immortality, Life-Review, Virtual Reality, Mixed Reality, Palliative Care, Thana technology, Embodiment, Korean Shamanism

Introduction

Patients with cancer face challenges that are multidimensional, extend beyond physical discomfort, and include psychological, spiritual, and existential distress. [1] Unaddressed domains of the patient's experience have a negative impact on their quality of life. [2]

The Palliative care (PC) teams often use a combination of pharmacological and non-pharmacological interventions to mitigate the high symptom burden and distress experienced by patients. [3][4][5] Our proposed study, VoicingHan, will use a dynamic, artistic medium, which facilitates patients' interactive, storytelling performance using avatars. The avatar platform will facilitate life review, an intervention originally developed for elderly patients, and also incorporated into conceptual psychosocial models for patients with cancer. [6] The VoicingHan Project is designed for use for patients with advanced cancer receiving palliative care at Virginia Commonwealth University's Massey Cancer Center. We have named our intervention "VoicingHan," since we believe the Korean mind/emotion model "Han" best reflects our goal of joining contradictory state of grief with a great hope for overcoming a seemingly impossible situation. [7] We situate Han in a special and holistic cognition found among patients and staff members in the palliative care program who have to confront the critical issue of mortality, and the human dilemma in connecting physical and spiritual domains. Carla Sofka coined the term "thana technology" to describe the intersection between death and technology. [8] VoicingHan explores thana technology in palliative care setting, inspired by Han and various structures of Korean shaman ritual "Kut", shaping a healthy attitude and culture in dealing with mortality in the digital age.

Currently, VoicingHan includes avatars at four developmental stages: child, teenager, adult, and elder. The user will be able to choose any stage in life and customize elements such as gender, ethnicity, and outfits.

Each avatar has a mirrored body movement via a wireless motion capture device, and lip-synchronization of live speech. Upon IRB approval, Avatar life-review sessions with cancer patients will begin June 2019, in the VCU palliative care outpatient clinic. Our goals are to explore the feasibility of delivering an avatar-life-review to support patients with active cancer, to archive the collected digital data, and to share the experience with family members.

VoicingHan: Avatar Life-review in Palliative care

Mortality is a recurrent topic in the hospital setting where the issue of life and death is faced by patients and their medical providers every day. A particularly cogent population to discuss "mortality" are patients receiving palliative care, where a fundamental inquiry of existential questions often occurs throughout their care. PC underscores the need to support patients in coping with the many facets of a life-limiting illness and intends to improve quality of life by relieving physical and emotional pain and by offering spiritual care and guidance. PC treats death as a life process and seeks to support patients through the difficult and uncertain process of transition [9]. Life reviews

have been used in PC to help individuals integrate memories into a meaningful whole, providing a balanced view of the past, present and future. Life review is also an evaluative process, enabling participants to examine how memories contribute to the meaning of their life. [10] Life review has demonstrated improvements in cancer survivors treated with curative intent, and in patients at the end of life. [11][12]

Funded by the VCU Massey Cancer Center, we are working on the VoicingHan project: an avatar life-review platform designed for use by patients with advanced cancer. Although the technology is not new, the incorporation of avatars into patient care is relatively recent, and to our knowledge no studies have included oncology or palliative care patients. VoicingHan is designed to promote creative expression, which may serve as a vehicle for patients with a life limiting illness in finding purpose and creating a sense of meaning. [13] By integrating art and technology into a storytelling, life review platform, and engaging physical, psychological and spiritual domains we anticipate our patients will be better supported in contemplating their own mortality.

VoicingHan supports terminally ill patients by using oral storytelling as an artistic medium, and facilitating patient's interactive performance while promoting autonomous creativity to encourage "patient activation" or "patient-centered care." After the project is completed, the Avatar video, sound data of stories, and motion capture data remain as an important patient and family legacy.

Avatar between Mortal and Immortal Body

The VoicingHan project creates an interactive avatar that simultaneously mirrors patients telling their stories as they are acted out in real time. The avatar mirrors the user's gestures using a wireless motion capture device and lip-syncs with the user's voice via microphone input. This feature gives an illusion that the avatar is the speaker, allowing users to observe their own stories as they are telling them, thereby providing a safe distance from the story and encouraging deeper reflection and memory retrieval. The users are able to create stories which may be difficult to express in daily interactions and conversation.

Patients will select avatars from different age groups, genders, and ethnicity during their sessions, allowing them to retrieve specific, positive memories of different lifetime periods and facilitating a more candid autobiographical memory. Each avatar has two design options: one with plain clothes (shirt and pants), and the other with delicate fashion and accessories. Each avatar has 4 ethnicity choices: African, Asian, Hispanic and Caucasian, and simple making variation of material colors. This allows 64 options of avatar choice the participants can make for their life story. Minimalistic aesthetic of avatar design stimulates the participants' imagination and playfulness to relate virtual body with significant ones in their life stories. In this playful engagement, users act out representations of themselves, significant others (family members, friends, etc.), or

fictional characters, shaping and reflecting their life story in a personal and engaging way.

Based on each patient's preferences, VoicingHan provides some bucket list-environments such as beach,
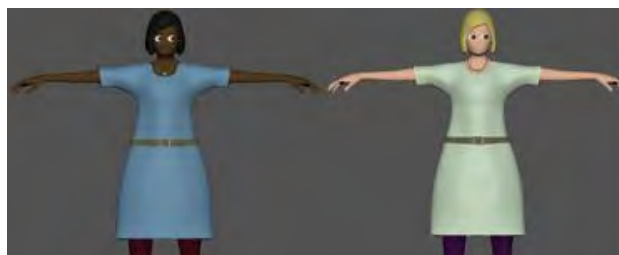

Figure 1. VoicingHan Avatar examples ©Johanna Meehan

mountain, European attractions, and also everyday settings including a living room, and an empty space, to perform their chosen avatar.

In this drama of performing the avatar, the patients can experience their life stories as "thick" documentation, developing new perspectives and revealing deep memory and feeling. These unique histories will help patients better communicate with their family, caregivers and friends in a creative, engaging format that can be viewed both in live performance and as recordings.

The avatar as digital body is, in fact, free from illness. It is non-biological, computational, and in a way, "immortal." However, the participant's life story consistently makes the avatar "mortal", especially in the palliative care setting where the participants are facing the issue of life's end. Ironically, the avatar obtains mortality while it is being humanized through personal storytelling. The VoicingHan project lets patients, families and caregivers question what it means to be mortal, in the process of searching for humanity.

Han in the context of Mortality

As previously stated, the Korean concept of Han is a paradoxical state of consciousness that combines an extreme state of grief with a great hope and desire for overcoming a situation that seems almost impossible. Han is known as the most important character of Korean mind and emotion. [14] One of the most important implications of Han is its perspective on mourning and the process related to tragic experience. The ritual of disentangling and releasing Han can be seen as a new way of mourning, applied into its therapeutic process. [15] The process of releasing Han is a celebration of one's tragedy. Even in the face of tragedy, the Korean people show eternal optimism. This is the power and beauty of Han. The process of crying and laughing in recognition of Han is not a passive aspect of reaction but rather a powerful aspect of healing self. Han is a powerful

driving force to activate the process of releasing itself, shown in transformative consciousness "Han Transformation" happening, to the actual shamanic performance of "Kut". It is an optimistic sense of overcoming difficulties, in acknowledging pains.

What the king of the Cho-Sun dynasty of Korea feared most was to see people looking up to the sky with sighs or tears, since this is the sign of Han. [16] Han calls forth revolutions; it makes people look to the sky with fearsome desire for change. Han is connected with paradoxical attitude of being hopeful, even in the most frustrated situations. This distinguishes Han from anxiety, fear or depression. It is the critical state of reflection, where opposite states coexist with transformative power.

The VoicingHan project promotes the Han attitude, asking the participants to look up. The participants need to tell their story facing their avatar on the screen. They tell their story in an active mode of watching their digital reflection with active state of moving body, keeping the same eye level with positive sense about their story being told. When the patients talk about illness and other painful experiences, they have tendency to find their gaze point on the floor, which locks the storyteller's body posture in a down looking position, possibly increasing anxiety, demoralization and frustration. VoicingHan avatar helps the patient user tell their story of lived experiences, facing, witnessing, performing and accompanying their digital reflections.

In an ontological sense, Han can be understood as an infinite dream for finite being. [17] Han exits in an immortal dream of mortal human being, demonstrating a paradoxical context of the eternal dream of human existence. The way to deal with Han is a ritual of accepting, grieving, recognizing it, and sharing it with family members and community. Han is the state that cannot be resolved, but rather released and acknowledged. VoicingHan is contemporary ritual mediated by technology, in the mode of grieving, mourning, accepting, sharing and honoring our Han through storytelling.

Liminal zone between the Living and the Dead

In the Korean tradition, death means "return" to the place where the soul of living was originated, unlike western tradition where death is conceived as "passing away". [18] The life path from living to dead doesn't happen in newtonic timeline and is not linear nor hierarchical, as a Mobius strip.

The world of the living and the deceased in the Korean culture cross over frequently. There are constant shifts of boundaries that supports a unique way to deal with mortality. The dead person is considered to cross over the river, to travel to the zone of dead. However, it is possible to travel back to the zone of living, for example, in Pari-Gongju (princess) mythology. Pari princess was able to come back to the living zone, to save her father's life. In fact, the Pari princess became the first ancestor of Korean shaman, with a special ability to cross over boundaries. [19]

In Korea, it is living reality to exist with spirits of the deceased, ancestors, gods and goddesses in contemporary daily lives. [20] Shaman doesn't travel somewhere else, instead, spirits are visiting her in the urban setting. Korean shaman ritual Kut includes a belief that god and spirit are active in the world. [21] It demonstrates the way to deal with mortality, in a dramatic interaction with spirits of the deceased, with laughter and tears in catharsis to bring forth a harmonious unity.

Kut becomes necessary when soul of the dead has Han, as this soul cannot return to original place until Han is released. [22] Shaman performs Kut to call the spirit to her body. The spirit of the dead person can be identified based on shaman's gestures, behaviors, and way of speech. Shaman's speech and actions significantly resemble the dead person invited to the shaman's body. In turn, everyone believes the dead person has returned to reality and is with us again to make conversation possible. People acknowledge the spirit's presence with particular gestures of the hand and a bow. The shaman performs the spirit (of ancestors, gods, etc) with full emotional ability to talk, complain, dance, sing, cry or laugh. [23]

In VoicingHan, an avatar is activated by live speech and movement of the participant. The avatar body is performed by the participant with speech and behavior, sometimes via complete immersion, or dramatic acting, playing with diverse states of embodiment. A similar kind of engagement might happen to Shaman as well, sometimes possessed by spirit, sometimes acting and sometimes both. [24]

In VoicingHan, the avatar is constantly shifted into different identities by speech and behavior of different participants. The avatar body plays the same role as shaman's trans body in Kut, as it invites a person to act and tell a story. Although the avatar's appearance may not match the patient's, the speech, behavior, and stories determine the identity and spirit of the virtual body. VoicingHan records and archives all these data as "digital spirit."

Digital Spirit

In previous iteration of the VoicingElder project (avatar life-review for older adults) in 2016, we held an avatar video screening day in a public theater after the storytelling sessions with older adults. The participants enjoyed watching their own avatar performance as well as others'. Often, they were surprised by witnessing their own stories as avatar performances. The distanced setting brought a fresh perspective to stories told via avatar; some were surprised by their own words. Participants wanted DVD discs of their avatar video to watch again with friends and family members. [25]

In the VoicingHan project, all avatar storytelling performances will be screen-captured as movie files. The patients can record their stories using a diverse choice of avatars and their bucket list environments. The participants have the option to edit their video, with their choices of video motif, title, soundtrack, subtitles, etc. This editing process contributes to the patient's self-reflection and the final video may become an important and meaningful family legacy. The avatar video may become an important source of communication and relationship building, as well as a way to preserve elements of family legacy for patients in the palliative care setting. The continuing bonds with the deceased by recording and reviewing the avatar video may allow new meaning reconstruction. It supports continuation of the relationship between the bereaved and the deceased, helping the bereaved to move forward and restructure their lives. [26]

During VoicingElder project in 2016, the aspect of communal ritual was evident after each life-review session. Often, the audience surrounded the storyteller and dynamically expressed their impression, empathy, encouragements, and similar experiences, using warm body language such as hugs and hand-holding. [25] This occurred consistently and involved everyone, including observers, mediator, residents and staff members. Whereas VoicingElder was in a public theater setting, VoicingHan happens in private. However, the patient participant can share their Han, anxiety, fears, as well as life memories with family members, friends and staff, through the avatar video and live avatar storytelling. Patients in palliative care often do not want to record themselves in a video, as their appearance may have altered substantially due to the cancer or the intense therapy process. The avatar video provides some anonymity and is a perfect medium to express difficult life stories and share the meaning of their lived experience.

Figure 2. VoicingElder project in a public theater setting at senior center ©Brianna Ondris.

Using a wireless motion capture device, the participant's motion data will be captured as a digital spirit of each patient, as well as sound files of stories. The archived digital spirit can be reprocessed in real time simulation by using an avatar body, despite absence of the agency after the participant's death. The simulation of behaviors and speech

Figure 3. VoicingHan project in a private setting at family room, Inpatient Unit, Palliative Care ©Holly Ashton.

resembles the Shaman's performing the spirit in Kut, inviting the deceased to her body. Han from the spirits of the deceased who passed in untimely and unexpected ways, need to be released, requiring empathetic understandings of family members and the community all together.

Research Design

Currently VoicingHan avatar platform version 1 was completed with 64 options of avatars and 5 environments, with partial or full body connection with virtual body. The partial body connection (upper body only or arms) is still powerful for the seriously ill patients on wheelchair or bed, allowing them to still play with avatar, using his/her body. We are currently implementing a sentimental responsive algorithm (developed by Prof. Faralli, Univ of Rome Unitelma Sapienza, Italy), to promote emotional release and catharsis in the patient's life storytelling, and also to obtain the flow of sentimental data of the patient´s storytelling. The regular sessions of study will start from June 2019, upon IRB approval.

The objective of VoicingHan project is to explore the therapeutic benefits and determine the feasibility of delivering an avatar life review platform for patients with active cancer. During the Avatar life-review sessions, patients are prompted with structured life-review questions conducted by a facilitator (either Palliative care physician, artist or psychologist) to help engage in reflection and meaningful life stories. The Avatar is intended to promote creative expression, playful engagement, improve mood, and reduce anxiety. The Avatar provides a safe distance for users to freely explore their storytelling, which may otherwise be difficult to express. VoicingHan avatar platform provides an illusion that the Avatar is speaking, thus allowing users to observe their stories as they are telling them; this has the potential to encourage deeper reflection, playful engagement and memory retrieval.

