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**Art, Immersive Learning Technologies, and Mindset:  
A Mixed Methods Study**

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**Art, Immersive Learning Technologies, and Mindset:  
A Mixed Methods Study**

**by  
Ryan Myers**

**Dissertation**

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## **Dedication**

Dedicated to Laurie Myers. You always believed in me. May you rest in peace and always remain in my heart.

Dedicated to Glenna Myers. I will forever love you. You taught me the meaning of love.

Dedicated to Reyna Vazquez. You gifted me full access to your lived experience. You inspire me.

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## **Abstract**

### **Art, Immersive Learning Technologies, and Mindset: A Mixed Methods Study**

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The University of Texas at Austin, 2022

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This dissertation is a report of a mixed methods study designed to examine art education, immersive learning technologies, and mindset. The study is based on the development and application of a digital online museum resource used as a mindset intervention and grounded in qualitative data about transforming existing museum curriculum to a digital online museum resource. The goal of the study was to statistically measure subjects' changes in empathy towards undocumented immigrants from Mexico, implicit theories of self, beliefs about social mobility, and views of malleability of intelligence after engaging with the digital online museum resource.

The researcher used an exploratory sequential design. This method has three phases: qualitative, development, and quantitative. Each phase builds sequentially off the prior phase.

In the first phase of this study an ethnography was conducted between 2016-2018 to collect qualitative data to use as a narrative in relationship to a pre-selected artwork and museum lesson plan ( $n = 1$ ). In the second phase of this study a digital online museum resource was developed, based on qualitative data in phase 1, and was tested for content validity. In the third phase the digital online museum resource was used as an intervention that was administered to a sample of undergraduate college students ( $n = 237$ ) as part of an experimental design to quantitatively measure change in four domains of mindset: implicit theories of self (change\_self), beliefs about social mobility (change\_society, views of malleability of intelligence (change\_IQ), and empathy towards undocumented immigrants from Mexico (change\_empathy). To increase the rigor of the study, two intervention conditions were included in this phase: a more immersive and a less immersive condition. A mindset survey with four subscales was used as a pre and post intervention test to measure changes in mindset across the four mindset domains mentioned above.

A repeated measures MANOVA, collapsed across experimental conditions, found a significant multivariate effect,  $F(4, 214) = 24.20, p < .001$ , indicating an overall positive mindset change from pretest to posttest. A follow up MANOVA found a significant multivariate effect,  $F(4, 213) = 6.72, p < .001$ , indicating an overall effect of condition. Additional univariate analyses revealed significant mean differences between condition A (more immersive) and B (less immersive) for change\_IQ,  $F(1, 216) = 20.71, p < .001$ , change\_society,  $F(1, 216) = 12.55, p < .001$ , change\_person,  $F(1, 216) = 16.49, p < .001$ , and change\_empathy,  $F(1, 216) = 18.10, p < .001$ . Participants exposed to the more immersive condition displayed greater change in all four domains.

A 2 (Condition) x 2 (Ethnicity) ANOVA found no statistically significant effects of ethnicity for all four domains of mindset, and there were no significant Condition x Ethnicity interaction effects on all four mindset domains. A second 2 (Condition) x 2 (Gender) ANOVA found no statistically significant effects of gender for three of the four domains of mindset: change\_IQ, change\_society, and change\_person. There was a statistically significant effect of gender for change\_empathy,  $F(1, 213) = 4.049, p = .019$ . Additionally, there were no significant Condition x Gender interaction effects on all four mindset domains.

In conclusion, results show a significant difference in pre and post intervention survey scores for all four mindset domains. The results also show significant mean differences in all four mindset domains between the two experimental conditions, with participants experiencing greater change in the more immersive condition. The researcher concludes that just as learning with art in a museum can be “an experience” (Dewey, 1934), learning with art online in a digital format, incorporating immersive learning technologies and digital storytelling, can also be “an experience.”

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## **Chapter 1: Introduction**

This dissertation is a report of a mixed methods study designed to examine art education, immersive learning technologies, and mindset. The study is based on the development and evaluation of a digital online museum resource intended to affect participants' implicit theories of self, beliefs about social mobility, views of malleability of intelligence, and empathy towards undocumented immigrants from Mexico.

This first chapter of the dissertation presents the background of the study, introduces the research problem, describes why this study is both timely and significant, and presents an overview of the methodology used by the researcher. This chapter concludes with an explanation of the limitations of the study.

A classroom is probably what most typically comes to mind when we think about a physical learning space. Formal education spanning from kindergarten to high school is a part of most students' lives. However, physical spaces exist where teaching and learning thrive. A museum offers a space for learning experiences that are very distinct and unique. The objects within museum spaces offer learners opportunities for constructivist learning and amplified opportunities for empathy.

Learning has also become more common in digital spaces. Information once reserved for textbooks and classroom lectures is now easily accessible online for a generation of digital natives. Additionally, a variety of modes of remote communication and digital collaboration make online learning and the opportunity it brings for exchanging ideas more readily available for learners and instructors.

Museums have broken the digital barrier by moving into digital spaces to varying degrees. Examples include making images of artwork and exhibitions available online, along with accompanying contextual information in various multimedia forms. Some

museums have created virtual tours of their exhibits. Specifically, in terms of education, examples include lesson plans intended to be used in classrooms that accompany specific works of art and audio and video lectures.

Like with online and remote learning, online museum learning should also be studied in terms of efficacy in achieving established museum education goals. Much research has been conducted on remote and online learning, but there is a large gap in research specific to online museum education. It is the purpose of the researcher of this study to address this gap.

## **BACKGROUND OF STUDY**

It is important to briefly describe the developments and changes in society at the time of this research. First, and maybe most significant, is that part of this study was conducted during a worldwide pandemic. At the time the researcher was writing this dissertation, approximately 93 million people were infected with the COVID-19 virus worldwide, and over one million people had died.

Because of this worldwide pandemic, countries around the world implemented novel and timely restrictions to mitigate the spread of the virus. As the virus began spreading in late 2019 and early 2020, countries around the world rapidly began to institute varying measures of containment such as economic closures, school closures, travel bans, and varying health and safety measures including mask wearing and social distancing. Restaurants closed dining rooms, cities introduced curfews, and schools worldwide switched from classroom instruction to online learning. Established societal norms changed radically in a relatively short space of time.

Vaccines and vaccine boosters became widely available in the U.S. at the conclusion of the writing of this dissertation and infection and death rates have decreased,



but the impact of this worldwide pandemic will endure well into the future. Our current way of life may replace the old as we grow accustomed to a “new normal.”

One sector of the economy and culture that has been greatly impacted is the arts, including music, theater, and visual exhibitions. Most museums shut down completely throughout the worst of the pandemic and began opening again with limited capacities of visitors. These closures and capacity shifts greatly impacted museum education departments.

Museum educators shifted to new modes of teaching because group tours through exhibitions were not possible during the pandemic. Museum websites became more robust by adding new resources meant to fill the void of in-person group tours. However, it may be unfair to compare these new resources to traditional group tours, or to assume they are a viable replacement, as physical learning in a museum space is considered a unique learning experience. The question then arises: How well do museum learning experiences transfer to circumstances of online learning?

As with general worldwide education, professional developments within art education have been greatly impacted by the worldwide pandemic. Educators have been asked to both develop and deliver art learning experiences in ways that are very different from in person museum teaching, ways that fall outside the expertise, training, and education of museum professionals.

Accompanying and pertinent to education are major developments in technology that have impacted teaching and learning. Immersive technologies like augmented reality (AR) and virtual reality (VR) have become ubiquitous and the video game industry is more profitable than the movie industry. Social media platforms permeate all facets of life to the point that they play a crucial role in politics and public opinion.

In addition to contemporary technological, societal, and professional developments, it is also important to note developments in social justice at the time of this research study. Contemporary worldwide immigration and race issues have endured and have been amplified by the COVID-19 pandemic. Divisive and dangerous political rhetoric about race, border security, and travel bans have further polarized our world. In the U.S. during the time of the pandemic, protests sympathetic to movements like Black Lives Matter happened nationwide in response to racial injustices by police, government funding went to building new border walls to prevent unauthorized border crossing, and travel bans on specific races were instituted.

It is the purpose of this dissertation to understand how art education, immersive learning technologies, and the mindset framework connect to one another to develop a digital online museum resource. This resource will be used as a quantitative intervention. The researcher will use pre and posttests to statistically test subjects' change in their implicit theories of self, beliefs about social mobility, views of malleability of intelligence, and empathy towards undocumented immigrants from Mexico.