This study will use a one-group observational design to establish feasibility and acceptability of Avatar therapy intervention in patients with advanced cancer. We will use both qualitative and quantitative research methods to further

evaluate this modality of patient care. It includes ethnographic methodology that includes semi-structured interviews and non-participant observation. The interviews will be guided and will take place directly after the VoicingHan session, to qualitatively review the patient's experiences.

Upon IRB and contract completion, we will recruit patients to participate in the Avatar life-review intervention. This feasibility study proposes to enroll 12-patients receiving outpatient palliative care. Eligible participants will undergo an unknown number of sessions depending on acceptability of the intervention to subjects and the capacity of the team to provide the intervention.

Feasibility and acceptability will be explored through semi-structured interviews and patient's satisfaction with the study using Likert scale. Following the Avatar session, a member of the research team will conduct a face-to-face interview that will consist of open-ended questions to elicit detailed responses. Questions will seek to understand participants' attitude about the intervention, perceived effectiveness or lack of it, barriers to engagement, and challenges faced throughout the session.

The outcome measures will include recruitment rate; number of subjects eligible; resources (e.g. cost), time scale; acceptability of the intervention; any barriers to data collection e.g. number of forms and questions patients are able to answer per session; response rates, adherence; the number of intervention sessions per patient and their perspective on recommending the study to others. Process issues including the potential for disruption of clinic flow, size of room constraints that may overwhelm patient or inhibit the patient narrative. The equipment acceptability and ease of use to patients (they will be attached to sensors) and sufficiently broad selection of avatars available for patients, based on age, ethnicity, etc. Patient demographic data will be recorded at the time of enrollment session.

Patient Selection

Inclusion Criteria
This study will enroll adults diagnosed with metastatic or locally recurrent cancer. Individuals will be recruited from Massey Cancer Center (MCC), a national cancer institute. MCC treats hundreds of patients a year providing an ample sample to enroll study subjects.

- Participants must be 18 years of age or older
- Patient participants must have metastatic or locally recurrent cancer
- Participants must be able to understand English
- Participants must be ambulatory
- Ability and willingness to sign a written informed consent document

Exclusion Criteria
- Participants who cannot understand written or spoken English

- Any prisoner and/or other vulnerable persons as defined by NIH (45 CFR 46, Subpart B, C and D).

Study Withdrawal Procedures
A patient may decide to withdraw from the study at any time. Participating is voluntary. However, a patient may be removed from the intervention for one of the following criteria: (1) unwillingness or inability of the patient to comply with the protocol requirements, (2) disease progression that prevents further administration of intervention, (3) general or specific changes in the patient's conditions that renders the patient unacceptable for further treatment in the judgment of the investigator.

Intervention Plan
After obtaining informed consent, VoicingHan will screen-capture patient's storytelling performances as video files. Immediately before the first intervention, patients will complete an array of self-reported questionnaires to assess physical, spiritual, and psychological well-being and elicit relevant demographic and medical information. The assessments include the ESAS, FACIT-Sp subscale, and EORTC PAL 15. Subsequent administration of these questionnaires spaced 2-4 weeks apart will occur before each avatar session (pre-intervention). This will determine if intensity of the patient's symptoms have changed over the course of the intervention. Following completion of the Avatar session, a member of the research team will conduct a semi-structured, open-ended interview to assess patients' perception of intervention components and identify possible factors influencing intervention feasibility and any technical barriers.

Each session is expected to last 20-60 minutes depending on the engagement level of each participant. During the intervention, a trained facilitator will ask open-ended questions to help engage patients in reflection and storytelling. Patients will follow-up with their scheduled appointment in 2-4 weeks for an unknown number of intervention sessions. Based on previous interventions of non-pharmacological therapy to improve spiritual and psychological well-being in patients with cancer, we anticipate sessions will be conducted every 2-4 weeks over a 2-month period. [27] A final administration of the questionnaires will be given approximately one month (± one week) after a patient's last Avatar-Therapy session to evaluate whether any sustained impact occurred. A time frame of one month was chosen to prevent hampering of recall and to accommodate conflicts patients may encounter when scheduling follow up appointments.

Interviews with the patient: Semi-structured interviews with the patient will be conducted to obtain a more in-depth examination of their experiences using VoicingHan. The

purpose of the semi-structured interview is to obtain data with rich explanations of the participant experience while using the virtual body and storytelling.

Interviews with family members: Semi-structured, in-depth interviews with family members of the participants will be conducted to obtain a more in-depth examination of their experiences watching their loved one share life stories using VoicingHan.

Non-Participant Observation: The purpose of the non-participant observation is to develop a holistic understanding of the process objectively and accurately as possible by documenting the emotions and behaviors of the participant while they are participating in VoicingHan life review. The observation will be conducted by a trained observer (i.e., researcher) and will use both structured (checklists) and unstructured (open observation) observations of verbal and nonverbal expression of feelings, frequency of behaviors and engagement in specific activities. In this context, non-participant observation will allow us to triangulate, or check definitions of terms that participants use in interviews.

Survey: Brief surveys will be given to all participants upon completion of their VoicingHan life review session in order to assess impact on quality of life, satisfaction with VoicingHan experience and recommendations for improvement to the experience. Quality of life will be assessed using the physical and mental health component scores of the EORTC PAL-15, and the FACIT-spiritual subscale.

Conclusion

Contemporary society facilitates online memorials in social media like facebook, and because society no longer has a taboo against the open discussion of death, mourning and grieving, may be mediated by technology, in private and public settings. However, it is important to take into account how the deceased will be memorialized and remembered in the digital age, and how this may impact patients with a life –limiting illness and their families. [28][29] It could reform our relationship with death, memory and mortality, and bring forth new discussion of humanity transcendence.

New technology in the digital age delivers a great opportunity for exploring possibilities of digital immortality as archived personal data, importantly, considering how to facilitate digital aids for personal and communal trespassing rituals. Kut could provide us with various structures supporting the VoicingHan avatar storytelling project, and can be a great model of VR, MR, AR and XR that supports multiple realities coexisting with harmonious unity. VoicingHan offers a cross reality setting where virtual/actual body, mortal/ immortal body coexist and cross-over, with creative tension of self-actualization. [30]

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Author Biography

Semi Ryu is a tenured associate professor in the Department of Kinetic Imaging, VCU Arts, and a joint appointed associate professor in the Department of Internal Medicine, VCU School of Medicine. Ryu earned a BFA from the Korean National University of Arts, MFA from Carnegie Mellon University and is finishing up her PhD in Doctoral program of Information and Knowledge Society, UOC, Barcelona.

Since 2002, Ryu has been working on virtual puppetry based on Korean ritual and oral storytelling. Her 3D animations, interactive artworks and papers have been presented at International venues of screenings, exhibitions, performances and publications in more than 20 countries, including Chelsea Art Museum (New York), Transmediale (Berlin), Videobrasil (Sao Paulo), Antonin Artaud space (London), ISEA, SIGGRAPH, the journal article "Ritualizing Interactive Media, from Motivation to Activation" (Technoetic Arts, Intellect Ltd), the book chapter "Sensing without Sensing"-The Point of Being (Cambridge Scholars), the journal article "Virtual Bodies in a Dramatic Paradox" (Virtual Creativity, Intellect Ltd), etc. Supported by VCU Presidential Research Quest Fund since 2014, Ryu has been working on Avatar projects for community engagement. Her transdiciplinary project "VoicingElder: Avatar Life-Review for Older Adults" has been presented in international venues of art, gerontology, drama therapy, and HCI. Ryu is the recipient of VCU Arts faculty award of distinguished achievement in Research, and had her TEDxRVA talk, "Virtual Reality for Han" at 2017. In 2018, She received "Massey cancer center" grant to support her current project VoicingHan: avatar life-review for palliative care, in collaboration with Dr. Del Fabbro and Dr. Noreika.

Dr. Danielle Noreika is the Medical Director of Palliative Services and an Associate Professor of Medicine in Virginia Commonwealth University's Division of Hematology, Oncology and Palliative Care. Dr. Noreika also serves as the Program Director for the Hospice and Palliative Medicine Fellowship. She received her medical degree from Drexel University College of Medicine and completed her Residency in Internal Medicine at the Naval Medical Center in Portsmouth, Virginia. After completing residency she remained active duty in the US Navy prior to honorable discharge after almost 10 years of service in order to pursue fellowship training in Hospice and Palliative Medicine at VCU in 2009. Dr. Noreika has published peer-reviewed articles as well as book chapters on palliative care, quality of life, and symptom management. Her areas of focus are applying technology to palliative care (telemedicine, Project ECHO, and the Avatar project) and education of the future palliative physician workforce.

Performing virtual bodies

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Performing virtual bodies

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ABSTRACT

Following the technical advancement of cross-reality platforms – including virtual, mixed and augmented reality, the term 'virtual bodies' has become widespread. Despite its increased use, however, there has not been much investigation of 'virtual bodies' taking into account a cross-cultural approach that links traditional methods and digital outcomes. This article will demonstrate the methods of experiencing virtual bodies, in the context of Korean healing ritual, along with discussions of my avatar life-review projects, in the phase of wishing, facing, creating and performing virtual bodies. Since 2016, I have been working on avatar life-review platforms that have a mirrored body movement and lip-synchronization of live speech. This platform was implemented in two projects: in the Voicing Elder (2016), the avatar life-review for older adults at Gayton Terrace Senior Living, Richmond, VA; The Voicing Han (2019), the avatar life-review for cancer patients, at VCU palliative care, Massey cancer center, Richmond, VA. These avatar life-review sessions will be discussed as examples of wishing, facing, creating and performing virtual bodies, to proactively experiment, design and facilitate emotional and therapeutic experiences. It will enrich the potential of technically mediated bodies in digital space, supported by the constant development of virtual, interactive and simulation technologies.

Introduction

Following the technical advancement of cross-reality platforms – including virtual, mixed and augmented reality, the term 'virtual bodies' has become widespread. Despite its increased use, however, there has not been much investigation of 'virtual bodies' taking into account a cross-cultural approach that links traditional methods and digital outcomes.

The concept of virtual body has been explained, in relation to phenomenology and embodiment. The phenomenal body was considered the liminality or threshold where physical and virtual boundaries disappear (Broadhurst 1999; Novak 2002). Broadhurst remarked, 'The experience of the corporal schema is not fixed or delimited but extendable to the various tools and technologies which may be embodied' (Broadhurst 2006). The physical body was considered as an anchor point for complex extension and embodied experience (Kozel 1998). However, in ancient healing rituals and therapeutic theater,

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the virtual body acts as an anchor point, to search for the material body that has been lost and suppressed, accompanied by a trance state of consciousness or active state of imagination. The virtual body becomes a reference, to find your own self lost and muted in physicality. Our body assumption and sensory experience are different, based on how it has been formed and trained that would imply a reconfiguration of our embodied experience. The concept of the virtual body needs further investigation to enhance the cross-cultural understanding that includes multiple states of bodies, selves and realities throughout ritual, performance and everyday consciousness. This re-conceptualization of the virtual body enriches the potential of technically mediated bodies in digital space, supported by the constant development of virtual, interactive and simulation technologies.

This article will demonstrate the methods of experiencing virtual bodies, in the context of Korean healing ritual, along with discussions of my avatar life-review projects, in the phase of wishing, facing, creating and performing virtual bodies. Since 2014, I have been working on avatar life-review platforms that have a mirrored body movement and lip-synchronization of live speech. This platform was implemented in two projects: in the VoicingElder project (2016), the avatar life-review for older adults at Gayton Terrace Senior Living, Richmond, VA; The VoicingHan project (2019), the avatar life-review for cancer patients, at VCU palliative outpatient clinic, VCU Massey cancer center, Richmond, VA.

The VoicingElder project is an avatar life-review platform developed for older adults, at Gayton Terrace Senior Living, Richmond, VA, 2016, in collaboration with Dr. Tracey Gendron at VCU Department of Gerontology. From March through June 2016, 10 avatar life-review sessions were held for 10 older adult participants at the public theater, the Brookdale Gayton Terrace senior living center in Richmond, VA, USA. In the sessions, participant residents chose an avatar and told autobiographical stories. They faced their avatars on-screen, and told the stories to themselves and others, speaking through avatars that lip-synced their speech and mirrored their upper body movements via Kinect. Four developmental stages of male and female avatars were provided, a total of 8 avatars, reflecting the participants (current age: around 80)'s time/fashion of each stage: childhood, teenagerhood, young adulthood and elderhood. Each life-review session was followed by lengthy community talks, building strong empathetic bonds between the storyteller, the artist (mediator) and the audience (residents). Moreover, the avatar movie screening brought everyone together reflecting on all those stories told via an avatar. Later, the avatar movie was distributed to the participant's family members and grandchildren enriching intergenerational relationships. The project was funded by the VCU Presidential Research Quest Fund.

The VoicingHan project is an avatar life-review platform designed for patients with advanced cancer receiving palliative care at Virginia Commonwealth University's Massey Cancer Center, in collaboration with Dr. Egidio Del Fabbro and Dr. Danielle Noreika. Avatar life-review sessions with 12 cancer patients were conducted from June to August 2019, in the VCU palliative care outpatient clinic. VoicingHan developed the avatars at four developmental stages: child, teenager, adult and elder. Each avatar has two design options: one with plainclothes (shirt and pants) and the other with delicate fashion and accessories. Each avatar has four ethnicity choices: African, Asian, Hispanic and Caucasian, by simply making variation of material colors. It has 64 options of avatars and 5

environments, with partial or full body connection with the virtual body. The user is able to choose any stage in life and customize elements such as gender, ethnicity and outfits. Like the VoicingElder avatar, each avatar has a mirrored body movement and lip-syn-chronization of live speech, but with a wireless motion capture device, for more precise motion detection possible, with flexible options of body setup based on the patient's situation. The objective of the VoicingHan project is to explore the therapeutic benefits and determine the feasibility of delivering an avatar life-review platform for patients with active cancer. During the Avatar life-review sessions, patients are prompted with semi-structured life-review questions conducted by artists to help engage in reflection and meaningful life stories. This feasibility study enrolled 12 patients receiving outpatient palliative care. The project was funded by VCU Massey Cancer Center Grant.

This article will discuss the avatar life-review sessions of VoicingElder and VoicingHan as examples of wishing, facing, creating and performing virtual bodies, to proactively exper-iment, design and facilitate emotional and therapeutic experiences. This digital art-based research (McNiff 2008) contributes to developing techniques and methods of virtual bodies, investigating embodied perceptions in a complex emotional phase of wishing, facing and performing virtual bodies. The methodology is based on the cross-cultural dia-logue of Korean healing rituals, and western therapy concepts, rooted in the practice-as-research framework and the cross-disciplinary exchange between art, technology and medicine.

Voicing virtual bodies

I grew up watching Western movies dubbed in Korean. The actors in the movies were all Americans but speaking perfect Korean. Korean voice actors not only did a great job lip-syncing but also with their acting voices, building cross-cultural characters that worked for the Korean emotional repertoire. The mixture of Korean voices with Western bodies remains in my memory as an unforgettable delicate texture. The strange combination of a Western body with a Korean voice created a hybrid reality that perfectly made sense to me in my childhood. Voice acting was so fascinating. It transported one to a different physical being, playing out an alternative body, and life story that was both unat-tainable in real life yet highly desirable.

Neo-Confucianism emphasizes the corporeality of the female body, the very aspect that men are supposed to transcend, as the virtuality of the body. Women are trapped by the physicality of the body, mainly as reproductive machines. My voice was to be weak and quiet, my motions gentle and soft. My gaze was supposed to stay at ground level without challenging others' eyes. Patience, respect and loyalty were predetermined to be my values and gender identity. Against these constraints, I started searching for alter-nate virtual bodies, such as musical instruments, toys, puppets and Western actors in films. I was searching for a different version of myself who could cry, laugh and express freely, which was impossible to do within my physical domain. I was searching for virtual bodies to explore new self-perceptions and meaning construction, beyond moral action and integrity, stressed in the social corporeal body within the Confucian ideology (Taeyon 2003; Yoon 1990). Through practice, I have developed techniques and insights to perform virtual bodies accompanied by an active state of consciousness and various

interactive modalities. My gaze, speech, body and mental engagement allow me to access and perform my 'virtual bodies'.

Later on, as an artist, I developed virtual puppets to investigate embodiment and the concept of the virtual body that I have experienced since my childhood. I have performed as a storyteller, speaking through an avatar body, very much like being a voice actor in my childhood fantasies. The relationship between virtual and physical bodies has been an ongoing inquiry in my life, as different states of consciousness and perception emerge while facing, speaking and performing through and with virtual bodies. Currently, my ongoing avatar projects have explored trans-disciplinary inquiries between art, technology, medicine and HCI (human–computer interaction), in collaboration with computer scientists, medical professionals and gerontologists, in order to help people perform their virtual bodies for psychological relief and healing.

Our bodies are situated within a definite socio-economic field, and have been disciplined by power structures. Guattari explains that what we learn from school is primarily a behavioral model adapted to certain social castes, what he calls 'micro fascism of one's own body'. Our body situated in the micro-politics of power structures, and systematically trained to be better adapted to the formations of power (Guattari 1996). In the context of Guattari's molecular revolution, virtual bodies would emerge in the process of denying the material body from oppressive states: from gender, culture, society, religion as well as disability and disease.

Regarding current theories about body performativity and personal identity, Judith Butler argues that 'constraint is not necessarily that which sets a limit to performativity. The constraint is rather that which impels and sustains performativity' (Butler 1993). Performativity has been largely discussed, in the context of self-perception and identity, through the physical-social body. Cavanaugh states in her book *Performativity*, that actions, behaviors and gestures are both the result of an individual's identity and a source that contributes to the formation of one's identity which is continuously being redefined through speech acts and symbolic communication (Cavanaugh 2015). In the digital age, with the omni-presence of technological and simulated virtual bodies, we need these discussions of body and performativity to be extended to the relationship between physical and virtual bodies. Speech, behaviors, emotions and cognitions mediated by virtual bodies may bring new dimensions into the discussion of the formation of self and identity.

My concept of virtual body in the digital environments I created is based on the idea that a digital representation of the body enables people to explore otherselves and to experience other relations with one's own body, and to critically transcend social constraints. Balsamo (1995) defines the lived experience of virtual reality as something triggered by material repression of the physical body. This understanding can be mirrored by the Korean shamanism.

Wishing virtual bodies

During the Joseon Dynasty in Korea, shamanism functioned as a breakthrough from repressive Confucian philosophies concerning women and the oppressed (Oh 2016). The Korean emotional state called 'Han' was developed by the oppressed over a long period of time and became a source for activating the Korean shaman ritual of 'Kut'.

Han is known as the most important element of the Korean mind and emotion. It is a paradoxical state of consciousness that combines an extreme state of grief with great hope and desire for overcoming a situation that is seemingly impossible (Lee 1982).

In fact, a Korean shaman called Mudang is a person (mostly female) who has deeply experienced and understood Han (as a woman and as her low social status in Korean traditional society) and obtained a special embodied technique to release Han. During a Kut ritual, not only Mudang, but also other women participants, start speaking gods' or a dead person's words (Lee 1990). Such transformative and possessive states have attracted followers among the weak and oppressed, particularly among women in male-dominated societies like Korea (Lewis 1971).

Kut functioned as a 'safe channel' for the oppressed to become and perform virtual bodies transcending their physical states. Their Han functioned as a springboard to jump off toward the alternative state of a virtual body. Virtual bodies cannot be activated without strong wishes to overcome physical, social and cultural limits. Through Han, we experience virtual bodies that respond to our desperate longings for healing. Thus, virtual bodies can be a tool to help people overcome a repressive state (such as Han) through therapy.

As an artist working with 'virtual bodies', I developed the idea of a virtual puppet and searched for Han as a source of creative energy to inspire my Avatar Life-review project. I took a cross-cultural perspective proposing Korean shamanism as the basis of a digital interactive system, with the aim that a digitally mediated body can help transform populations that are suffering and whose voices are not heard. In contemporary society, Han may exist in those who experience difficulties and have existential questions, such as older adults, terminally-ill patients, people with mental health complications and people with anxiety or depression.

One of the first developments of the Avatar Life-review project was the VoicingElder project, envisaged to perform avatar life-review for older adults at the Gayton Terrace Senior Living in Richmond, VA. VoicingElder avatars were designed with real-time lip-synchronization and mirroring upper body movements via Kinect sensors. One of the most powerful performances of the avatar came from Mrs. C, who showed unexpressed feelings and repressed memories about her father, which I connected with Han. On 4 May 2016, Mrs. C carefully checked to make sure her physical body was connected with the avatar body via Kinect before starting her story. In the middle of her story, she said:

> …In my life, I had a very sad time. This is a true story and it's been with me in my heart, heart, heart, … (standing up) there, heart. So I was a little, little, child, tiny. My father was an engineering professor. He had a little tiny room in his basement that he called it cubbyhole …

During her storytelling, Mrs. C used her avatar body with the most animated gestures and voice performance. She was desperately longing for a channel to express and communicate her story through her avatar. She continued to describe the incident, facing, connecting and performing the avatar virtual body on the screen.

> … I stood at the door to his cubbyhole. 'Surprise—Surprise!!' I was so happy. My father reached to me and said 'Don't ever do that again'. Arm was that that that that…I was so heartbroken. I ran up the stairs. My mom didn't know what could have happened. Ohh I was heart heart, heart broken inside…

Eventually, she concluded her story in tears:

> … I was never very close to my father. I really wanna forgive my father. I know if he were here today, he would say, Oh my goodness, I can't believe this is one tiny incident in your life. Why are you hanging onto this? I wanna let go. I wanna let go. I wanna say ERASE that from my mind. Erase that. I have been through worse things. I have deep feelings AND love for Christ and I pray. So I? HELP UP MY PRAYERS. And say 'Help me to forgive my father.' I have learned what it means to say, forgive them for they know not what they…(crying)

After returning to her seat in the audience area, Mrs. C's discussed the experience with her Gerontologist.T, describing her experience as 'such a good release' (Figure 1).

Gerontologist. T:	How do you feel after telling the story?
Mrs. C:	I am feeling better. I knew I would … .Thought last time when I was I might tell this story, but like I said, I've been trying for years to do something … and see today I cried. I very very seldom cry. See this is wonderful. I said this before last time. This is such a good release. This is 'such a good release' to say.

In terms of Korean shamanism, Mrs. C's repressed childhood memory became a source of her Han. She had a deep sadness in her mind but with powerful wishes to overcome. Her wishes were visible when she carefully checked the avatar connection with her body before starting her story. We could witness she seriously cared about the connection with the virtual body. During her storytelling, she spoke and moved her body carefully responding to how the virtual body works on the screen which resulted in a great performance. From Han, she was able to connect to a virtual body in a genuine way, and eventually use it to express her feelings. Mrs. C's repressed feelings were expressed as a wish through the virtual body,
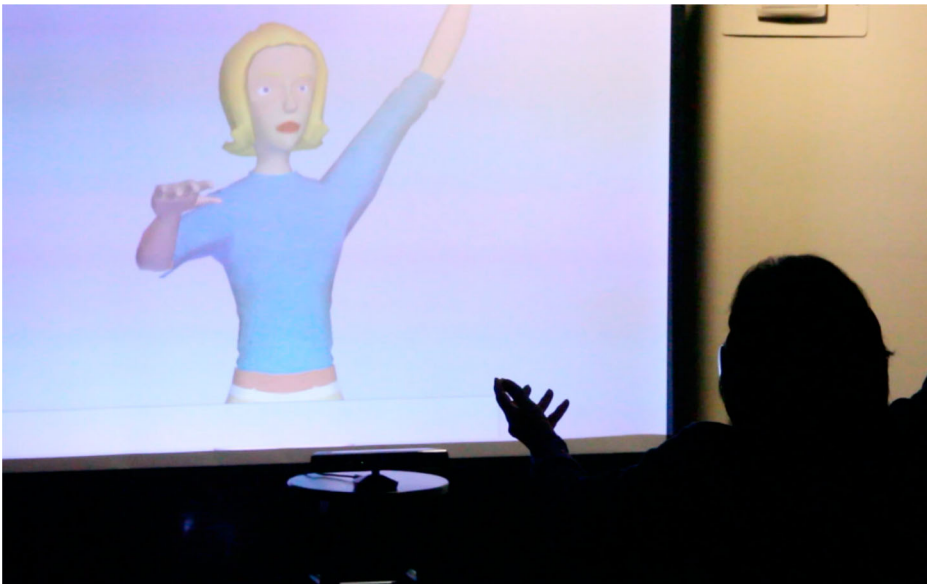
Figure 1. Mrs. C telling her story dynamically using the avatar gesture, June 2016. Gayton Terrace Senior Living, Richmond, VA. Photo: Brianna Ondris.

allowing her a great emotional release. If there is pain, there is a wish, and if there is a wish, there is a hope. It is how our virtual bodies are formed, realized and experienced.

Facing virtual bodies

Another Korean emotional concept, 'Cheong (정)' explains the relationship between the physical and virtual body. Woo (2010) talks about three structures of yin/yang called Sam-Taeguk as the foundation of Korean philosophy. He describes the dance of Sam-Taeguk, called Yul-Lyeo (율려), as a repetitive circulation of three kinds of energy – sky, earth and human, in swirls. There is a Korean nostalgia for Hana (하나 meaning one) demonstrated in the repetitive dance of Sam-Taeguk: one embraces three and three return to one. In Korea, the word 'Hana' means one, but includes different dimensions such as 'single' or 'whole' (Lee, Park, and Cha 2001). Cheong is a strong nostalgia toward infinite oneness, moving from single to whole one (Choi 1993).

In human relationships, Cheong brings a state of great intimacy, allowing people to share everything and transcend privacy boundaries (Choi 1993). Under the feeling of Hana, friends share all secrets, as if they were a single person; they share the stew from the same pot and drink from a single cup. As shown in Sam-Taeguk, Cheong also exists between humans and non-living things. With warm and caring attitudes. Cheong exists between physical and virtual bodies, creating a strong desire to join them together in a swirling dance. It facilitates a hybrid reality integrating differences to Hana that converge into infinite oneness. Hybrid bodies are constantly emerging between virtual and physical bodies, shaping different states of embodiment and disembodiment, in constant movement, joining and parting.

Cheong has a close relationship with Han as Han is usually developed from people with much Cheong (Chun 1993). Cheong shares some similarities with the concept of 'unconditional positive regard' in Carl Rogers' person-centered therapy, as it is like unconditional love, beyond criteria of judgment or likability. Person-centered therapy has two concepts: empathy and unconditional positive regard (similar to Cheong) (Rogers 1951, 1961). Unconditional positive regard is the basic acceptance and support of a person, regardless of what the person says or does. Humanist psychologists believe that by showing the client unconditional positive regard and acceptance, the therapist is providing the best possible conditions for the individual's personal growth.

Cheong is encouraged in my avatar life-review projects: a participant tells their story while looking at their avatar's virtual body as it lip-syncs and mirrors their movement. They tell their story while watching and witnessing their digital reflection through an active state of speaking and moving their bodies. This creates a self-dialogue, allowing the participant to tell their story and actively listen to their story as told through their virtual body. Facing the participant, the avatar virtual body constantly echoes what the participant says via lip-syncing. There is a slight delay in the lip-sync, due to time for audio processing in computing. In this sense, the virtual body listens, confirms and acknowledges what the user has spoken, supporting unconditional positive regard.

Cheong involves the desire to accept, connect and integrate with alternative bodies, which allows people to perform through virtual bodies with dynamic emotional involvement. It is well demonstrated in the participant's desire to be connected with the avatar.

As we have seen, during the VoicingElder life-review session on 4 May 2016, at Gayton Terrace Senior Living, Richmond, VA, Mrs. C showed a great desire for connection with her

virtual body, making sure her physical body was detected closely by the on-screen avatar before starting her story. In the first part of her story, when Mrs. C touched her heart (*This is a true story and it's been with me in my heart, heart, heart, …* (standing up) *there, heart*), the Kinect sensor couldn't detect her hand correctly and came up with unexpected posture and motion of the avatar. Instantly, Mrs. C started copying the avatar's independent behaviors when her electronic connection was lost. Technically, the avatar was designed to follow the user's body movement, but her physical body mimicked the avatar motion, showing a longing for connection related with Cheong. Her physical body kept voluntarily mimicking the avatar body to connect itself when the technology failed to do so. Moreover, the avatar's error behavior was something impossible for human joints. However, she tried to mimic the impossible movements. In Korean terms, this demonstrates her physical and virtual body were strongly integrated with Cheong in non-hierarchical relationships. In the sense of Hana, the virtual and physical freely crossover the boundary. If the virtual body does not follow the physical body, the physical body can do for the virtual, dedicated to infinite oneness, in non-judgmental and non-conditional context.