## **PROBLEM STATEMENT**

Develop a digital online museum resource, including art and an oral history, to use as an intervention to statistically measure subjects' change in implicit theories of self, beliefs about social mobility, views of malleability of intelligence, and empathy towards undocumented immigrants from Mexico.

Research Questions:

How can art, digital storytelling, and immersive learning technologies be used to develop an online museum digital resource?

- What is the process of transforming existing museum curriculum to an online learning experience?
- How can qualitative results, gathered through ethnography, be reported through art, digital storytelling, and immersive learning technologies?
- Does an intervention using art, digital storytelling, and immersive learning technologies produce a statistically significant difference in implicit theories of self, beliefs about social mobility, views of malleability of intelligence, and empathy towards undocumented immigrants from Mexico?

#### **PROFESSIONAL SIGNIFICANCE OF STUDY**

The museum referenced in this study is one of the largest university art museums in the U.S. and has one of the most comprehensive art collections in its state's region. With a permanent collection of more than 18,000 works, the museum has galleries devoted to modern and contemporary American and Latin American art, European paintings, print collections, Western American art, and temporary exhibitions. In addition to the galleries, the museum also has an auditorium, print study room, and classrooms, making it an important resource to university students, staff, and faculty.

The museum has a dedicated Education Department with a full-time museum educator specifically charged to foster and maintain university engagement. With a student population of more than 50,000 undergraduate and graduate students, faculty and staff of more 21,000, and 18 colleges and schools, the university's outreach tasks are very large responsibilities.

With the goals of showcasing museum teaching pedagogy, making curricular connections, and being a resource to a diverse university population, the problem becomes

how to communicate with these groups and accommodate museum visits. The task is to provide outreach in a way that does not simply take the place of a museum visit but provides an experience that promotes the goals of the museum as well as fosters motivation to visit.

This goal became even more pronounced at the time of this study due to the worldwide COVID-19 pandemic that shut the museum down to in-person learning. The importance of creating outreach to learners, specifically online learning experiences, was vital as it was the only form of outreach and communication available. Focuses of mindfulness, empathy, growth mindset, and social justice which laid the foundation for museum tours were now just as important as before, and maybe even more relevant. With police violence protests and civil rights issues dominating the media, artwork meant to help viewers grasp the lived experience of others is especially timely. Empathy is widely regarded as a desirable societal outcome and has its oldest roots in art.

Empathy is much more complex and much more nuanced than portrayed in popular culture. We assume empathy is a good thing, and that we should strive to be more empathic, but what does that really mean, and how do you become more empathic? How do you know if you are becoming more empathic, and how does our modern world of technology affect empathy?

It is common to hear empathy defined as *walking in another's shoes*. Because empathy is dependent on seeing from another person's perspective, it implies that to truly experience empathy there is an experiential prerequisite. More specifically, it implies that one must experience the changes that are the result or consequence of an action taken by another as well as feelings that another experiences.

Our senses allow us to experience empathy. We approach this through narratives — reading, listening, feeling, etc. We look to share the lived experience of others, to

immerse ourselves in their experiences. We may read about the experiences of others, listen to others describe their experiences, view digital media that takes us to different places around the world and introduces us to different people and cultures, and experience art that shows us different perspectives.

Because this level of immersion may not always present itself as a possibility to the individual seeking understanding at an empathic level, learning technologies may be applicable here. This avenue can fill an experiential gap that would normally require someone to use imagination to have the kind of direct simulated experience necessary to achieve empathy.

There are currently many claims about how different immersive technologies can impact individuals' levels of empathy. For example, Chris Milk, an American director and founder of Vrse, claims that VR technology holds the power to be the ultimate empathy machine. In 2015 Milk presented at TED on the power of virtual reality, where he said:

And that's where I think we just start to scratch the surface of the true power of virtual reality. It's not a video game peripheral. It connects humans to other humans in a profound way that I've never seen before in any other form of media. And it can change people's perception of each other. And that's how I think virtual reality has the potential to actually change the world. ... So, it's a machine, but through this machine we become more compassionate, we become more empathetic, and we become more connected. And ultimately, we become more human (Milk, 2015).

Milk and his production company worked with the United Nations (UN) to produce a documentary film shot entirely in VR that follows Sidra — a 12-year-old girl in the Za'atari refugee camp in Jordan — into her home, to a family dinner, and into her classroom. Named *Clouds Over Sidra*, the film screened before donors prior to the Third International Humanitarian Pledging Conference for Syria in Kuwait and raised 3.8 billion

U.S. dollars, over three times the amount of money raised the previous year without the presence of VR.

There are other examples of technology being used to bring both art and empathy to participants. The Virtual Human Interaction Lab at Stanford researches VR interventions that teach empathy through seeking to experience the life of someone else by participating in perspective-taking activities. In this project, a participant can see themselves as someone different and experience a scenario as that person. For example, in one experience a participant saw a 65-year-old avatar of herself and was prompted to save money for retirement. Results showed that participants were more inclined to save for retirement when virtually inhabiting a 65-year-old avatar than when they inhabited an avatar more like their present-aged selves (Sims, Bailenson, & Carstensen, 2015).

Another example is *The Machine To Be Another*, an embodiment system that addresses relationships between identity and empathy. In this experience, the user sees herself in the body of another person. This experience uses embodied simulation mechanisms, which are actions, emotions, and sensations, that have been connected to empathy, social cognition, perception of one's body, neural plasticity, and formation of concepts. There is no virtual world; rather, participants using VR headsets swap perception with a performer to explore issues of mutual respect, gender identity, physical limitations, and immigration with the purpose of being present in another perspective to induce body ownership for the reduction of implicit racial bias. User movements are coupled to a performer's movements using head-mounted displays, head tracking, headphones, microphones, and servo-controlled cameras. Using these technologies, performers follow user movements in an identical space and users experience the performer's perspective in a VR headset.

These are just a few examples of how contemporary immersive technologies are being used in relation to empathy and art. Art and empathy are intrinsically linked, both in the oldest roots of empathy and in contemporary learning with art. Therefore, in the current study, empathy plays a vital role in selecting the artwork to be used in the development of the digital online museum resource as well as determining the media of learning technologies that will work best for delivering the resource. Additionally, due to the importance of social justice in art and museum education, as well as the current focus in our society, social justice was be considered in the selection of the artwork used for the digital online museum resource.

Although empathy has been a trendy topic in relation to contemporary immersive technologies and has been empirically researched, it is not the researcher's goal in the present study to measure changes in empathy in relation to the intervention that will be developed. Rather, mindset will be measured as it is not only one of the major focuses in terms of learning at the museum referenced in this study, but additionally because there exists a large gap in research on the relationship between art and mindset.

It is the goal of this dissertation to systematically review theoretical and empirical research connected to art education, immersive learning technologies, and mindset to better understand how to develop a digital online museum resource. The researcher developed this resource using a pre-selected artwork and findings, in the form of a digital story, to use as a quantitative intervention. Change in mindset, based on participation in the intervention, was measured using a mindset survey.

## **OVERVIEW OF THE METHODOLOGY**

An exploratory sequential mixed methods design was used by the researcher in the present study. The purpose of using this method was to first explore the lived experience

of an individual qualitatively to pair with a pre-selected artwork to inform the development of a digital online museum resource. This resource was developed as an intervention targeting changes in mindset. The researcher planned a quantitative assessment of the intervention that was used to interpret differences in mindset using a survey that measures participants' implicit theories of self, views of malleability of intelligence, beliefs about social mobility, and empathy towards undocumented immigrants from. The researcher will refer to this measure as the mindset survey moving forward.

This method had three main phases, each building off the one prior. In the first phase, an ethnography was conducted between 2016-2018 to collect qualitative data to use as a narrative in relationship to the artwork presented in the digital online museum resource. In the second phase, a digital online museum resource was developed based on qualitative data in phase 1 and was tested for content validity. In the third phase, the digital online museum resource was used as an intervention administered to a sample of participants as part of an experimental design to quantitatively measure differences in mindset connected to the intervention (Creswell & Plano Clark, 2018).

Purposive sampling (Onwuegbuzie & Collins, 2007) was utilized to select participants for all three phases of this study. To strengthen the design, two conditions were utilized in phase 3. Held constant in both conditions were the artwork, narrative, and pre and posttest employed to measure differences in mindset, but the learning technology varied in terms of immersive characteristics.