In the VoicingHan project: an avatar life-review platform designed for patients with advanced cancer receiving palliative care at VCU Massey Cancer Center (2019), Cheong can be found in participants' choices during the avatar selection process, which provided more than 60 options for virtual bodies that included various developmental stages, ethnicities, genders and fashion. Mrs. T was excited to navigate all of these options and ended up choosing a young adult African-American female avatar wearing a blue dress. The following are Mrs. T's responses to her avatar selection process (Looking at avatar on screen):

'Oh look!'

(Avatar switches to white male character)

'Oh, homeboy. That's a bro. (big laughters)'

(Avatar switches to a small black boy)

'Oh there he goes. Hey!'

(Avatar switches to a small white girl)

'Hey girl! Look at Gia, my niece.'

(Avatar switches through all child skins)

'Oh … very cute … oh … look at him! Aww, this is really neat yall!'

(Mrs. T is asked if she wants to be a kid)

'Yeah I don't want to be a kid.'

(Avatar switches through all elderly male skins)

'Does he got grey hairs? Is that what he got, grey hairs?' (laughter)

(Avatar switches to elderly black woman)

'Hey! I like her. She's jazzy, yeah! With her purple on!'

(Environment changes to the beach, Mrs. T notices ambiance)

'Oh, I can hear it!'

(Environment changes to the living room)

'Oh, the beach was so much nicer. You should've heard the sounds!'

(Camera zooms in on elderly avatar)

'Yeah! That's what I'm saying! That's my girl right there! She's got on pearls; she's got a little hat on! You know I keep a hat on my head.'

(Avatar changes to middle aged black woman and environment changes to Europe)

'Oh she is cute … I like her. Yeah, we can keep her.'

In the Korean perspective, Mrs. T was a person already full of Cheong, with a warm and caring personality. From the beginning, she was very empathetic to each avatar on screen. She related each avatar with her family member, or relatives. People with Cheong have an emotional way of connecting with others, even non-living-beings like objects. They can talk with plants, trees or objects, even without any technological connection, embracing everything together. Starting from Cheong, Mrs. T was able to powerfully immerse herself into her avatar storytelling in virtual space, which results in altering her chronic pain perception on her left arm, which will be explained further later.

During most of the VoicingHan sessions, an emotional connection like Cheong was built between the participant and the digital avatar when prompted by the mediator '*What is your name?*' '*How old are you?*' Most of the participants started having a personal relationship with their virtual body and wanted to express an emotional connection when the session was finished by hugging, waving, and kissing as if the avatar was alive. One such example is described below.

Excerpt from Mrs. V's remark, after her story:

'Thank yall so much, I appreciate yall doing this! This was something new, different. Very exciting, the questions! I'm a people person, and I love people. How about that one? How about that?'(watching the avatar on screen she used).

(Avatar is about to be disconnected)

'This was nice though, different. I enjoyed yall! The questions yall asked were really deep, really something, but it's all true! You know?' (laughs)

(All of a sudden, the avatar suddenly disappeared from the screen, in the process of taking off the mocap sensors from Mrs. V's body. She is a bit sad.)

'I tried to wave at her but … ' (saying in frustration)

After spending more than 30 min of personal life storytelling with the avatar, Mrs. V obviously built a special relationship with her avatar. The avatar virtual body was ritualized. It is just as when playing an instrument for a long time, we build up a special relationship with the instrument which is much more than a functionality. The instrument can give you trust and friendship and spiritual power, just like a long-time friend. Cheong was formed by sharing time and memory together, no matter what good or bad stories. Digital avatars were ritualized quickly, in this context of telling personal and emotional life memories together (Figure 2).

Creating virtual bodies

The process of making the Korean shaman (called 'Mudang') into a virtual body requires complex planning and production involving costume, props, food, performance and music. The space for the Kut ritual is filled with a variety of colorful shamanic dresses representing each god's character. The Mudang chooses to wear a specific dress related with the god's spirit that will be called into her body. Wearing a dress, she dances with ritual objects like a fan and rattles in order to welcome the specific god's spirit into her body. When the spirit visits her body, her voice, gestures and behavior change as if she were a god herself. It is believed that when the spirit is manifested through her body, she can dance on knives without being cut or hurt. Her body becomes an alternative state, transcending her physical body.

When creating a virtual body for the VoicingHan project, I wanted to reproduce a similar process as Kut. Virtual bodies used in ritual were designed to support speech and body movements in the process of becoming others. VoicingHan avatars were designed to support these modalities via lip-sync and motion detection technology. The avatar mirrors the user's gestures using a wireless motion capture device and lip-syncs with the user's voice via microphone input. The avatar simultaneously mirrors patients telling their stories as they are acted out in real time. Patients select avatars from different age groups, genders and ethnicity during their sessions, allowing them to retrieve specific memories of different lifetime periods and facilitating a more candid autobiographical memory. The minimalistic aesthetic of avatar design stimulates the participants' imagination and playfulness to relate virtual bodies with significant ones in their life stories.

Wearing a mask is another method of creating virtual bodies often used during rituals and theater. The mask, like the shamanic dress and cap, allows the shaman to incarnate a

Figure 2. VoicingHan Avatar mirroring full body, using wireless motion capture device.

mythological figure such as a god, ancestor or mystic animal (Eliade 1985). In fact, masks are considered the historic predecessors to puppets. Masks gradually transformed from head coverings to being held in front of the body, then to being made to move by strings (Tillis 1992). In many societies, there is a widespread use of articulated masks in religious ceremonies, with clear evidence that these performances eventually transformed into puppetry (Baird 1965). Kaplin (1999) has pointed out distinctive features of puppetry in this progression, yielding two centers of gravity. This is a critical point when the virtual and physical body are separated, forming a more sophisticated relationship. My Avatar Life-Review project is part of this creation of virtual bodies: technological avatars inspired by shamanic dress, masks and puppets. In the case of the digital avatar, the virtual body gets more externalized and separated from the physical body using wireless technology. Out of this separation, a hybrid body perception emerges, traveling between virtual and physical bodies in an expanding range of performative states.

As briefly described before, during the VoicingHan project, a hybrid body perception has contributed to a different pain sensation for a cancer patient. For example, Mrs. T's cancer had spread to her left shoulder, so her left arm was in pain. While telling her story, however, she moved this arm a lot. We observed different body perceptions and reduced pain from Mrs. T, in the process of becoming her virtual body-avatar. She performed as a young African-American woman wearing a blue dress who was spending a nice time with her family at Virginia Beach (Figure 3).

> Excerpt from Mrs. T's story:
>
> Mediator: Where are you?
> Mrs. T: 'Huh? Where am I? Umm … I am at the beach. I am at Virginia Beach. Yea!'
> (Mrs. T begins trying to correct her painful left arm position of the avatar, as the avatar's arm appears to be submerged into its body)
> Mrs. T: 'I lost my arm, but it's coming back. There it is! Coming back, coming back.'
> (After the sensor position has been corrected, Mrs. T started her story again)

Traditionally, in Korean shaman ritual, the design of a virtual body is inspired by the spirits we wish to channel, such as gods, ancestors, the dead, animals, nature etc. As a

Figure 3. VoicingHan project at VCU Palliative Care. Photo: Holly Ashton.

contemporary ritual, my projects channel different 'spirits', proposing alternative identities of the self into different timelines: past, present and future self, as well as different gender, ethnicity etc. We designed the avatars to represent four developmental stages: child, teenager, adult and elder. This allowed participants to access different stages of their lives in order to see the full spectrum and greater meaning of their lives. In a VoicingHan session, the participants start their story from a child self and gradually grow into a teenager, adult and elder. The one's elder self's story is interesting as it involves mostly fiction and imagination about their own future. For example, in a story told as the elder self, Ms. R was in the middle of her trip to Europe, all by herself, at age 70. Mr. E spoke about celebrating his 80th birthday barbeque party in his daughter's house which indicates a great hope in his current cancer treatments. Connected to the virtual body of the elder man avatar with grey hair, this participant was able to freely imagine a meaningful future in his life story.

> Excerpt from Mr. E's story:
> (On the screen, young adult avatar was changed to an old man avatar with grey hair)
>
> Mediator: How old are you now?
> Mr. E: Wow look at me. I am dead! (Mr. E Chuckles)
> I am 80 … will be 80 in August 19th. My Kids gonna have a big party for me, going over my daughter's house. She is living in Minneapolis. So we gonna go over there.
> All my other kids will fly in, coming in. We gonna celebrate, we gonna have a big barbecue…

Performing virtual bodies

After virtual bodies are accessed by various means, we can perform our virtual bodies with a great emotional involvement. The Korean shaman ritual Kut provides diverse approaches to performing virtual bodies, based on two ways of understanding Kut: one as a dramatic art and the other as a sacred ritual for inhabiting trance states of consciousness. Kister (2006) sees Kut as a dramatic art to bring about the transformation of people's lives through manipulation of their imagination. Supporting these differences, Korean shamanism is divided into two types: the Northern type (charismatic shamans) and the Southern type (hereditary shamans) (Lee 1990). The Northern type is characterized by ecstasy and trance and experiences the so-called shaman illness – a mysterious illness that can never be cured until one accepts becoming a shaman. They have the ability to communicate with the spirits of gods and the dead directly. Southern type-hereditary shamans, by contrast, do not have this ability, but have been educated to perform the Kut. They practice acting, singing and dancing and perform complicated ritual procedures (Oh 2016). They perform virtual bodies by imagining the presence of the god, goddess, or the dead, within their own or other bodies. Regardless of type, each Korean shaman obtains her personal technique of performing virtual bodies through enormous practice.

During the VoicingElder Life-Review, there was an interesting case where we can witness the gradual change in the performer's consciousness, starting from remembering to dramatic enactment, and eventually to living reality. During the VoicingElder sessions, most of the participants used the past tense while performing virtual body as they were speaking about past events. However, there was one case where a participant gradually transitioned from past to present tense, from past to current event, and eventually from enactment to

living reality. During his avatar storytelling, Mr. W started using a child avatar and talked about the constant challenges he faced in writing courses during his elementary school years. These were memories from more than 80 years ago. On 23 May 2016, he started his story in past tense, tracing back his memory at Gayton Terrace Senior Living, Richmond, VA:

> Mr. W: (sits up) 'I went to school in a one room country school in West Virginia on a farm. I was five years old and they had to show me how to get to the school and it was only 100 yards away and we only had one teacher. We had one rows of seats. And we started as five-year-olds and in that first seat in that one year and I struggled desperately throughout nine months and the teacher, teacher, didn't think I was very smart. But I struggled on and on. And she had finally agreed to let me move from the first grade from the first row of seats to the second grade or the second row of seats … '

His storytelling started changing to dialogue between himself and his teacher.

> Mr. W: ' … she decided to teach me how to read. And I said "what do you mean?" and she said "I want you to read out of this book." So, I said (voice gets more strained), "read me out of what!?"'
> (Small laughter from the audience)

After telling his story for a few minutes through the avatar body of a young boy, he changed to a present tense, performing dialogue between himself and his teacher as if it were occurring currently.

> Mr. W: 'I … well let's just go up to the sixth grade. Where's the book? The books right there, can you see it right there?'
> Mr. W: (Leans forward)
> Mr. W: 'No … Please, please I don't know what to do'
> Mr. W: (Turns to audience)
> Mr. W: 'take me to the fifth grade please, please. Fifth grade please!' (Turns back to the avatar)

After a while of telling his story as a child body avatar in the present tense, Mr. W looked for his elementary teacher. The mediator changed his child avatar to a young adult female avatar, on the screen. Then he started to make conversation with this female avatar as his elementary school teacher, as if she is alive in reality.

> Mr. W: 'Where's my teacher? I'm sick'
> Mediator: 'Your teacher is coming. This is your teacher' (changes boy avatar to adult female avatar)
> Mr. W: 'Awe, come and hug me, kiss me.' (Arms stretched open for a hug)
> Mr. W: 'Please, no … if I don't kiss me or love me … what am I supposed to do? Can you read out loud? Do you kiss? You don't? Well what do you do? Please, I'm begging you, I'm begging you look at my lips … kiss me. Kiss me. You're going to leave me alone. Who am I? Is there ever a teacher here? Is there ever a teacher? Does she read? Does she kiss?' (Reaches out to avatar and hugs)
> Mr. W: (laughs) 'hahaha' (more embracing gestures towards avatar)
> Mr. W: 'When are you going to go cut your hair. It's curly and it needs to be drawn and set?'
> Mediator: (walks up)
> Mr. W: 'Thank you Lord'
> (Audience claps)
> Mediator: (walks Mr. W to the avatar screen for embrace and touch)

We paused Mr. W's story, as we judged he was too immersed into the avatar. After his story, Mr. W stood up and seemed to go back to his audience seat. However, all of sudden, he turned his direction and moved to the avatar screen, by the walker. He desperately tried to touch the avatar image on screen. Everyone was worried about his potential fall. Several people ran into him for assistance while he tried to touch the projected avatar image. Ironically, his own shadow in the projector light erased the avatar image (his elementary school teacher for him). It was a heartbreaking moment for the viewers. He desperately wanted to touch and feel the avatar, but when he approached, the avatar disappeared, covered by his own shadow. During his life's storytelling process, gradual transitions have happened in his consciousness, from the state of remembering the past, to acting out the events, to a very vivid reality. Mr. W finally went back to his seat and smiled. He smiled like a child boy (Figure 4).

Conclusion

The avatar life-review projects presented here are inspired by Korean shaman rituals and emotional concepts. This traditional way of approaching self, body and emotion can be an alternative way to understand the relationship between the physical and virtual body, that is not in opposition to Western thought but enhances it. Performing the virtual body as a way to release Han allows us to understand the therapeutic dimension that the virtual body can play. Examining infinite wholeness of the physical and virtual body from the Korean perspective of Cheong demonstrates another way to explain the process of becoming and liminality, transcending the boundary of virtual and physical. Even if using digital technology, the process of building and becoming one with a virtual body
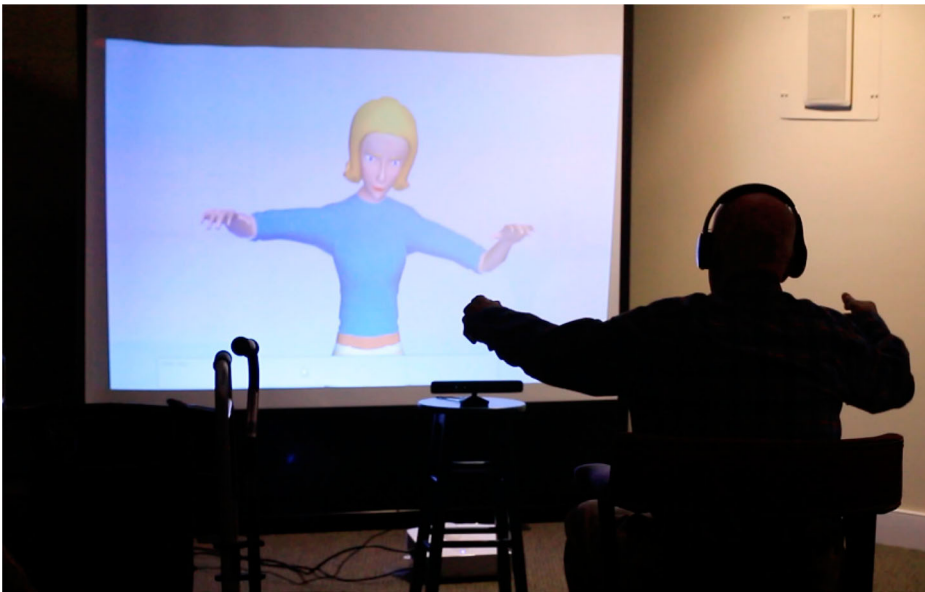
Figure 4. Mr. W who was trying to hug the avatar who he thought was his elementary school teacher, June 2016. Gayton Terrace Senior Living, Richmond, VA. Photo: Brianna Ondris.

in avatar life-review projects is analogous to the Korean shaman ritual Kut. Digital avatars follow ancient methods and techniques like masks, shamanic dresses and other prompts in rituals and dramatic performances. Based on the understanding of Han, we can learn to become a shaman, mediated by technology. We can heal ourselves and others, proactively shaping our virtual body experiences.

When designing virtual bodies for digital media, we don't usually discuss the experience of how one performs virtual bodies. The terms 'embodiment', 'engagement' or 'immersion' have replaced this discussion and have been critiqued as ambiguous terms in the discourses of digital media (Bayliss 2007). 'Embodiment' has been broadly defined as a participatory state but needs further investigation to be analyzed as diverse phases of body/mind engagement, to contribute to methods of performing virtual bodies in digital space, which would involve wider cross-cultural research.

Mainstream VR devices provide quick and easy immersive solutions for an aspect of embodied experience. However, we need to examine them further as individualized experiences that can access a variety of techniques, modalities and methods (crossing between old and new, analog and digital) for performing virtual bodies. If physical and virtual bodies activate forces that converge into one, a new awareness is produced. This hybrid reality constantly emerges between the physical and virtual body, shaping different embodied states with different self and body perceptions.

The Avatar Life-Review project will continue to experiment with old and new technologies to address diverse populations. With advances in interactive and simulation technology, the potential for multi-sensorial modalities that integrate virtual and physical bodies are endless. In-depth discussions of identity, self-actualization and meaning construction would contribute to diverse therapeutic outcomes and phenomenal experiences in VR, MR, AR environments which are rapidly becoming integral to our contemporary lived experience. Digital technologies allow us to build virtual bodies not only for entertainment but also for exploring alternative ways of communication and self-expression, exploring transcendence, cathartic release, spontaneity and emotional healing.

It is critical to bring alternative perspectives to HCI discussions that have been attached to Western traditions of thought, especially as they understand the body, experience and emotion as universal conceptions. The concept of virtual bodies needs to be continuously explored, introducing an alternative philosophy as well as Western methodologies developed in performance and theater, opening cross-cultural dialogues of body, perception and experience. This re-conceptualization of the virtual body through Han will enrich the potential of technically mediated virtual bodies in digital space, bringing forth rich discussions of interactive modalities, design aesthetics, phenomenology and anthropology.

Disclosure statement

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Notes on contributor

Semi Ryu is an associate professor at Kinetic Imaging, VCU Arts, and a joint appointed associate professor at Internal Medicine, VCU School of Medicine. Since 2002, Ryu has explored the psychological relationship between physical and virtual bodies, based on Korean rituals and oral storytelling. Her 3D animations, interactive artworks and papers have been presented at International venues of screenings, exhibitions, performances and publications in more than 20 countries. Since 2014, her avatar life-review projects have been engaged with older adults and terminally ill patients, in collaboration with gerontologists and medical professionals. Currently, she is working on an avatar storytelling platform for people with traumatic memory, at the Virginia Treatment Center for Children. Ryu has been featured on TEDxRVA with her talk, "Virtual Reality for Han," and received the VCU Arts faculty award for distinguished achievement in Research. (www.semiryu.net)

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Feasibility of Delivering an Avatar-Facilitated Life Review Intervention for Patients with Cancer

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Abstract

Background: Life review, a narrative-based intervention, helps individuals organize memories into a meaningful whole, providing a balanced view of the past, present, and future. Examining how the content of memories contributes to life's meaning improves some clinical outcomes for oncology patients. Combining life review with other modalities may enhance therapeutic efficacy. We hypothesized a life review intervention might be enhanced when combined with a kinetic, digital representation (avatar) chosen by the patient. Our goal was to determine the feasibility of an avatar-based intervention for facilitating life review in patients with advanced cancer.

Methods: We conducted an observational, feasibility trial in a supportive care clinic. Motion capture technology was used to synchronize voice and movements of the patient onto an avatar in a virtual environment. Semistructured life review questions were adapted to the stages of child, teenager, adult, and elder. Outcome measures included adherence, recruitment, comfort of study procedure, patients' perceived benefits, and ability to complete questionnaires, including the Edmonton Symptom Assessment System (ESAS) and Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being Scale (FACIT-Sp).

Results: Seventeen patients were approached, with 11/12 completing the intervention. The total visit time of a single intervention averaged 67 minutes. The post-intervention survey found all patients agreed or strongly agreed (Likert Scale 1–5) they would participate again, would recommend it to others, and found the experience beneficial. After one month, ESAS scores were either unchanged or improved in 80% of patients.

Conclusion: An avatar-facilitated life review was feasible with a high rate of adherence, completion, and acceptability by patients. The findings support the need for a clinical trial to test the efficacy of this novel intervention. Clinical Trial Number NCT03996642.

Keywords: avatar; digital representation; feasibility; life review; motion capture; virtual reality

Introduction

A SYSTEMATIC REVIEW of nonpharmacological psychosocial interventions found some interventions, such as Cognitive Behavioral Theory, meaning-based therapy, and narrative-based interventions (dignity therapy and life review), were further along in establishing effectiveness with positive outcomes in quality of life (QoL), sense of meaning, and dignity among patients with advanced cancer.[1,2] Of these, life review, "an intervention that helps individuals integrate memories into a meaningful whole, providing a balanced view of the past, present, and future,"[3] has demonstrated positive outcomes, including improved QoL, decreased despair, and decreased spiritual distress for patients at the end of life.[4] However, the most effective intervention for mitigating spiritual, existential, and psychosocial distress among patients with advanced cancer is still undetermined.[5]

Virtual reality (VR), which provides real-time animation with full immersion in a virtual world using body-tracking sensors and sensory input, may facilitate life review by creating personal narratives through digital storytelling. VR has been used for rehabilitation,[6] psychiatric disorders,[7] and

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stressful medical procedures.[8] Randomized controlled trials have demonstrated the benefits of VR for acute and chronic pain management in burn patients[9] and for chemotherapy-related anxiety among breast cancer patients,[10] and a meta-analysis found VR-based interventions improved emotional, cognitive, and physical well-being with significant improvements in cancer-related fatigue.[11]

Although VR-based interventions have positive effects on health,[12,13] to our knowledge, no studies have explored the intersection of storytelling, life review, and kinetic digital imaging. We hypothesized that a kinetic, digital representation (avatar) platform would enhance life review therapy.

We developed a therapeutic model incorporating avatars into life review, encouraging patients to review their personal histories and to reflect on their past, present, and future. The primary objective of this feasibility trial was to evaluate patient adherence and the acceptability of an avatar-facilitated life review intervention for ambulatory patients with cancer. In addition, patients' perceived benefit of the intervention was determined, as was our ability to recruit from our supportive care clinic.

Methods

Population

Study subjects were ambulatory oncology patients seen in the supportive care clinic at a National Cancer Institute (NCI) Designated Cancer Center. Inclusion criteria included (1) metastatic or locally recurrent cancer; (2) age 18 years or older; (3) ability to ambulate; (4) ability to understand and speak English; (5) a history of at least two prior visits to the clinic; and (6) at least one Edmonton Symptom Assessment System (ESAS) score ≥3 for pain, depression, anxiety, or well-being. Before the intervention, the physician or clinic nurse approached patients and informed consent was obtained. The Massey Cancer Center and the Institutional Review Board (IRB) at Virginia Commonwealth University approved the study.

Study design

This study was a single-center, prospective trial of 12 patients to establish feasibility and acceptability of VoicingHan, an avatar-facilitated life review intervention. As a single-arm intervention, a sample size of 12 was sufficient to establish feasibility.[14]

Use of Perception Neuron® motion capture system

Perception Neuron is a Motion Capture® (MoCap) device originally developed for video games and biomechanics research; it is portable and relatively affordable. Nine-axis sensors wirelessly embed motion data visualized onto an AXIS Neuron software program. The device uses 10 easily adjustable straps and provides a real-time view of each motion capture session. The system can be modified with hardware and software add-ons for advanced motion capture applications. VoicingHan's main hardware utilized a Perception Neuron Pro Motion Capture device and a Logitech® wireless headset. Software modifications used to create avatars and the environment options included Unity3D and Autodesk® Maya®.

Intervention

The intervention consisted of one session using the Perception Neuron MoCap system to synchronize voice, gestures, and movements onto an avatar in a virtual environment.[15] VoicingHan includes 5 environments that can be chosen by the patient (beach, mountain, city, living room, and empty space) and 64 customized avatar options, including 4 male and 4 female avatars at 4 developmental stages: child, teenager, adult, and elder. The avatar sessions were conducted by a team, including an art professor, research assistants, and a palliative care (PC) physician and nurse. The art professor and PC physician provided oversight within the supportive care clinic, and research assistants and clinic nurses facilitated questionnaires.

The preintervention assessments included the ESAS, European Organization for Research and Treatment of Cancer-Quality of Life Questionnaire Core 30 (EORTC QLQ-C30), and the Functional Assessment of Chronic Illness Therapy (FACIT) Spiritual Well-Being Scale (FACIT-Sp). Each assessment is a valid measure of symptom burden and/or health-related quality of life (HRQoL) in PC or cancer patients.[16–18]

Although changes in QoL scores were not a primary objective of this study, the patient's ability to complete baseline surveys factored into the feasibility of the intervention. Following the completion of the questionnaires, the provider or research assistant escorted patients into a separate room that accommodated full-body movements and the equipment setup (projector, laptop, and MoCap device).

Before the session, patients were given a brief two-minute tutorial demonstrating the motion capture software's ability to detect and project range of motion and lip synchronization. Patients were given the option of full- or partial-body setup. Full-body setup consisted of a chest strap, groin strap, right- and left-hand gloves, right- and left-arm straps, and right- and left-foot straps. Partial-body setup accommodated only the upper body as seen in Figure 1 (hands, arms, and chest strap).

The session used a semistructured interview format with reference to Life Review and Experiencing Form.[19] Patients began at the child avatar stage, progressed to teenager, adult, and then elder stage. Life review questions were adapted to the developmental stages (Table 1). Patients' avatar narratives were screen recorded, edited, and processed as movie files to create a legacy document. Figure 2 provides an overview of the intervention.

Outcome measures

The primary outcomes assessed the feasibility of delivering an avatar-facilitated life review intervention as determined by patient adherence, recruitment rate, acceptability and comfort of study procedures, and patients' perceived benefits. Adherence rates were determined as the number of patients able to complete baseline questionnaires, avatar sessions, post-session surveys, and one-month follow-up questionnaires. Acceptability of the study procedure was measured by the ability and length of time required to complete baseline questionnaires, technical feasibility, compliance with the protocol, and self-reported comfort with the study through open-ended answers. A 5-item Likert post-session assessment captured patients' perceived benefits.

FIG. 1. Avatar full-body setup using Perception Neuron®.

Secondary outcome measures included the length of time required to set up equipment, time to set up the patient, and the total session length of the avatar-facilitated life review. Equipment setup duration was defined by the time taken to preload avatar software, charge the MoCap device, and sanitize equipment before patients entering the room. Patient setup time included a brief avatar tutorial demonstrating the range of movements and lip-syncing capabilities, strapping partial- or full-body connection to patients, and device calibration. The avatar session time began at the start of the

TABLE 1. THE MAIN QUESTIONS ASKED DURING LIFE REVIEW

Childhood
(1) What is your earliest memory
(2) Tell me about your parents
(3) Tell me about your best friend as a child
(4) What was school like?
(5) Do you have any siblings?
(6) What was your home like?

Adolescence
(7) Tell me about your best friend
(8) Are you dating?
(9) Who did you want to be like?

Younger adulthood
(10) What type of career did you pursue?
(11) What are your hobbies?
(12) Did you marry? How did you meet your spouse?

Older adulthood
(13) What are you most proud of?
(14) What relationship stands out as most important?
(15) What were some of the difficulties you encountered?
(16) How do you want family and loved ones to remember you by?
(17) What word of advice would you give your younger self?

semistructured interview and ended at the patient's last response or as determined by the facilitator.

Exploratory aims evaluated HRQoL, symptom burden, and spiritual well-being as measured by the EORTC QLQ-C30, ESAS, and Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being Scale (FACIT-Sp) at baseline versus follow-up.

Results

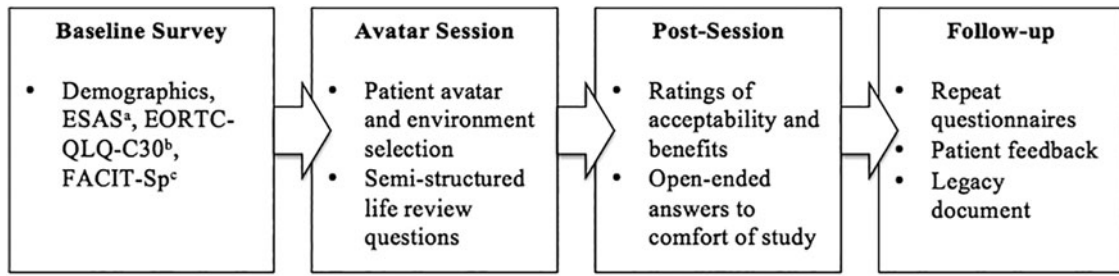#### Patient adherence and recruitment rate

We identified and approached 17 eligible patients in the supportive care clinic either by phone or direct contact over a one-month period (Fig. 3). Twelve patients agreed and consented to participate (71%); however, one patient within the consent group dropped out after completing baseline questionnaires, and declined to proceed with the avatar intervention (dropout rate 8%). The adherence rate was high, with the remaining 11 patients (92%) completing the session and follow-up questionnaires. Patient characteristics are described in Table 2.