The researcher used statistical analysis focused on pre and post-test comparisons of the mindset survey across two condition groups of the intervention and in consideration of gender and ethnicity of subjects. To do this, the researcher used both multivariate analysis of variance (MANOVA), and a mixed model analysis of variance (ANOVA) in SPSS Statistics software. The MANOVAs were used by the researcher to compare differences in



pre and posttest scores, and then to analyze changes in mindset for the two experimental conditions.

The researcher conducted two series of ANOVAs. Both were 2 x 2 analyses, the first focusing on ethnicity and the second focusing on gender. In both series of ANOVAs, the dependent variable was change in mindset. The independent variables were the intervention conditions A and B, ethnicity, and gender.

### **LIMITATIONS OF STUDY**

Due to the worldwide pandemic happening during phases II and III of this research study, findings might be considered idiosyncratic as they are reported within the limitations that existed at the time. This also affects how replicable this study is, not so much in the methods used, but in terms of unaccounted independent variables present uniquely due to the pandemic that might affect dependent variables of change in mindset in ways that may not be replicable.

Additionally, VR, as discussed in the research as an important immersive technology with capacity to be used in relation to empathy and art, was not available for this study. Due to the pandemic and restrictions present at the museum, participants had to experience the interventions remotely and it was neither possible to assume participants would have their own VR headsets nor feasible to provide headsets to participants remotely.

## **Chapter 2: Literature Review**

A large body of literature on art education, immersive learning technologies, and growth mindset provides a basis for the present study. This chapter will examine both the theoretical and empirical studies in these fields. The following review was developed through a systematic search of relevant literature to the present study.

### **LEARNING IN A MUSEUM**

The focus of museum education has changed over time. Historically, the mission of museum education was more along the lines of art appreciation with the purpose of instilling a love of art in the public. Art existed for the sake of its own experience (Gilman & Museum of Fine Arts, 2018), and having an aesthetic experience with art to gain a firsthand acquaintance was a primary goal (Ivins, 1944).

The primary aim of museum education has shifted towards a more constructivist goal of assisting visitors to have personally significant experiences with pieces of art (Patterson & Williams, 1984). Slowing down and focusing, finding value in personal reactions and associations, making judgements, and thinking within cultural contexts are important to viewing art. Interpretations of artwork should be personal, and individual meanings should be based on individual experiences (Fines, 1984).

Today, the purpose of education programs in a museum are focused on gathering people together around art for sustained and careful viewing. The priority of a contemporary museum educator is to engage the learner through dialogue and to foster discussion through asking questions (Burnham & Kai-Kee, 2011). Modern museum educators learn the context of works of art that will be used in a tour, including historical context, to extend dialogue among learners, thus enabling a variety of interpretations

(Roberts, 1997). Context can give a sense of direction, a sense of possible outcomes, and promotes constructivist learning among visitors to the museum.

Along with this constructivist purpose, there are several goals for learning in a museum. One goal is for learners to experience feelings of enjoyment and fulfillment at the closing of a tour (Tishman, 2018). Another goal is for there to be a culmination to the experience of learning in the museum or feeling a state of strong appreciation at the end of an experience with art (Dewey, 1959). Learners should have engaged in meaning making, gained greater knowledge and understanding of a work of art, and connected to it personally and directly (Burnham & Kai-Kee, 2011). Finally, learners should have connected museum collections to school studies when applicable (“Volume Information,” 1932).

### **Learning With Art**

Dewey (1934) refers to learning in an art museum as “an experience.” He differentiates this experience from other learning experiences in terms of flow. The experience of viewing art unfolds over time because the flow of learning with art is more than casually looking, but rather looking closely over extended periods of time. The flow is slow, intense, and focused (Dewey, 1959). It may be a struggle, and learners must learn to accept uncertainty in their journey. Tishman (2018) refers to this journey as aesthetic courage.

Experiencing a piece of art can be an interpretive moment due to close looking and extended viewing. The experience of looking at art closely can bring the learner both immediate agreeableness and disagreeableness (Dewey, 1998) and can influence future learning experiences. The English poet John Keats refers to close looking as a “negative capability” (Keats, 1817, as cited in Keats & Barnard, 2014), and James Elkins (1996) says,

“... seeing is metamorphosis, not mechanics” (p. 10-11). Intense, close looking can bring the sensation of looking at something for the first time again, which for the learner, can bring a painting to life in a way it did not live before.

Each encounter with a work of art will end differently and unpredictably, and only concludes when the material experienced by a learner runs its course to fulfillment. (Dewey, 1959, 1998). The experience doesn’t just end but builds towards a satisfying conclusion which Dewey (1934) refers to as culmination. Culmination, in turn, leads the learner to a state of strong appreciation. This kind of experience brings a sense of wholeness and unity to the learner, as well as feelings of enjoyment and fulfillment when an experience with art has concluded.

The following sections will include more details about the individual components of learning with art; interpretation, dialogue, constructivism, social justice, and empathy. These components, gathered as a whole, embody what Dewey describes as “an experience.”

### ***Interpretation***

Good quality gallery teaching means that students are learning through discovery by constructing their own meanings (Dewey, 1998). Teaching in this way is meditative, insightful, poetic, and transformative, and will lead to a profound experience (Burnham & Kai-Kee, 2011). It is through vocalizing what we see and explaining what we understand that we can communicate to others our experiences with art (Gadamer, 1985). Conversation and dialogue are the foundation of interpretation of art as a learners find words to communicate what they see (Gadamer, 1982).

Interpretation means always making room for a profound sensory attentiveness to works of art (Sontag, 1990). Learners must immerse themselves in a piece of art, allowing

their thoughts to freely go in one direction or another (Elkins, 2004). Anticipation should drive a learner's inquiry, and learners should expect that their observations and thoughts about a work of art will come together into a coherent whole. Gadamer (1982) refers to this process of revision and clarification as a Hermenéutica circle. It is an iterative process where the emerging sense of the whole is continually revised, enlarged, and clarified. This includes moments of silent reflection and moments of consensus. Meanings are provisional as the learners continually test their understandings and recognize that their understandings are never complete. It is important for the learners to be open to new meanings and interpretations.

Dewey (1998) presented a viable model for museum teaching that accounts for both what transpires in words and what transpires beneath and beyond words. In this model, experience occurs continuously while learners interact with art and their environment. Even if a learner is not speaking aloud, "under doing," or mental processing, makes the learner's role active (Dewey, 1998). Life is a process of both doing and under doing, or a balance between doing and receiving, and emotion is the moving and cementing force of "an experience" (Dewey, 1998). Emotion, in addition to imagination, belief, sensation, and cognition, can make an aesthetic experience, or an experience with art, meaningful (Greene, 2001).

### ***Dialogue***

Dialogue is a middle ground between conversation and discussion (Hubbard, 2010), focuses learning, and is appropriate for almost anyone (Burnham & Kai-Kee, 2011). A museum education pedagogy that embraces and encourages talking about art needs a clear sense of purpose, which includes quality of talk, or talk that leads to knowledge and understanding (Burnham & Kai-Kee, 2011).

Dialogue is its own construct, separate from conversation and discussion (Burnham & Kai-Kee, 2011). Conversation is more open and improvisatory in quality, whereas discussion has a sense of purpose from the beginning. Dialogue is a middle ground between the two (Hubbard, 2010). What sets dialogue apart from conversation and discussion is the teacher's role (Burnham & Kai-Kee, 2011). All the participants, including the teacher, take on a task of exploring a work of art together through exchanging observations and ideas. More specifically, a teacher and participants share inquiries, engage in a cooperative pursuit of understanding, see and think together (Isaacs, 2018), and learn with an exploratory tone guided by discovery and curiosity (Burbles, 1993). Dialogue requires participants to listen deeply to each other's views and engages participants in a constant transformation of perspectives (Gadamer, 1960).

Isaacs (2018) laid out a dialogical model that consists of four roles that participants can fill at any time and that correspond to four basic verbal actions. First is the mover role, responsible for the forward momentum of the dialogue of a group, who is driven by discovery, and who uses dialogue that consists of new ideas and observations. Second is the follower, who offers supporting evidence and encouragement, and who both listens actively and reflects. Third is the bystander, who is the least active. This is the resting position, and though this participant is the least active, his/her metacognition is working. Last is the oppressor, who actively disagrees with other views and welcomes opposition in order to advance dialogue.