Patient's acceptability and comfort of study procedure

There were no major breaches of the protocol. The four baseline questionnaires (demographics, ESAS, EORTC QLQ-C30, and FACIT-Sp) had a mean completion time of 16.3 minutes and were completed by all patients with no assistance (Table 3). Immediately following the end of the avatar session, 11 patients were administered a 5-question Likert post-session survey to capture acceptability and perceived benefits. The majority of patients had strong, positive evaluations (Table 4). Acceptability by patients was high, and all agreed or strongly agreed they would participate in the avatar session again, would recommend it to others, and found the experience beneficial. Most reported the duration of the avatar session to

Baseline Survey	Avatar Session	Post-Session	Follow-up
• Demographics, ESAS[a], EORTC-QLQ-C30[b], FACIT-Sp[c]	• Patient avatar and environment selection • Semi-structured life review questions	• Ratings of acceptability and benefits • Open-ended answers to comfort of study	• Repeat questionnaires • Patient feedback • Legacy document

[a]Edmonton Symptom Assessment System
[b]European Organization for Research and Treatment of Cancer- Quality of Life Questionnaire Core 30
[c]Functional Assessment of Chronic Illness Therapy Spiritual Well-Being Scale

FIG. 2. Overview of Intervention [a]Edmonton Symptom Assessment System; [b]European Organization for Research and Treatment of Cancer-Quality of Life Questionnaire Core 30; and [c]Functional Assessment of Chronic Illness Therapy Spiritual Well-Being Scale.

be acceptable, which averaged 30 minutes per patient; however, the total time spent per patient was slightly more than one hour. Only one patient indicated a score of neutral or less in response to the item, "This experience helped me to reflect on my past, present, or future hopes."

Furthermore, open-ended responses were captured to assess acceptability. Patients reported emotional responses as cathartic or, at worst, to not have been perceived negatively. One patient stated, "never having been in this position [diagnosed with cancer], it was helpful to think about how it has affected me … the structured questions were helpful," while another patient found the use of an older avatar, despite not having yet reached that age, "eye-opening," but not unduly distressing. Another patient stated, "It was a useful tool to prompt people to start thinking of issues that we don't want to talk about." Although minor technical malfunctions occurred during one avatar session, requiring recalibration of motion sensors, all sessions were successfully saved, edited, and burned onto a DVD as a legacy document. The avatar intervention had a completion rate of more than 90%.

Intervention duration

Each avatar session lasted between 20 and 40 minutes (M = 29.3, standard deviation [SD] = 7.3). Breakdown time,
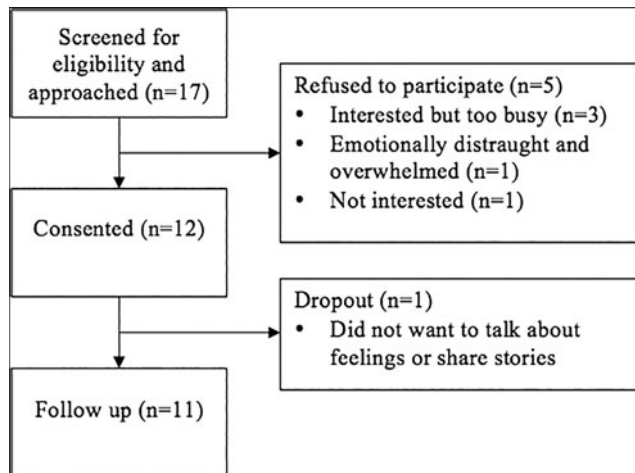
which included saving the video file and unstrapping patients, averaged 6.2 minutes (SD = 2.8). The total patient visit time (length of time to complete questionnaires, patient setup, avatar session, breakdown, and post-session survey) averaged 67.45 minutes (Table 3).

Potential benefit for symptoms and HRQoL

Baseline and follow-up questionnaires were assessed. There were no significant pretest/post-test changes for spiritual well-being or HRQoL scores; however, more patients showed improvements in their Total FACIT-Sp scores than not. Similarly,

TABLE 2. PATIENT CHARACTERISTICS

Characteristics	Consenting patients (n = 12), n (%)
Age	
24–34	3 (25)
35–54	2 (17)
55–64	5 (42)
65+	2 (17)
Gender	
Males	5 (42)
Females	7 (58)
Ethnicity	
Caucasian	5 (42)
African American	5 (42)
Other	2 (17)
Education	
Less than high school education	1 (8)
High school graduate	6 (50)
College graduate/advanced degree	5 (42)
Cancer type	
Genitourinary	4 (33)
Gastrointestinal	3 (25)
Myeloma	1 (8)
Breast	1 (8)
Lung	1 (8)
Neuroendocrine	1 (8)
Sarcoma	1 (8)
Local or metastatic	
Metastatic	10 (83)
Local	2 (17)

Screened for eligibility and approached (n=17)

→ Refused to participate (n=5)
• Interested but too busy (n=3)
• Emotionally distraught and overwhelmed (n=1)
• Not interested (n=1)

Consented (n=12)

→ Dropout (n=1)
• Did not want to talk about feelings or share stories

Follow up (n=11)

FIG. 3. Diagram of recruitment and adherence.

TABLE 3. TECHNICAL FEASIBILITY OUTCOMES AS MEASURED BY LENGTH OF TIME

Variables		Average time (minutes)	SD	Median (minutes, IQR)
Equipment Setup		30.0	24.2	30 (9–47)
Presession Questionnaires	$n = 12$	16.3	8.3	15 (11–20)
Patient Setup	$n = 11$	14.0	3.8	13 (12–17)
Avatar Session	$n = 11$	29.3	7.3	27 (24–35)
Avatar Breakdown	$n = 11$	6.2	2.8	5 (4–7)
Post-session Survey	$n = 11$	1.3	0.5	1 (1–2)
Patient's Total Visit Time	$n = 11$	67.5	12.4	64 (59–72)

IQR, interquartile range; SD, standard deviation.

ESAS scores for well-being showed improvements or no change in 9 out of 11 patients. Total ESAS scores improved for 6 out of 11 patients. Changes in global health, functional scale, and physical symptom scale varied.

Discussion

Although there is growing evidence to support the use of life review for elderly and end-of-life patients, this is the first study to use avatars to facilitate life review in patients with cancer. Unlike most other narrative interventions, our therapeutic model was used in the outpatient setting. We found the intervention was technically feasible and acceptable to patients with advanced cancer.

Studies have combined life review therapy with other modalities, such as memory specificity training, in an attempt to enhance therapeutic efficacy.[20] Using VR and avatars to augment life review in patients may have a number of additional advantages. Virtual environments induce a sense of immersion during a therapeutic interaction, and avatars facilitate navigation in these virtual environments, allowing patients to use gestures and movements, which may enhance verbal communication. The use of avatars in a virtual environment could also enhance patient engagement by reducing communication barriers, providing anonymity, and promoting the expression of patient identity.[21]

VR has alleviated distress in conditions such as Post-Traumatic Stress Disorder[22] and social anxiety disorder,[23] improved well-being in older adults,[24] and supported memory retrieval in young and aged populations.[25] The psycho-logical and spiritual distress experienced by patients with advanced cancer may respond similarly to a VR-facilitated life review. A systematic review and a pilot multicenter study suggest there is enough preliminary support for evaluating the role of VR in larger clinical trials.[25,26]

Despite concerns about the burdens of VR in PC patients,[27] our ambulatory patients did not perceive the equipment setup and breakdown to be arduous even when the motion capture sensors required recalibration. All video and audio recordings of the avatar sessions were successfully saved and converted to a movie file and given to each patient. An album or legacy document has been used in narrative interventions such as dignity therapy and has been shown to bolster a sense of hope and purpose when compared to therapies without this component.[28,29] One study found that a legacy component increased social interaction between patients and caregivers, while legacy activities improved physical symptoms.[30] Moreover, there is evidence that digital legacy has similar effects, increasing emotional comfort and improving communication between pediatric PC patients and parents.[31] Although few clinical trials have studied the effects of legacy documents as an isolated intervention, the creation of a legacy document is a simple and useful activity. Providing the option of remaining anonymous through the use of an avatar may facilitate storytelling and the capture of patients' personal narratives in a legacy document.

As a feasibility study, we evaluated HRQoL, symptom burden changes, and effects on spirituality only as exploratory outcomes. The majority reported improved ESAS and FACIT-Sp scores a month later, suggesting the potential for sustained

TABLE 4. POST-SURVEY RESPONSES RATED ON A 5-ITEM LIKERT SCALE
FROM 1 = "STRONGLY DISAGREE" TO 5 = "STRONGLY AGREE"

Patient	This experience was beneficial	I would participate in this experience again	I would recommend this experience	This experience helped me to reflect on my past, present or future hopes	I was able to easily engage with my Avatar
1	5	5	5	5	5
2	5	5	5	5	5
3	4	4	4	4	4
4	5	4	4	5	4
5	5	5	5	3	5
6	5	5	5	5	5
7	5	5	5	5	5
8	4	4	4	4	4
9	4	4	4	4	5
10	5	5	5	5	5
11	4	4	4	4	4
M (SD)	4.6 (0.5)	4.55 (0.5)	4.6 (0.5)	4.5 (0.7)	4.6 (0.5)

M, mean.

benefit after a single intervention. We decided on a single visit because our institution is a safety-net hospital and because patients may not have the resources for multiple visits. The attrition rate in PC due to symptom burden, fatigue, or death was also a concern in this population.[32] Although some had worse global health, functional, or symptom scores, this is not unusual for patients with advanced cancer experiencing disease progression. Life review may also have some limitations regarding efficacy since trials have reported improvement in some (e.g., spirituality and meaning), but not all aspects of QoL following life review interventions in patients with advanced cancer.[33,34]

This study has several important limitations that warrant further discussion. Since this was a feasibility study, a sample size of 12 was appropriate[14]; however, selection bias may be contributing to the high adherence and acceptability rate because we approached patients who were known to the supportive care clinic team. Generalizability may also be an issue since the intervention required some technical expertise, time, and space that may not be readily available in other centers. We were fortunate to have a large procedure room in the supportive care clinic that would accommodate the equipment and the study team, while providing sufficient room for patient movement. All patients were ambulatory and had excellent performance status to take advantage of the movement-based avatars. Counseling-based interventions administered individually or in person and requiring a highly trained facilitator are cost- and time-intensive. While our intervention does require some technical skill, we found that minimal additional training was required to administer the semistructured life review questions and that the bulk of the intervention can be delivered by a PC nurse.

Conclusion

In conclusion, an avatar-facilitated life review intervention was feasible in the supportive care clinic and acceptable to patients with advanced cancer. By integrating avatars to enhance life review therapy, we anticipate patients will be better supported psychologically, spiritually, and physically. Future studies using this therapeutic model will have a framework to test the efficacy of this novel intervention for mitigating spiritual, existential, and psychosocial distress among patients with advanced cancer.

Human Rights

All procedures performed in this study, which involved human participants, were in accordance with the ethical standards of Virginia Commonwealth University IRB.

Informed Consent

Informed consent was obtained from all individual participants included in the study.

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Author Disclosure Statement

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Embodied storytelling and meaning-making at the end of life: VoicingHan avatar life-review for palliative care in cancer patients

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Embodied storytelling and meaning-making at the end of life: VoicingHan avatar life-review for palliative care in cancer patients

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ABSTRACT

This article presents VoicingHan project as a new form of life-review mediated by digital avatars promoting the reconstruction of self and identity through performativity. Whereas traditional life-review uses interview as primary means of the therapeutic process, VoicingHan is mediated by virtual bodies with self-guided participation in one's own life stories through embodied storytelling performance. VoicingHan enrolled 12-patients receiving outpatient palliative care at VCU Massey cancer center. The storytelling performances were recorded via avatar video format and distributed to participants for review and/or sharing. The present study considered the avatar videos as qualitative data emerging from these individually constructed life review narratives. In this article, the benefits of VoicngHan life-review were demonstrated by analyzing the avatar video narratives, based on theoretical and developmental frameworks. Through the lens of Social Constructivism, this qualitative study deepens our understanding of human-avatar interactions to engage life review process, within the liminal space of life-threatening illnesses.

INTRODUCTION

This paper discusses how digital art can support quality of life for cancer patients in palliative care settings through the creative process of life review, facilitated by avatar virtual bodies. Traditionally, life-review relies on clinician interview and audio-recording as primary means of engaging the therapeutic process. VoicingHan avatar life-review is mediated by virtual bodies which contributes to the playful and therapeutic possibility of constructing a new perception of one's own life stories.

VoicingHan is an avatar mediated life-review project designed for cancer patients, in a palliative care setting. The VoicingHan study enrolled 12 patients receiving outpatient palliative care at VCU Massey Cancer Center, from June to August 2019. Each participant had a session lasting about 30–40 minutes of spontaneously engaged avatar life-review, starting from childhood and ending at elder hood. The storytelling performances were

Figure 1. Avatar full body setup using Perception Neuron®.

Figure 2. Avatars and environments.

recorded via avatar video format and distributed to the participants for their review, sharing and as a legacy document.

The present paper shows the first results of the study, considering the avatar videos as qualitative data emerging from these individually constructed life review narratives. Avatar digital stories were viewed as observational data of participant experience, using primary anchors from social constructivism, life review, and narrative deconstruction and reconstruction to guide the observation and provide a framework for qualitative coding and analysis. Qualitative analysis explored the psychosocial benefits of VoicingHan by re-visiting the concept of life-review through a social constructivist lens (Lincoln & Guba, 2013).

In this article, we discuss the theoretical frameworks for life-review, including discussions of *Social Constructivism and Knowledge Reconstruction, and Retrospective Meaning-Making through Psychosocial Development* which were used to assess the benefits of the

VoicingHan avatar system. Further, we relate these theories with two methodological frameworks that support the operation of avatar: *Embodied Storytelling and Distancing*, as methods grounded in designing the avatar system: VoicingHan. Within this theoretical context, we inform how the system worked for the patients and describe qualitative data analysis and interpretation. Finally, the qualitative results, discussion and conclusions are presented within the theoretical foundations of this inquiry.

BACKGROUND AND THEORY

Life-review (Butler, 1963) is a well-established process used both with the older adult population and for terminally ill patients at the end of life to re-examine their lived experiences and reconstruct meaning through reviewing the events of their lives. Butler's seminal writings as a gerontological psychiatrist regarding the life review process echoed the lifeplan developmental psychology of Erik Erikson (1959) noting that a naturally occurring process of aging (or the approach of end of life) is an engaged sense-making of life experience which therapeutically allows the person to gain a sense of integrity over their lives and in doing so, psychologically prepare for their own death.