For a successful dialogue to take place, questions should come from students, not the teacher. When the teacher poses questions, these questions should be "real" (Burnham & Kai-Kee, 2011). It is the teacher's responsibility to set up circumstances to increase the likelihood of "an experience" (Dewey, 1959; Greene, 1995).

## ***Constructivism***

Learning in an art museum means making discoveries, thinking freely and inventively, and working towards meaning. Art is understood by bringing together observations, thoughts, and feelings to a whole (Burnham & Kai-Kee, 2011).

Educators need to respect the knowledge and life experience learners bring to the galleries (Burnham & Kai-Kee, 2011). Knowledge is usually framed within prior traditions of understanding (Gadamer, 1982). Intense looking with deep concentration leads to construction of meaning for learners. Observing the art, like an investigation, leads to making sense of what we are seeing (Tishman, 2018).

Learners should have an active role in creating meaning of a museum experience through the lived experiences they each bring (Silverman, 1995). Explanations constructed by learners engaged in meaning making in cultural and social communities of discourse should be the goal of a museum educator. It should be a struggle for the learner to make meaning through assimilating and adapting conceptual schemes and structures to new experiences (Fosnot, 2005).

Jeffery-Clay (1998) says, "...museums may be the perfect environments in which to use constructivist theory" (p. 3). This is because a gallery is full of objects that invite meaningful experiences, and a museum educator has the role to stimulate curiosity, provoke thought, connect prior experience, all of which pushes students to form their own interpretations. An educator can do this by asking learners open ended questions and empowering the learners to arrive at their own interpretations. Educators should never be the source of opinion (Rice & Yenawine, 2002).

Constructivist theory emphasizes knowledge as a function of how learners create meaning from their individual experiences (Ertmer & Newby, 2013). Learners create meaning from experience by filtering input from the world around them to create unique,

individual realities. Knowledge, therefore, consists of learners' own interpretations of their own personal experiences in the world. This major tenet of knowledge creation sets constructivism apart from behaviorism and cognitivism in that the former two categorize learning as acquiring knowledge rather than knowledge creation (Ertmer & Newby, 2013).

Constructivist learning theory promotes a learning environment where there are many possible realities with many possible meanings, rather than one objective reality. Learners create knowledge that is relevant as it emerges in different contexts. Therefore, constructivist learning is linked to the context under study as well as learners' experiences (Weegar & Pacias, 2012). Learning tasks should build on prior experience (Ertmer & Newby, 2013).

Realistic learning settings, learning activities relevant to learners' lived experiences, and context are essential components of constructivist theory. Active learning through the application of ideas to solve problems, exposure to multiple perspectives, and constructing and validating new understandings are examples of learning through constructivism. Additionally, situated cognition, authentic learning tasks anchored in meaningful contexts, and building on prior experiences are integral parts to constructivist learning theory. (Ertmer & Newby, 2013).

Discourse is the traditional medium of knowledge construction, or more specifically to museum education, dialogue between the teacher and learners, as well as among the learners. Statements are constructed through dialogue, which is how knowledge is formed and shared in group learning. This fosters a collaborative learning environment where there is co-construction of Knowledge and mutual engagement among learners (Lipponen et al, 2002).

Within group dialogue, disequilibrium may occur, causing imbalance between opposing views. This divergence in a group results in the construction of new



understandings through social interactions. Piaget refers to this as socio-cognitive conflict (Piaget & Duckworth, 1970). Vygotsky believes that dialogue in a group is the facilitator of individual cognitive development. Learning is more a matter of participation in social processes of knowledge construction (Vygotsky, 2019)

### ***Social Justice***

Social justice is also an important component of museum education. The Independent Study Program, started at the Whitney Museum of Art in 1970, saved the lives of ghetto youngsters through methods of focused looking and active searching to develop visual perception. The program had a teaching method that was flexible and had a personal approach (Burnham & Kai-Kee, 2011).

In the Arts Awareness Program started at the Metropolitan in 1972, young people responded on their own terms to what they saw (Council on Museums and Education in the Visual Arts et al., 1978) (note: The Art Museum as Educator was the first comprehensive attempt to document museum education programs in the USA). Artworks were accessible through a kind of empathy, referred to as varieties of aesthetic formalism (Jarzombek, 1994).

The Harlem on My Mind exhibit was intended to be a three-month long multimedia exhibition at the Met to spotlight the history of Harlem up to 1900 (Kammen, 2006). The exhibit contained photomurals and photographs depicting life in Harlem intended to open this lived experience to viewers. However, there was no artwork from black artists, and subsequent protests ensued.

Today, artwork showcased in galleries and exhibits around the world come from individuals of all backgrounds, orientations, and agendas, allowing viewers exposure to things that might be foreign. More specifically, artists have used their platforms to tell their

stories, and theoretical frameworks like Critical Race Theory (Delgado & Stefancic, 2001) and Lat Crit theories (Yosso, 2002) are not only used to create, but also utilized as a lens to learn from art.

The basic assumption of Critical Race Theory (CRT) is that racism is central to everything in the U.S. and is endemic. A CRT theorist asserts that the USA was built on racism, and it pervades all parts of our society today, often in a manner that might seem invisible. CRT places marginalized people at the center of analysis (Delgado & Stefancic, 2001; Fernández, 2002).

Both Fernández (2002) and Solórzano and Yosso (2002) list out tenets of CRT. Of note here is the goal to challenge dominant ideologies, promote knowledge through lived experience, and seek social justice. Intersectionality is central to CRT and refers to the point at which race, gender, class, and sexuality come together.

CRT empowers experiential knowledge. Putting importance on lived experience in art communicates to the viewer that the voice of a member of the outgroup is legitimate, appropriate, and critical (Solórzano & Yosso, 2002). Storytelling and art give a member of the outgroup a voice and enables that individual to name their own reality, a reality that often doesn't fit nor conform to the broad white normative reality widely present in USA society. Specifically, counterstories told through various mediums from the outgroup have the potential to upset the dominant narrative in our society that has been constructed by people in power. Counterstories parry deficit storytelling by exposing, analyzing, and challenging majoritarian stories from the dominant race and class which distort and silence the experiences of minorities (Beverley, 1991; Delgado, 1989; Sternbach, 1991; Urrieta et al, 2015).

Majoritarian stories allege to be neutral, however, they often distort and silence the experiences of people of color (Solórzano & Yosso, 2002). Stories are constructed because

there is no such thing as a pure, complete story waiting to be told (Fernández, 2002). There is no single true all-encompassing description. We construct stories as well as much of social reality (Delgado, 1989).

Counterstories related in various forms of media attack complacency, humanize the outgroup, and challenge, reject, rebel, and call to action. Many counterstories can also function as testimonios (Tierney, 2000) which bear witness to a social urgency regarding a silenced or marginalized society. One bears testimonio with the “...hope that his or her life’s story will move the reader to action in concert with the group with which the testifier identifies” (p. 540). Both counterstories and testimonios open new windows into different realities, the realities of underrepresented people. To the dominant group who oppresses the marginalized, oppression does not seem like oppression, therefore counterstories are vital to educating people of other realities and have the power to cure oppression.

Freire (1970) defines oppression as, “Any situation in which ‘A’ objectively exploits ‘B’ or hinders his/her pursuit of self-affirmation as a responsible person is one of oppression (p. 55).” In this way, oppression can be a domesticating force, as one party seeks to train another party. Freire (1970) continues, “The oppressed have been destroyed precisely because their situation has reduced them to things” (p. 68). The oppressed have been dehumanized.

Freire (1970) says the question of greatest importance when confronting oppression is, “If the implementation of a liberating education requires political power and the oppressed have none, how then is it possible to carry out the pedagogy of the oppressed...” (p. 55)? Narrative character (Freire, 1970) is education between a narrating subject and listening objects, narrating lifeless and petrified contents. This is the banking model of education, where a teacher’s task is to fill students. This concept of education only serves the interests of the oppressors as it requires passiveness on the part of the oppressed. This

is undesired, and oppressive, and the answer to overcoming this mode of education lies in liberation through praxis. This style of education is contrary to an experience laid out by Dewey (1998), specifically the importance of dialogue when learning with art.

Freire likens liberation to a childbirth in that humans are starting anew through the process of achieving freedom. Authentic liberation is a process of humanization which is only accomplished through praxis, which Freire (1970) describes as action and reflection on the world to transform it. To transform the world to escape oppression, the oppressed must first perceive their reality, the reality of oppression, in order to achieve liberation. The oppressed must view oppression as a limiting situation which they can transform. This understanding of oppression must be the motivating force. In this way, praxis shares a familiar path with Dewey's ideal of culmination, as well as the importance of reflection when looking at art closely and slowly to construct new understandings.

Praxis is practice, not just theory. It is reflection and action upon the world to transform it. Freire (1970) states that freedom from oppression must involve action. It must include serious reflection, which leads to action. Therefore, the goal of the oppressed should not only be to liberate themselves, but their oppressors as well. This is truly transforming the world. "Only power that springs from the weakness of the oppressed will be sufficiently strong to free both" (Freire, p. 44).

This pedagogy that Freire (1970) laid out with the goal of praxis and liberation through reflection shares many of the same characteristics of the experience of learning with art. Both focus on the struggle of making sense of one's surrounding, engaging in dialogue to construct new meaning, continuing to iterate on knowledge construction, and taking the appropriate amount of time to come to a praxis or culmination that is liberating.

## *Empathy*

Emotional involvement of the learner is a necessary precondition for learning in an art gallery (Dewey, 1998). The learner must “live a little in the work” (Dewey, 1934), which is a phrase that resembles the popular saying “walking in another’s shoes”, a phrase commonly connected to empathy. This idea of an affective response from a learner or being able to live in an artwork for a moment through cognitive perspective taking, is one domain of empathy (Davis, 1980; Davis, 1983; Davis, et al.,1999). Dewey (1934) believes that a work of art does not exist until it becomes alive in the viewer’s experience.

Art, especially narrative forms like literature and drama, help us untether, and makes empathy safer and more enjoyable. Untethering is the act of unsticking yourself from time and allowing your mind to go where you imagine (Laeng & Sulutvedt, 2014; Nyberg et al., 2001; Wheeler et al., 2000). Empathy is a kind of untethering. The more we engage in the brain’s untethering system, the deeper we can go, and the better we can understand what other people think (Buckner & Carroll, 2007; Tamir & Mitchell, 2010; Zaki et al., 2009).

Acting and stories are examples of untethering. Actors who can better model their characters' minds and hearts, or in other words have better empathy for the characters they are playing, are better actors. Reading stories give people the chance to experience other life perspectives. Avid readers have an easier time identifying others’ emotions than people who read less, and experience empathy in a safe way towards outsiders they might avoid in public (Mumper & Gerrig, 2017). Fictional stories can help us feel empathy for others when real-world caring is too difficult, complicated, or painful (Dodell-Feder & Tamir, 2018; Koopman, 2015; Pino & Mazza, 2016).

In one study, reading led incarcerated repeat offenders, enrolled in a program called Changing Lives Through Literature, to repeat less offenses. Specifically, twenty percent of

repeat offenders enrolled in this program repeated an offense versus forty-five percent of repeat offenders not enrolled in Changing Lives Through Literature. This program included discussions that consisted of listening, responding, follow-up questions, figuring out motives, and speaking as equals. The program instilled greater empathy in inmates (Jarjoura & Krumholz, 1998; Schutt et al., 2013).

Empathy has its oldest roots connected to art. Robert Vischer (1847-1993), an art therapist, first started using the term to refer to a state of close attention which allowed viewers of art to see the emotional meanings behind the pieces (Vischer & Yanacek, 2015). The word empathy is derived from the German word *empathie* which translates as “feeling into” in English. Vischer, who conceived the phrase, was an art therapist, and was interested in the phenomenon of the art viewer's state of close attention which could allow viewers to see the emotional meaning behind art (Vischer et al., 1994). The term empathy was introduced into the English language by Edward Titchener (1867-1927) as a translation of the German term.

The German poet and playwright Bertolt Brecht (1898-1956) rejected the idea of empathy as an emotional identification that produced social feelings, explaining that emotional identification runs counter to the ability of individuals to initiate social change because there is no moment of alienation. This moment of alienation is necessary to disrupt existing world views, thus provoking internal change (Brecht & Bentley, 1961). Brecht referred to this as the alienation effect and believed that an audience at a play needed emotional distance to reflect intellectually on the action in front of them. One way he accomplished this was having an actor directly address the audience, therefore tearing down the illusion that the audience was only an unseen spectator.

Brecht wanted to alienate his audience from the characters, making the audience impotent emotionally, unable to sympathize or empathize with personas on stage

psychologically. He desired this forfeiture of emotional investment so that audiences could intellectually understand the characters' dilemmas and thus reach a level of understanding called intellectual empathy. Brecht believed, in theory, that through this emotional alienation and intellectual empathy, the audience could more effectively analyze and seek to change the world, which was his social and political goal as a playwright.

Empathy is far more nuanced and faceted than what is commonly understood. One side of empathy is more about emotion and feelings, and the other side is more about cognition and intellect. Both general facets are important to consider when evaluating studies of empathy.

***Multidimensional Construct.*** Empathy is not just one construct, but rather a multifaceted phenomenon. It is a cognitive process (Wiske, 1986). It is an accurate understanding of another (Demond, 1950). It is the sharing of emotional states with a target (Hoffman, 1984). It is a specific emotional response of sympathy (Batson, 1991). It is processes taking place within the observer and includes affective and non-affective outcomes that result from those processes (Davis, 2014).

Better put, empathy is a set of constructs, including the definitions above, having to do with the response of one individual to the experiences of another (Davis, 2014). It is, "...the reactions of one individual to the observed experiences of another...a set of constructs, related in that they all concern responsivity to others but are also clearly discriminable from each other", and that there are, "...a variety of such possible reactions" (Davis, 1983, p. 113).

Empathy is commonly divided into two major domains: affective (emotional) and cognitive (Batson, 1997; Davis, 1983; Zaki, 2014). Affective empathy refers to sympathetic responses which happen immediately and without thought due to proprioceptive transference or feeling like you are in another's position. Empathy may

happen spontaneously in us as a response to something we see or hear (Kant & Gregor, 1998). Empathy can be a reflexive emotion, which triggers involuntarily in an individual (Batson et al., 1997; Kant & Gregor, 1998; Gaertner & Dovidio, 2014).

Cognitive empathy is more conceptual or imaginative as a person tries to reconstruct how something feels to another person (Batson, 1991). Empathy can be a cognitive choice that we make.

Davis (1980, 1983) further breaks empathy down from the widely accepted affective and cognitive domains, outlining four specific aspects: fantasy, perspective taking, personal distress, and empathic concern. Fantasy and perspective taking apply to the cognitive domain, and personal distress and empathic concern apply to the affective domain.

Fantasy refers to individuals' tendencies to imaginatively transpose themselves into the feelings and actions of fictitious characters. Perspective-taking (PT) refers to the tendency an individual must adopt to experience the psychological point of view of another person. It is purely cognitive. A person sees things from another's point of view and reflects the sentiment "putting yourself in another's shoes".

Personal distress refers to an individual's own feelings of discomfort when observing negative experiences of others (Davis, 1980). It is literally when one individual feels another individual's emotions. For example, a person may feel afraid because they are empathizing with a character in a scary movie, or pain if they are empathizing with a patient who is sick. This phenomenon is referred to as emotional contagion, which means being infected by another's emotion. The last type, empathetic concern, is mostly what we think of when we think about empathy. It is the ability to recognize another's emotional state, feel in tune with that emotional state, and show concern. Empathetic concern assesses



the degree to which an individual feels compassion towards another individual (Davis, 1980).

Zaki (2014) divides empathy into three subcomponents, similar to Davis (1980), which fall under the broader affective and cognitive domains. The first is experience sharing, which is taking on the sensory, motor, visceral, and affective states of another. The second subcomponent is mentalizing, which is the capacity to draw explicit inferences about another's intentions, beliefs, and emotions. The third subcomponent is mind perception, which is the detection of another's internal states (Zaki et al., 2009; Zaki, 2014).

Zaki (2014) further separates empathy into automatic or dispositional, similar to what other researchers' term affective, emotional, and motivated (affected by context). There are two contextual features that can shift empathy. Studies confirm that empathy decreases in the presence of outgroups, or individuals unfamiliar or different from the observers. Second, expertise can decrease empathy, as evidenced in a study where medical professionals felt decreased empathy when tending to patients (Zaki et al., 2009; Zaki, 2014).

***Empathic Episodes.*** A typical empathy episode is when an observer is exposed, in some way, to a target, which leads to a response. The target can be another individual or group, or the depiction of people or groups in art. The response can be cognitive, affective, motivational, and/or behavioral (Davis, 2014). This response has four related constructs: antecedents, processes, intrapersonal outcomes, and interpersonal outcomes.