In traditional life review therapy, the narrative construction would occur dialogically between therapist and patient. By engaging the patient in a guided history of the past through the developmental challenges of each life stage, the therapist would effectively deconstruct areas that had been psychologically unresolved and allow for the client to "reauthor" their lived experience through recognizing a larger pattern of events which have occurred across her or his lifespan. The meaning and significance of those events may be reinterpreted in a therapeutically beneficial way. Building up a trusted relationship between the patient and therapist is vital to this process, but is often challenging in the clinical setting due to the time, costs and competing demands of medical treatment and psychological counseling.

Unlike traditional life-review, VoicingHan life stories do not follow prescriptive pathways or oral histories of events, but instead are spontaneously triggered by the participant's choice of avatar and virtual environment. Each avatar has a mirrored body movement and lip-synchronization of live speech. The participants perform a virtual body self at any stage in life and customize elements such as gender, ethnicity, and environment, performing events as if happening right now in the present tense. Acting out their chosen life events, the participants are immersed into their life stories quickly and playfully. Each participant constructs a life review which reveals meaning making, rather than focusing on personal history or fixed identity, linked with therapeutic aspects.

Lincoln and Guba (2013) in their seminal writings regarding constructivist inquiry offer a metaphor which engages the human desire for sense-making. If knowledge is a social construction, it is subject to continuous change (Lincoln & Guba, 2013). By extension, if self-knowledge is also a social construction, then it would also be subject to continuous change if not through lived experience, then in reflective perception. Given the nature of the participants' social construction of their stories, the added elements of spontaneity and play allow them agency to re-author their life narratives in a non-threatening manner. This holds the possibility both of therapeutic benefit and personal spiritual transformation.

Inspired by Butler and Erikson's psychosocial developmental theory, VoicingHan offers a role-playing platform to allow participants to engage playfully in settings representing four developmental stages of life (child, teen, young adult, elder). When the participant acts out as a child avatar, the participant is asked to speak about school, friends, family, dreams, and surroundings in a casual way, as if it is happening right now, with little prompting. The life-review starts from a child avatar, then the avatar grows to teen, young adult and finishes as an older adult. In this way, the virtual body avatar passes through the developmental stages and their corresponding challenges, allowing for spontaneous re-authoring of life events as the virtual body interaction is taking place, embracing a social constructivist understanding of one's ongoing life review.

VoicingHan offers embodied storytelling as a methodological framework in operation. The avatar lip-syncs with the participant's speech and mirrors body motion, and facilitates the embodied storytelling into the life-review process. The idea of embodiment supports a phenomenological understanding of human experience that the person's cognition is strongly influenced by aspects of an agent's body beyond the brain itself (Valera et al., 1992). Embodiment involves the way the self is realised by and through the body including through gesture, expression and voice to enact complex emotion and memory processes (Elam, 1991). Attention is given to the ways in which the body communicates on an unconscious, as well as conscious level (Jones, 2007).

Husserl's phenomenological investigations eventually led to the notion of *kinaesthetic consciousness*, which is a consciousness or subjectivity that is itself characterized in terms of motility. Both its movement capabilities and its distinctive register of sensations play a key role in human perception and experience. Embodiment entails emotional experience (Burkitt, 1999). By facilitating speech and behavior, the VoicingHan avatar operates embodied storytelling which relates to emotional experience, triggering different aspects of memories. The relationship between emotion and memory is critical in therapeutic modalities, and can be explored by embodied storytelling shaped by the VoicingHan process (Uttl et al., 2008).

In electronic arts and HCI (Human computer interaction), the embodied interaction was discussed as our presence in the world happens in realtime and real space, in a broader range of worlds we are manifesting, including physical and virtual (Dourish, 2001). VoicingHan avatar offers a dynamic form of participative status, in embodied interaction and storytelling, as the virtual body provides diverse looks, and bodily feelings to facilitate a diverse spectrum of self perception. Based on Social Psychologist Darly Bem (1972)'s self-perception theory, people are constantly influenced by their own bodily feelings, appearance, and utterances in making decisions. People's self concepts are influenced not only by others with whom they interact, but also by their own appearance and behavior, which suggests the potential of avatars to impact real life and self-perception.

This embodied storytelling facilitated by VoicingHan is connected with psychodrama's action methods which place emphasis on both speech and behavior, as life stories are not only verbal but enacted. The founder of psychodrama, Jacob L. Moreno (1953), has criticized talk therapy as relying on only speech. He thought that action, body movements and dynamics could tell more about the difficulties in interpersonal relations than speech itself (Djuric, 2006). By acting out life stories as something happening at present, the VoicingHan participant remembers and re-experiences the past in a fresh way, and spontaneously constructs their own narratives and embodied moments of "here and

now" (Jones, 1996), resulting in narrative construction/reconstruction (i.e. White & Epston, 1990), and retrospective meaning-making in life storytelling process (i.e. Butler, 1963).

The other methodological framework for VoicingHan operation is "distancing" which allows the participants to explore difficult memories, or express something they could not express in their real life. As a form of therapeutic puppetry, VoicingHan avatar works as a digital puppet to aid physical and emotional healing, based on a dramatic reality (Bernier & O'Hare, 2005). Dramatic reality is a powerful method of healing because it provides a way to re-experience pain, sometimes overwhelming pain, through the safety of distance. Drama therapist Robert Landy defines "aesthetics distance" as a balance of affect and cognition. When at aesthetic distance, an individual is able to be playful, responding spontaneously to new experience and revisiting old experience as if for the first time (Landy, 1996 &, 1997). In VoicingHan, the participants' re-authoring and meaning-making process is supported by a distancing effect, facilitated by the avatar virtual body and environment.

METHOD

Technology, recruitment, procedure

In the Voicinghan pilot study, Avatar life-review sessions were conducted with 12 cancer patients from June to August 2019, at the VCU palliative care outpatient clinic, at Virginia Commonwealth University's Massey Cancer Center.

This intervention consisted of one session each using the Perception Neuron motion capture system, Autodesk Maya and Unity. Specifically, the Perception Neuron ® MoCap system was used to synchronize gestures and movements onto an avatar in a virtual environment (PN), with minimal latency. Seventeen body sensors wirelessly embed motion data visualized onto an AXIS Neuron software program. The device uses easily adjustable straps and provides a real-time view of each motion capture session. Logitech® wireless headset and SALSA unity asset were used for lip sync process. Patients were given the option of full-body or partial-body setup. The full body set-up consisted of a chest strap, groin strap, right and left-hand straps, right and left-arm straps, and right and left-foot straps.

VoicingHan includes five environments that can be chosen by the patient (beach, mountain, European attraction, living room, and empty space) and 64 customized Avatar options, including four male and four female avatars at four developmental stages: child, teenager, adult, and elder, and four ethnicity choices. The Avatar sessions were conducted by a team including artists, research assistants, palliative care physician and nurse.

Upon IRB and contract completion, we recruited patients to participate in the Avatar life-review intervention. Prior to the intervention, patients were approached by the physician or clinic nurse and informed consent was obtained. Inclusion criteria included (1) metastatic or locally recurrent cancer, (2) age 18 years or older, and (3) the ability to ambulate.

The study withdrawal procedures were set as usual in clinical studies. A patient may decide to withdraw from the study at any time. Participating is voluntary. However, a patient may be removed from the intervention for one of the following criteria: (1) unwillingness or inability of the patient to comply with the protocol requirements, (2)

disease progression that prevents further administration of intervention, (3) general or specific changes in the patient's conditions that renders the patient unacceptable for further treatment in the judgment of the investigator.

VoicingHan participants first completed an array of self-reported questionnaires to assess physical, spiritual, and psychological well-being and elicit relevant demographic and medical information. Following this initial intake, participants were brought to a separate room that accommodated full-body movements and equipment setup (projector, laptop, and MoCap device). Before the session, participants were given a brief two-minute tutorial demonstrating the avatar's ability to detect motion and lip-synchronization automatically, as well as instructing how avatar life-review works, between the mediator and the participant. In this live demo, the mediator addressed a question to the avatar on screen, for example, "what is your name?". The participant responded as the avatar on screen, using the present tense. Patients were given the option of full-body or partial-body setup. Full-body setup consisted of a chest strap, groin strap, right and left-hand gloves, right and left-arm straps, and right and left-foot straps. Partial-body setup accommodated only the upper body (hands, arms, and chest strap), single arm, etc. The session followed a semi-structured format. Patients began at the "child" avatar stage, progressing to "teenager", "adult", and ending in the "elder" stage. Life review questions and prompts began by situating the virtual body in the chosen virtual environment and were adapted to the selected developmental stage. Patients' avatar narratives were screen recorded, and processed as movie files to create a legacy document. Brief surveys were given to all participants upon completion of their VoicingHan life review session in order to assess impact on quality of life, satisfaction with the VoicingHan experience and recommendations for improvement to the experience.

The initial study of VoicingHan was designed for assessing feasibility of delivering an avatar facilitated Life-review Intervention for patients with cancer. Seventeen patients approached with 11/12 completing the intervention. Total visit time of the single intervention averaged 67 minutes. Post-survey found all patients agreed or strongly agreed (Likert Scale 1–5) they would participate again, recommend it to others, and found the experience beneficial. After one-month ESAS scores were either unchanged or improved in 80% of patients. In previously published results, the team found that Avatar-facilitated Life-review was feasible with high rate of adherence, completion, and acceptability by patients (Dang et al., 2021).

Qualitative data and analytical methodology

Here we present the qualitative analysis of the VoicingHan project based on the avatar videos which emerged as the artifacts of the feasibility study. An IRB amendment was obtained for this retrospective qualitative analysis to introduce a qualitative researcher onto the project team. The project team recognized the potential benefit of this retrospective analysis when the feasibility study revealed that each avatar video represented a distinct, person-centered performance narrative which was embedded in the participant's life story. Each performance, although characterized by creativity and imagination, carried the capacity for adaptive psychosocial development as well as retrospective meaning-making.

Social Constructivism (Lincoln & Guba, 2013) guided the methodology for the retrospective qualitative analysis of the VoicingHan avatar videos. Each video was considered as a stand-alone performance narrative, potentially including spontaneous elements of psychosocial development in childhood, adolescence, adult and older adulthood to mirror the settings of the VoicingHan process; narrative construction/reconstruction as characteristic of life review including elements of retrospective meaning-making and reauthoring of the narrative. Nine primary themes drawn from these guiding theories were used as the anchors for a template analysis. Four additional themes related to participant instrumental and psychological satisfaction, spirituality, and transformation were added to the template, as these were implicit conceptual components of the project either in the artistic design of VoicingHan (spirituality; transformation) or echoing the quantitative measurement (psychological satisfaction, instrumental feasibility). The final template was used as the analytic tool for observational analysis of the avatar videos. As each video was viewed, portions reflecting one (or more) template themes were transcribed and moved to the analysis template as a singular data point reflecting that theme.

The qualitative researcher, who was not a part of the VoicingHan life-review sessions, completed the observational analysis of the videos by unitizing the performance narratives into short segments and coding them using the template structure. Units and coding, as well as themes and sub-themes that emerged under each primary template anchor, were iteratively reviewed with the researcher that had collected the data and designed the interactive system to promote credibility and confirmability. Transcribed units (with pseudonym and time stamp) were retained under each template theme, then subsequently verified by the project team. The purpose of this joint review was to develop a holistic understanding of the process as objectively and accurately as possible by external review (the qualitative researcher) and the internal review of the project team to assess the construction and meaning-making made evident in the emotions and behaviors of the cancer patients during VoicingHan life review.

Three phases of qualitative analysis were conducted. In the first phase, the Avatar Video was considered as a whole to see if the performance narrative held together as a recognizable "person" with distinct traits as projected in a 30 minute video and observed by a researcher unfamiliar with the research participant. A short summary of each "character" was developed and shared with the research team to ascertain whether the avatar video as socially constructed was a recognizable version of the participants.

The second phase of the analysis considered the therapeutic possibility of life review and narrative reconstruction in each VoicingHan avatar video by observing for spontaneous resolutions of tasks of psychosocial development; narrative reconstructions of meaning; restorying of dominant and subjugated discourse; and noting unitized examples of these elements using template analysis.

The third phase of analysis examined the extent to which life review and meaning-making can be considered therapeutic across avatar videos as performance narratives. In this third phase of analysis, we considered how the construction of the narrative (phase one) and the components of life and review and meaning-making (phase two) were impacted by the expressed instrumental experiences and/or psychological satisfaction reflected by participants spontaneously in the VoicingHan Avatar videos.

RESULTS

The qualitative data analysis results from the VoicingHan project are presented according to the three phases of analysis previously described.

Phase 1: Narrative inquiry: construction of individual performance narratives

Through the analysis of the VoicingHan performance narratives, we find ample evidence of both spontaneous performance and developmental life review which ranged from descriptive memory to complex reflection. As a result, a short character description was generated, reflecting the socially constructed self and meaning-making made evident by the external observer of the avatar life-review, unfamiliar with the human participants in the project. Here some examples of the short character description:

> Ellison began her narrative with passive engagement over surroundings and choices; through restorying and "de-romanticizing" her life experiences and focusing on her own decisions within those experiences, Ellison finally characterized liberation over the events of her life. She experienced the performance narrative as liberation over her illness and her resistance to illness re-defining her remaining time in life.

> Odile identified with her avatar as representing all that she wanted to be right now; her performance was joyful and filled with laughter in spite of difficult events; throughout her narrative she characterizes herself as "being free by rising above."

> Tyson described himself as someone who "did what he needed to do" and acknowledged that it wasn't always what others thought he should be doing; he lives life and depicts his avatar as pragmatic and hedonistic, enjoying life now, "because I don't want nothing else than death."

> Kaitlyn disengaged often and wasn't sure if she could take this seriously; she needed to be redirected back to talk to her avatar, but when she did she discussed her parentified upbringing ("they had their playtime while I worked to take care of the family") and reminisced about how formal structures, like her Catholic faith, gave her a container for making meaning of her life.

> Sophia portrayed a life filled with choices that moved away from risk and towards predictable stability and related that now she felt passivity even about how her avatar was depicted or in what environment the story was located; she told her younger avatar self to set goals, and to be braver.

> Tracy's family was present during her avatar performance and she spoke mainly to them; she didn't want to replay her past as much as communicate that her priorities had shifted from money and status to what was really important, her family.

> Jordyn thought at first that it was "really weird" to talk to her past-self avatar, but ended up telling some in-depth stories about two pathways to success: the road she travelled, and the road travelled by a close friend which could have been her road; she saw herself "in a different lane" than where she began her life and became teary and unable to see her future self.