Antecedents are characteristics of the observer, target, or situation that may impact prosocial behavior, perspective taking, sympathy, and other processes that happen within the observer. Situational context as well as similarities between the observer and the target also can affect processes within the observer (Davis, 2014).

There are three broad classes of empathy-related processes that can produce empathic outcomes (Davis, 2014; Eisenberg et al., 1991; Hoffman, 1984). Each can produce both cognitive and affective outcomes. These processes are non-cognitive, or processes that are automatic, simple cognitive processes which require rudimentary cognitive ability, and advanced cognitive process that are effortful like perspective taking (Davis, 2014).

Intrapersonal outcomes are cognitive, affective, and motivational responses produced in the observer dependent on exposure to a target (Davis, 2014). Cognitive outcomes can be successful estimations of another's thoughts, feelings, and characteristics (Dymond, 1950; Ickes, 1997). Affective outcomes can be reactive emotions to the experiences of others, and motivational outcomes refer to an observer's motivation to value the other's outcomes (Davis, 2014).

Interpersonal outcomes refer to behavioral responses directed toward the target because of prior exposure to the target (Davis, 2014). These four constructs are related and are evident in a typical empathy episode. In addition, dispositional perspective taking and empathic concern are both personality traits that relate to empathy and prosocial behavior. Other constructs that may be part of an empathy episode are situational perspective taking, parallel emotional responses, and empathic concern (Davis, 2014)

***Motivation.*** The Motivated Empathy Model (Zaki et al., 2009; Zaki, 2014) is a framework that includes regulatory strategies for approaching or avoiding empathy. There are five parts and three subcomponents. First, motives affect both affective and cognitive empathy. Second, people experience motives to engage or not engage with others' emotions. Third, there are three phenomena that may cause people to avoid empathy: pain, costs, and interference with competition. Fourth, there are three phenomena that may cause people to seek out empathy: positive affect, affiliation, and desirability. Lastly, there are

three empathic regulatory strategies; situation selection, attention modulation, and appraisal (Zaki, 2014).

There are three implications of the Motivated Empathy Model on interventions. First is in theory, which infers that motives prompt observers to seek or avoid empathy and looks at how observers act on their motives through regulatory strategies. The Motivated Empathy Model explains the variance in empathy across different situations, as well as self-versus-other oriented motives, or in other words altruism (empathic concern) versus personal distress (compassion) (Zaki, 2014).

The second implication is for interventions. Empathy is flexible, and there are several ways interventions can increase empathy. One is through perspective taking exercises, although there is little evidence that this produces long-term change in empathy. Another is through explicit training in mentalizing, which sometimes does produce long-term change. Another way is through adapting Buddhist practices of compassionate meditation to increase subjective empathy, neural resonance, and pro-sociality. The last way is through immersion in narratives (Zaki, 2014).

The third implication of the Motivated Empathy Model is for motivation-based interventions. As a result of these interventions observers may experience an increase in motivation to engage empathetically and modulate approach and avoidance motives (Zaki, 2014).

If we want to change the scenarios in which our empathy triggers, we can engage in psychological tuning. Psychologically tuning our mind refers to the quick and agile ways we alter our experience (Bloch et al., 2014; Ford et al., 2018; Halperin et al., 2013). More specifically, we can choose to turn our emotions up or down and we can choose to cultivate specific feelings we deem useful in specific moments. We constantly weigh the costs and benefits of choosing feelings that serve our purpose (Tamir, 2016).

As mentioned earlier, empathy can occur automatically (affective), but more often we choose or avoid empathy depending on whether we deem it to be useful in a given moment (Dimberg et al., 2000; Heyes, 2011; Neumann & Strack, 2000). Studies show that individuals choose empathy when it feels good and when it looks good to others and avoid empathy when it risks personal well-being, or when it takes time (Cacioppo et al., 2017; Cameron & Payne, 2011; Darley & Batson, 1973; Helliwell & Aknin, 2018; Hodges & Klein, 2001; Morelli et al., 2015; Morelli et al., 2017; Shaw et al., 1994; Zaki, 2014). Research studies on empathy benefits show that those who avoid empathy forgo its benefits like happiness, decreased depression, and more friends (Cameron et al., 2019; Zaki, 2014).

Empathic nudges are interventions that can influence whether an individual chooses empathy (Thaler & Sunstein, 2009). One study showed that some nudges can lead to fast-twitch changes in empathy that may shift people's motives and encourage empathy, however with a more temporary effect lasting only between a minute to an hour. The same study also found that some nudges can lead to slow-twitch changes in empathy. This kind of change in empathy is less temporary and needs chronic, repeated experiences that lead to mental mobility (Thaler & Sunstein, 2009).

Through purposeful effort people build more long-term empathy and can change the chemistry of their brains. However, this kind of effort is extremely demanding and may not be realistic for people (Condon et al., 2013; Hildebrandt et al., 2017; Klimecki et al., 2014; Lumma et al., 2017; Valk et al., 2017).

***Perspective Taking.*** Perspective taking is defined as the process of imagining the world from another's perspective (Oh et al., 2016). Social perspective taking (SPT) refers to the process of discerning the thoughts, feelings, and motivations of a target (Gelbach et al., 2015). The type of perspective taking affects the outcomes, meaning the extent to which and the manner in which a learner learns about the target's perspective (Gelbach et al.,

2015). Both the degree of knowledge about the target and the active or passive nature of the learning about the target affect the outcome.

In laboratory investigations using generic strangers, when the target is a distressed stranger where little is known about the person, empathy is a reliable influence on the willingness of a participant to offer aid. In studies using problematic strangers as the outgroup, the affective construct of personal distress, or parallel emotional response, was either unrelated or negatively related to helping. The affective construct of empathic concern was associated with pro-social responses, like perspective taking.

Perspective taking (PT) was not always found to reduce stereotyping. PT has more impact on responses about self-described prejudice than cognitive responses about stereotyping. Studies do not speak directly to the question of whether PT leads someone to provide the same level and quality of help to outgroups rather than in-group targets. Results are inconclusive regarding the claim that PT increases helping behaviors for outgroup targets to the same level as in-group targets. Regarding studies using interdependent strangers, PT was found to be less egoistic and at the same time exploitative to others.

## **Summary**

The experience of learning with art and learning in a museum is one that is unique from other ways of learning. The experience is multifaceted and can lead to a praxis of understanding. It is a demanding way to learn as viewers seek to construct new knowledge and wrestle with long periods of time looking closely at objects, but the reward comes in an experience that may not exist anywhere else. The researcher will now shift focus to digital museum resources and immersive learning technologies in order to compare and contrast online learning experiences with art with experiences in a museum.

## **IMMERSIVE LEARNING TECHNOLOGIES AND THE MUSEUM**

A modern museum functions as a dynamic place of convergence where people come together for intellectual exploration, cultural expression, and connection to a shared history (Erickson, 2019). Most museums' digital initiatives primarily focus on digitizing collections for web-based and asynchronous experiences (Gaylord-Opalewski & O'Leary, 2019). Additionally, some museums incorporate Interactive Virtual Learning (IVL), or synchronous and asynchronous ways of viewing and discussing art, in varying forms as digital resources to museum patrons (Simon, 2010). Through technology museums can connect with a more diverse public.

Technology may offer benefits that can allow museums to remain relevant in the 21<sup>st</sup> century. IVL is not intended to replace in-person museum visits, but to introduce or extend an on-site experience and enhance a museum's collections (Mitchell et al., 2019; Gaylord-Opalewski & O'Leary, 2019). IVL programs meet students on a technological middle ground (Mitchell et al., 2019), and should be a conduit for greater outreach and promotion of a museum's collections, especially to those who may not be able to visit a museum space in person (Erickson, 2019; Gaylord-Opalewski & O'Leary, 2019).

IVL experiences should be designed to engage different types of learners, to reinforce classroom learning when applicable, and foster love of cultural centers like museums. They are intended to link virtual visitors with museum content, encourage active learning, and offer personalization to meet specific needs of participants (Gaylord-Opalewski & O'Leary, 2019).

There is some variance in defining IVL. Often IVL is in real time, live programs, where both teacher and students see each other, converse, and view images together, and engage in studio projects. IVL happens in synchronous learning environments where groups interact with each other while they interact with content (Hilton et al., 2019; Sim,

2010). Other times IVL is intended to provide self-directed learning experiences (Mitchell, 2019).

There are many benefits to IVL. It increases audiences, expands the role of museum educators, and augments museum content. It encourages more enthusiastic, empathic, and reflective museum visitors when it is synchronous (Mitchell et al., 2019). IVL is excellent outreach that extends the reach of a museum without geographic restrictions (Gaylord-Opalewski & O’Leary, 2019; Simon, 2010). It is an innovative way to promote museums and connect with the community (Gaylord-Opalewski & O’Leary, 2019).

An example of IVL in museum education is a portal. Portals are a network of repurposed shipping containers with built-in audio-visual equipment which allows full body real-time connection (Erickson, 2019). They offer a dynamic medium for civic engagement, artistic expression, learning in a global classroom, and synchronous learning. They are a solution to a new social infrastructure that integrates humans and technology in collective embrace of knowledge and difference.

Portals subvert typical power dynamics and offer a “third place” for learning, or an informal gathering place that fosters social interaction and civic engagement where everyone interacting with one another is in the same kind of space. It is an empathy infrastructure to flatten the environment (Erickson, 2019) that is important to face-to-face engagements.

IVL offer a remedy to an issue present in K-12 museum programs. When schools can’t manage multiple museum site visits IVL can be implemented (Mitchell et al., 2019). An IVL solution at Pennsylvania Museum is a scaffolded educational series. In this series the museum uses existing teaching methods, synchronous technology, and collaboration to work with K-12 schools. They created portable artifact kits and facilitated interaction with real archaeologists as part of a four-part plan with their digital outreach. The purpose was

to activate content, use digital tools, involve content experts, and collaborate with K-12 educators. Synchronous live streaming events make stronger connections between museum and virtual visitors and make delivery of instruction less passive (Gaylord-Opalewski & O’Leary, 2019).

The most effective elements of an in-person museum visit are unavailable online. However, most museum virtual tours are designed to simulate physical visits. Designers should take advantage of the unique affordances of an online setting when creating digital resources. Examples may include slideshow like content for virtual galleries with more immersive ways of viewing individual gallery pieces like scrolling to shift graphics into place and/or awaken colors or clicking to reveal different portions of artwork (Kabassi et al., 2019).

Instead of attempting to replicate an in-person gallery visit, a designer can instead attempt to explore linear narratives through art (Kabassi et al., 2019). Examples of using digital storytelling to teach with art are available in stories found in the Google Arts and Culture smartphone application. Making some of these stories even more immersive is the use of immersive 3D spaces.

Software can also be used to create digital 3D models of museum objects. These models can be produced through range-based modeling using laser scanning, or image-based modeling using photogrammetry. Creation and online publication of 3D museum objects permits learners a virtually immersive way to explore artwork. However, if published objects just float against a default dark background the object becomes disconnected from its context which in turn disconnects the object from the people viewing it. To prevent decontextualization, objects should remain embedded in their surroundings if applicable and possible, or at least include a tombstone, or a short summary about the object providing context (Kabassi et al., 2019).



## **Virtual Spaces for Learning**

Reality (VR) is an immersive media experience, one that seeks to replicate either a real or imagined environment. Users can interact with the virtual environment and therefore feel like they are present in that place (Aronson-Rath, Milward, Owen, & Pitt, 2015).

VR has two necessary components (Aronson-Rath et al., 2015). First, the virtual environment must be created for the user to experience, either by using computer generated models or video capture, and second, there must be a device for the user to use to enter the virtual environment. The most common, and least expensive devices are cell phones that can be placed in headsets to create and enter a virtual space. There are also headsets that offer a better-quality experience. These headsets do not need cell phones, but rather depend on high-end computers, and are far more expensive.

Immersion deals with how enveloped a user is when viewing content in VR, and presence deals with the perception a user has of being there (Aronson-Rath et al., 2015). Immersion into a VR space means that a user has left the physical world and entered a virtual world. Ease of interaction, image realism, and duration affect immersion (Aronson-Rath et al., 2015).

Presence in VR means the feeling of being there. It is the ability of the VR experience to take the user somewhere else. The user feels like they have been transported to another place, that they have departed from the physical reality to the virtual reality. Presence is achieved when the user reacts in the virtual environment the same way as they would react in the physical environment (Aronson-Rath et al., 2015).

VR affords users increased control of what they feel is interesting, and research has shown that VR can create a feeling of social presence or feeling that a user is really in that space. This feeling of presence then engenders a deeper empathy for the subject of the film, more than other kinds of media representations (Aronson-Rath et al., 2015).

There are other immersive technologies and experiences that are often confused with VR. 360-degree video is an immersive technology that is often considered as VR (De la Peña et al., 2010). To create a spherical video, a special camera, or multiple cameras, are necessary to record every direction of an environment at the same time to produce footage that is stitched together to create a spherical video. This kind of video is often considered VR because the spherical video footage is immersive and can be viewed in a VR headset. Viewers control the direction they want to look by freely moving their head around during the video. However, 360-degree video can also be viewed on a computer screen or smart device where viewers can use a mouse to pan around the spherical viewing area. In addition, the level of interaction in a 360-degree video is limited to viewing, compared to other VR experiences where users are able to move through and interact with a virtual environment.

Knowledge is embedded in the context in which it is learned (Brown, Collins, & Duguid, 1989). New knowledge can be facilitated through experiential learning in virtual spaces. A virtual space can help students move from learning through seeing and hearing to learning by doing as they actively explore their virtual surroundings and initiate contextual cues to learn more about the perspective of other characters in the virtual space.

Rich media promote intimacy, not isolation. Social presence theory promotes the idea that each communication medium offers different levels of social presence and more social cues. When immersive virtual environments (IVE) feature sufficient behavioral realism and social presence, social influence effects can occur (Groom et al., 2009). This is based on research that showed people with real world aversions to racial groups demonstrated the same racial biases in IVEs. The ability to imagine oneself in a different situation with different attitudes can have a powerful effect on attitudes and behaviors. This kind of perspective taking has the ability to reduce stereotypes (Groom et al., 2009).

Learning can take place in a virtual zone of proximal development within a learning community (Engestrom, 1987).

### **Online Dialogue**

Traditional museum spaces fulfill a role as a physical space for gathering (Giaccardi, 2012). Designing digital museum resources and spaces presents a challenge in fulfilling this expectation. For example, there are issues with sharing digital images of artwork on social media. Viewers may take the artwork out of context and by doing so disrupt their experience in being immersed in the art. Additionally, there is a lack of cultural and critical contexts in social media (Drotner & Schröder, 2017; Giaccardi, 2012; Sánchez Laws, 2015).

Another challenge in sharing digital images of artwork on social media is a vagueness of goals. Often it is confusing to know if objects are being shared to teach, being shared to tease viewers into attending a museum, or being shared to prompt conversation (Booth et al., 2020). If the goal is to prompt conversation, the challenge then becomes facilitating the conversation online, listening effectively to viewers comments, and responding appropriately.

Four types of public engagement can be facilitated by museums (Drotner & Schröder, 2017). First is through making collection databases accessible or sharing access to objects over social media. This is what most museums do. Second is through communicating and consulting through blogs and online forums. Third is through reflection and provision of digital places for community derived and selected materials. Fourth is through structural involvement, or through community or external individual curated exhibitions.

Museum social media rarely approaches reflection and provision or structural involvement. Rarely is audience-generated content integrated back into museum knowledge. As stated earlier, dialogue is a cornerstone of an experience of learning in a museum, however it is unclear what counts as dialogue online. Different social media platforms afford different manners of interacting with content and other users. Twitter allows users to retweet content with or without comment, both Facebook and Instagram allow users to repost content with or without comments, and all platforms allow users to voice opinions in the form of likes and dislikes. Feedback in the form of comments online has the potential to inform museum research, framing future research and projects.

It is possible for an individual to become emotionally stretched by caring too much (Kinnick et al., 1996). Modern life and modern technologies give us an unprecedented number of opportunities to broaden our empathy. Through these modern technologies it is possible for journalists, activists, and others to take advantage of these opportunities and overwhelm consumers of information (Kinnick et al., 1996).

Technology and the internet make untethering easy. More specifically, they make it easy for people to access others' lives and broadcast their own. This may seem to make technology and the internet better for empathy; however, the problem is that real-world conversation is rich and multifaceted, and online conversation and social life is often reduced to strings of text and images. By retreating from face-to-face encounters into online conversations we neglect opportunities for empathy. When people read each other's words, instead of hearing them, they are more likely to dehumanize, especially if they disagree with the other person (Meyer et al., 2013, Stinson & Ickes, 1992).