> Parker had a great time playing, and making the best out of each age in her performance; when her teenage self was asked who she most admires she said, "myself, of course, because I'm 15!" Her playfulness of performance was evident at every age.

> William is a deep thinker who could watch the role of depression take hold on the narrative of his life; he was reflective in the long-run and felt he finally made it to a place where he had

accepted himself and in doing so could learn to love others: "It's sort of an arduous way to figure out who you are, by doing everything you don't like."

These socially constructed characters emerged spontaneously in the course of the Avatar life view video which consisted of 30–40 minutes of storytelling. The mediator and the participants had met only for that singular interaction, and the qualitative observer had no knowledge of the human subjects in the story, only their projected avatar video.

Phase 2: Therapeutic possibility: life review and narrative reconstruction

Psychosocial development and life review

Erikson's stages of psychosocial development offer a framework both for traditional life review, and were similarly applied to the VoicingHan avatar life-review. As noted previously, VoicingHan is a chronological but non-directive life review. Even so, participants naturally moved themselves into situations where they confronted the theoretical development challenges attributed by Erikson to the developmental stages their virtual body was occupying. In this analysis, participants were able to confront and resolve key developmental moments through their socially constructed avatar. Table 1 offers a summary of specific examples of developmental themes (and their resolution) which were observed spontaneously emerging across the lifespan within the VoicingHan performance narratives.

As noted in Table 1, VoicingHan participants used reminiscence, play and storytelling with their virtual body avatar to revisit their life narratives and spontaneously engage the developmental tasks and crises as described in Erikson's psychosocial development theory.

Table 1. Developmental life review stages, themes, and examples.

Developmental Stage	Developmental Conflict	Themes	Examples:
Childhood	Industry vs Inferiority	Childhood Lost and Rediscovered New Meaning to Old Actions	Ellison, describing a childhood lost, "I'm right with it now, but I was mad about it then." Tyson, "Eventually I took up boxing. I used to fight a lot at school, and that channeled it in a good way."
Adolescence	Identity vs Role Confusion	Seeing the emergent self Carving identity from adversity	Sophia, "Friends are important to me. And in high school, that meant cliques where you were in, or you were out. I didn't see that then, though, because I was in one." Jordyn, describing her sense of responsibility: "After my parents separated it was just my Mom and she worked a lot, so we learned to take responsibility."
Young Adulthood	Intimacy vs Isolation	Following the heart Finding oneself after heartbreak	Jordyn, "I shifted into a different lane once I met my husband; it wasn't just about me anymore." William, "I kind of blew it. I had a girlfriend and we broke up. Now I know it was depression but I struggled a long time after that until I finally figured out who I was and what was happening to me."
Older Adulthood	Integrity vs Despair	Affirming life choices and circumstances Struggling to see the future	Kaitlyn, reviewing the challenges of her life, "I see meaning now in love and family." Jordyn (tearful): "I just can't see myself old, I just don't think it's possible." She later says, "its ok, though. It was very therapeutic to say that out loud."

Reconstructed meaning themes and examples

In addition to descriptive findings by developmental stage, the performance narratives viewed across participants offered specific examples of *agency, meaning-making* and *social reconstruction* characteristic of traditional life-review narrative therapy.

Agency: Butler asserts that one of the psychological benefits of life review is autonomy over meaning making. In the VoicingHan study, this agency was observed in two primary ways in the avatar narratives: 1) *Recasting life events* beyond one's control as adaptive; and 2) *Retrospective sense-making* about later life events through earlier life choices.

For example, Tyson *recasts his life events* by telling his avatar a story about "reworking my life" through taking up boxing, confronting the tendency to fight like his biological father who had rejected him and transforming it into something adaptive and competitive. Similarly, Kaitlyn recasts herself as a consistent caregiver to her siblings, in response to having disrupted peer relationships from extensive family moves as a child.

Retrospective sense-making was related to agency, with a mix of positive and negative implications. Ellison chides her younger self for not wearing glasses when she was younger, noting her belief that this earlier life choice had led to later life vision problems. On the other hand, Jordyn engages in retrospective sense making about her short and long-term life choices and finds ways for her life lessons to help guide her through her current diagnosis, especially in parenting her children, "My son told me the other day, 'we're here for a good time, not a long time' and I wanted to tell him, 'yeah, but think about the long time and do the things that will help you have a good time over the longest time.' This diagnosis has taught me that."

Retrospective meaning-making is also a hallmark of Narrative Therapy. Spontaneous therapeutic responses were noted while observing the avatar videos. Most poignantly, Odile conversed with her avatar to be able to talk through the death of her son, first avoiding the topic and eventually spontaneously talking through the details of the tragic event and stating her sense of meaning-making, "I say God took one brought back two, that's what I say, my granddaughters." Sophia also reaches a retrospective peace with undesirable life events as she talks with her older adult avatar about the emotional benefits of age, "There is some stability coming to the age where you don't have to struggle with the decisions; it just is what it is. The things that happen when you're young are very stressful; I don't care what anybody says."

Social Construction and Subjugated Discourse Given the opportunity for social construction to allow freedom from structures of social expectations, the analysis also listened for examples of Foucault (1972)'s reauthoring of the dominant vs. subjugated discourses in the emergent life stories. This differed from general re-authoring through performative play, in that the reconstructed life stories fitting this criterion emphasized assertion, explicitly shifting power in their constructed narrative. For example, Odile reauthored being shamed in school for talking too much as a story she laughed at defiantly in her performance, in which she overrides the teacher and her personality wins out, "And see, I'm still talking now; I'm a people person." William spoke directly and frankly to his projected avatar who felt socially constructed: "Here's what you should have known: the only thing that's important in life is to figure out who you are, and make good choices about that. Your grades are your grades, your learning is your learning. That only happens once and if you miss that boat, you miss that boat. It's sort of an arduous way to figure out who you are, by doing everything you don't like."

There was even some push back in the avatar videos around the social assumptions underpinning seemingly benign questions by the facilitator, like a question about a "first kiss" being quickly confronted by, "I lived on the street; I just did what I had to do." Likewise, for a suggestion that a beach trip with one's partner was romantic came a retort that, "no, there were just a whole lot of bugs and a bad marriage." This deconstruction was paired with the opportunity to reconstruct in ways unique to the person, rather than aligning with social norms or constraints.

Phase 3: Avatars and meaning making: instrumental and psychological influences

In the VoicingHan demonstration, attention was paid not only to what was socially constructed in the avatar life reviews, but also to how those social constructions fit together with instrumental and psychological observations from the participants. In terms of instrumental satisfaction, participants required initial guidance to look at and talk to their avatar; when this shift occurred, it was common for participants to joke with the avatar as if seeing another person, ("Avatar, you look like I do now!"; "Oh, lucky you . . . you have hair!"; "well look at you, you've got hips there but you still don't have a butt!"). Some people commented on the avatar ("the fingers are kind of creepy") and some on the backgrounds ("why are the trees moving?") but often they used the background visuals as prompts for conversation, or used their arms to move and make a point. The connections between the virtual body and the physical body were evident in these unprompted, instrumental comments and connections. In general, participants would laugh and joke at any instrumental glitches ("look, I sit down and my hand disappears!) and engaged with the added adaptability their avatar sometimes had beyond their own physical strength ("She can go on standing, but I need to sit down.") The move in and out of play was evident when the participant/avatar conversation moved almost seamlessly from first person to third-person references.

The psychological connection between the participant and avatar was also evident to the researchers. For example, Jordyn stated, "I'm talking to my younger self here but I can only talk about this in the present . . . maybe the avatar helps that." Similarly, Kaitlyn who was having trouble connecting with her avatar at first was asked to pretend she was doing sports ("swing a tennis racquet"; "pretend you're swimming") which effectively synched her own motion with the motion she saw performed back; this relaxed her and helped her engage conversation. In Sophia's case, there was both an instrumental and psychological break with her avatar when someone entered the room while filming was occurring. While it was a relatively normal occurrence for a hospital room, it clearly was taken as an invasive action given the level of performativity and social construction taking place, "I found it very distressful and distracting, when she walked in just then . . . who was that anyhow . . . I was in my place and that just blew it all out . . . if anyone walked in, it would be the same. OK, I'm not ready anymore but let's go on." It's noteworthy that Sophia and her avatar were no longer able to be "in sync" after that point of the video, and she responded to all remaining prompts flatly without further character development.

An interesting anomaly was noted with Tracy who had family present during the interview, and was the only interview where sustained, performative interaction between participant and avatar was not attained. The avatar life review was superficial and distracted, often with family heard laughing or chiming in to respond to a prompt instead

of the participant. In this recording (and none of the others), the participant directed praise and advice to specific people in the room through her avatar. However, she was not able to apply (and in fact, directly avoided) talking about her own "pre-family" life growing up, "well, I can't talk about that here." The instrumental connection was made, but psychologically her life review process was impacted by the priority of the physical presence of loved ones which limited playful engagement with the avatar.

DISCUSSION

The VoicingHan avatar life-review demonstration offered a novel opportunity to move beyond the assessment of technological and pragmatic effectiveness of an interdisciplinary intervention in end-of-life care by exploring meaning-making and psychological impact of the intervention on participants. Through the lens of social constructivism, this qualitative study deepens our awareness of human-avatar interactions to engage life review and the role of play and performativity within the liminal space of a life-threatening illness.

The three phases of qualitative analysis highlight the value of VoicingHan avatar life review to engage patients and how the social construction of self and meaning-making theoretical framework are suitable to explain their experience and therapeutic effects. Through engagement in the VoicingHan process, participants showed adaptation to and overcoming physical limitations, spontaneous immersion into and meaning making regarding prior life events, and organically occurring reconstruction and reauthoring of life stories through the avatar life-review process. Spontaneous experiential feedback observed within the avatar videos suggests that these avatar life-review sessions were adaptive for participants psychologically as well as socially. While further studies are needed to determine the extent to which the trends from this feasibility study may be generalizable, we are encouraged by these findings which situate the intervention within existing studies regarding the therapeutic benefit of life review therapy (Haber, 2006; Keall et al., 2015).

Our results show that one of the most important realizations of the VoicingHan Life-Review is that the unscripted, non-directive prompts pertaining to environment and particular lifespan points led organically to an embodied life review process that allowed the reconstruction of the self narratives in significant moments of their lifespan. It took very little prompting for people to go to areas of developmental challenge and to resolve them spontaneously and dialogically through a combination of memory and story, engaging their avatar. With several participants, this occurred within minutes of the time the interview started which is quite remarkable considering the typical length of time to establish trust within a traditional therapeutic relationship. The literature often considers the life review timeframe to be six or more weeks (Haber, 2006; Haight, 2000) with various applications of traditional life review involving multiple therapeutic sessions and specialized professional training (Keall et al., 2015). While this feasibility study does not claim a particular degree of psychotherapeutic efficacy, the potential for therapeutic benefit in a shorter amount of time is worthy of further exploration, given the unique person-avatar engagement and embodied storytelling within Voicing Han.

Instrumental engagement with the VoicingHan avatar through movement and play also appeared to psychologically "sync" the participants and their avatars to mutually

engage in this life review process. Once that instrumental engagement was achieved through eye contact and mirrored movement, the natural progression of conversation led to high levels of engagement, story reconstruction, and meaning making in spite of physical mobility of participants. Consistent with other life review studies, certified and consistent training of facilitators is essential to insure safety and efficacy in instrumental domains in future studies (Haber, 2006).

Finally, we would like to emphasize the role of play and spontaneity which created an opportunity for narrative life-review which could transcend limitation of time or physical ability. With the exception of one disengagement produced by accidental interruption, participants remained engaged and showed depth of conversation and meaning-making over time. VoicingHan produces a tangible video artifact, which is something considered of benefit (and expense) across studies of therapeutic life review (Haber, 2006). The resulting VoicingHan video became a narrative reconstruction of the person's life, complete with challenges, strengths and meaning making. The therapeutic benefit of Voicing Han thus rests in the hands of the participant, magnifying the value of social construction to psychological well-being at the end-of-life. These findings are encouraging for future studies exploring VoicingHan as a form of self-directed life review. While therapeutic benefit has been shown from life review interventions across studies, they are not widely practiced in part because they may be considered too lengthy or practitioner-driven (Keall et al., 2015). These concerns are addressed substantively through VoicingHan, in a participant-driven manner which also minimizes the stigma often associated with mental health interventions, which is another barrier often encountered with participant engagement in life review (Keall at al, 2015).

While opening the door to several possible therapeutic benefits, this study has several important limitations that warrant further discussion. The initial sample of 12 was appropriate for a feasibility study and also served as a realistic size for the exploratory, observational analysis reflected here. However, we recognize that selection bias may have contributed to willing engagement of participants in the intervention because we approached patients who were known to the supportive care clinic team (Dang et al., 2021).

It is noteworthy that counseling-based interventions administered individually or in person and requiring a highly trained facilitator are cost and time intensive. While our intervention does require some technical skill, we found minimal additional training was required to administer the semi-structured interview questions and that the bulk of the intervention could be delivered by a palliative care team member.

CONCLUSION

In this paper, we have presented some results of the qualitative analysis of the data obtained during the VoicingHan Life-Review implementation. This study's foray into the psychological dimensions of a play and performativity-based intervention demonstrate that physical and virtual bodies can and do work in concert to add depth, dimension and meaning into life, even in its most complex and challenging moments encountering the proximity of death.

Digital society includes the virtual and augmented dimensions of the bodies and simulated realities that contribute to the whole mechanism of social construction. Our

perception of reality, knowledge and identity is constructed and reconstructed, constantly mediated by old and new technologies. Within our agency as human beings, multiple states of self and reality are constructed, not only psychologically, phenomenologically, and socio-culturally, but also technologically. In-depth discussions of social constructivism, individual autonomy and meaning making processes as embedded aspects within the interactions between physical and virtual bodies are vital to future scholarly endeavors exploring the application of VoicingHan.

Lastly, the cross-disciplinary and cross-cultural benefits of this work cannot be understated. The VoicingHan project was created by professionals from diverse disciplines: art, clinical medicine, social work, and computer science exploring co-constructed knowledge and engaging in discussions from various points of view. From our collective work, we were able to learn from the lessons shared through the VoicingHan avatars as well as with each other. We embraced knowledge from Korean shamanism and healing rituals within the structure of technology enhanced western medical care and came away transformed as well (Ryu, 2020). This exploration lays the groundwork for future cross-cultural and cross-disciplinary applications to emerge, and reminds us that play and performativity are integral to this process of emergence, for participants at the end of life as well as to those who engaged in practice and research within this context.

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