Another issue with technology and the internet is that people often use it to narrow their perspective. Even though we have access to more stories, information, and statistics than we can possibly process, we have the freedom to point our attention where we choose,

and studies show that we tend to seek out facts that match what we already believe. We look for like-minded stories that affirm our beliefs, and we use empathy to demonstrate we were right. An example of this is with immigration. Individual A may find a story about immigrant children being taken from their family that reaffirms their position and individual B may find a story about a murder by an undocumented immigrant that reaffirms their position. Each sides' victims are the other sides' perpetrators (Schroeder et al., 2017; Waytz & Gray, 2018).

In one study, people felt more outrage skimming the internet for news than by skimming newspapers, the television, or through in person conversations (Hofmann et al., 2014). Another issue with technology and the internet is online anonymity. People see us differently when we replace our names and faces with usernames and avatars. Accountability is a key pillar of kindness and the internet strips this away through anonymity (Sest & March, 2017).

Extreme voices tend to dominate and can be mistaken for the majority opinion or voice (Levendusky, 2013). It is easy to see examples of these extreme voices on cable news and social media. Extreme voices in the media can also oftentimes be negative, and for interventions building empathy it might be beneficial to focus on the positive. By focusing on the positive, researchers can use the force of conformity to pull people towards healthy or kind actions. For example, in one study participants read stories about the struggles of homeless people, and then were shown how other people responded. Participants reported greater empathy when they read responses that reported empathy from their peers (Nook et al., 2016).

Suicide is higher for cyberbullying than for traditional bullying (Van Geel et al., 2014). Social media encourages us to broadcast fury towards outsiders. This also leads to

depression and enforces human tribalism as we seek approval through likes online (Brady et al., 2017; Crockett, 2017; Verduyn et al., 2015).

Violence mediated by technology doesn't feel violent because people mediated by technology don't feel like people. For this, and other reasons, technology is widely viewed as our era's biggest threat to empathy (Bilal & Lydersen, 2008).

### **Digital Storytelling**

The practice of storytelling predates modern technology and is a way people around the world have shared knowledge (Hausknecht, Vanchu-Orosco, & Kaufman, 2018). It has also been a way for storytellers to disseminate integrated cultural heritage (Valtolina, 2016). Digital storytelling is a branch of storytelling that uses digital media to tell a story (Hathorn, 2005). It extends ancient storytelling practices by using and combining various forms of technology, including videos, music, images, sound, narration, and text (Rule, 2010). It uses technology to create narratives through digital media platforms (Gladwin, 2020), and presents a new way of sharing personal narratives in a captivating way as a media artifact (Burgess, 2006; Hausknecht, Vancouver-Orozco, & Kaufman, 2019).

Digital storytelling has the capacity to produce public knowledge, activate social responses, and amplify narrator voices which maximizes the relevance and impact of a story (Gladwin, 2020; Henson et al., 2015). Digital story telling increases accessibility and enables better transportability and preservation within society. Narratives told through media can also be used to contest dominant narratives and direct social action (Gladwin, 2020).

## **Empirical Research**

There is a large gap in empirical research in the field of museum education and using digital resources for learning with art. What follows is a survey of relevant empirical studies that address digital storytelling and immersive learning technologies that are reported outside of museum education, but are pertinent to learning with art, with emphasis on empathy.

In education digital storytelling can meet the needs of various learning styles and can be used to foster higher order cognition among students (McLoughlin, 1997; Sharda, 2007). Several studies have shown digital storytelling to be an authentic learning experience. One study found that students that were asked to utilize real world artifacts in a real-world context to create their own digital stories were able to think more deeply about the meaning of the story and better personalize their experiences compared to other learning exercises (Sadik, 2008). Another study found that K-12 students that produced their own digital videos and evaluated other students' films showed a high degree of student autonomy, demonstrated enhanced skills in visual and digital literacy, and displayed improved motivation to learn (Kearny & Schuck, 2004)

Verdugo and Belmonte (2007) found that six-year-olds in an experimental group that used digital stories to learn English as a second language scored higher on a language assessment test compared to a control group. Digital storytelling was also found to be effective in a study where children from culturally diverse backgrounds improved mathematics skills by being taught geometry skills using digital storytelling (Casey, Erkut, Cedar, & Young, 2007). Third year dental students that experienced digital stories before interacting with their supervisors demonstrated consistently higher satisfaction scores, and factor analysis produced evidence that storytelling nurtured reflective learning while students worked on clinical anatomy problems (Kieser, Livingstone, & Meldrum, 2008).

Inter-generational digital storytelling embedded within university students' curricula improved their sense of connection with younger and older participants (Henson et al., 2015). Ryan and Aesetre (2021) conducted a single-case design study to analyze the usefulness of digital stories as learning tools to enhance deep learning in geography. In phase 1 of their study, a teacher led a class of teenagers in making digital stories in geography. In phase two, stories were evaluated by a sample of forty-one first-year university students majoring in geography. A thematic data analysis and open-ended questionnaire were used to analyze data. Results showed that digital storytelling, both as an instrument in the classroom or delivered through the internet, created additional multi-sensory and affective dimensions of learning about geography. It made learning more contextual, created feelings of community, and made geography more realistic.

In addition to student learning, digital storytelling has also been found to have benefits to teachers. One study examined the effects of a digital storytelling on pre-service teachers' self-efficacy towards educational technology. Self-efficacy was defined in the study as the personal belief about your performance capabilities in a given domain of activity (Hoy & Spero, 2005; Schunk, 1985). Ninety-eight pre-service teachers spent one week creating their own personal digital stories and the results showed that their technology competency and openness to change towards educational technology improved after their experience with digital storytelling (Heo, 2009). Pre and post self-efficacy surveys were analyzed using a paired sample t-test to measure changes in responses and there were significant results ( $p < 0.05$ ). ANOVA tests were used to measure covariates (role of academic year on responses), and collinearity diagnostics and multiple regression analyses were used to consider the roles of experience on responses. Results show that self-efficacy is malleable (Heo, 2009).



Digital storytelling has been found to be beneficial in museum and cultural heritage education. Nosrati, Crippa, and Detlor (2018) conducted a mixed methods study on how proximity-based technology can be used to provide digital stories that raise interest and appreciation for a city's cultural heritage. One-on-one, open-ended interviews and a short survey were used with 50 participants to collect data on users' experiences. Qualitative results reported satisfaction with the experience, raised awareness and interest in cultural heritage, increased personal belongingness to the city, increased emotional connection to the city, and increased sense of pride in the city. Quantitative results confirmed the relationship between the independent variable (proximity-based technology) and dependent variable (greater interest in a city and greater appreciation for a city's cultural heritage).

### ***Immersive Learning Environments***

There is empirical evidence that IVE interventions lead to greater cognitive and behavioral changes when compared to more traditional mental stimulation (MS) interventions (Oh et al., 2016). IVEs afford a high sense of presence by offering perspective takers a vivid sensory experience by inhabiting or embodying an avatar in a virtual space, and can lead to body transfer illusion (Ahn et al., 2013; Rosenberg et al., 2013). Body transfer illusion is the perception of owning either part or the entire body of another person (Škola & Liarokapis, 2018). When IVEs feature sufficient behavioral realism and social cues, social influence effects can occur. For example, perspective takers with real world prejudice towards a racial group will demonstrate the same prejudice in IVEs (Groom et al., 2015). In addition, perspective taking exercises using VR can influence behaviors for some time after the intervention (Rosenberg et al., 2013).

Perspective taking is an effortful and highly controlled process, and interventions with too high a cognitive load can reduce the self-other overlap, meaning negatively affecting the overlap between a learner's mental representation of themselves and the target. Perspective taking in IVEs requires less cognitive effort and more presence in a virtual space leading a learner to experience what it feels like to be in another's shoes without as high a cognitive load as more traditional perspective taking activities (Oh et al, 2016).

At Stanford University, Jeremy Bailenson runs the Virtual Human Interaction Lab (VHIL) where his research seeks to answer this question of whether immersive technologies can make caring about forgotten people easier, more natural, and inescapable. Bailenson believes virtual reality (VR) has psychological presence which envelops people so completely that they forget it is media (Bailenson, 2018). This is the power of immersive technology.

Bailenson (2013, 2016, 2018) has also found that VR facilitates quick, deep learning. It allows people to see themselves in the body of someone else. For example, he has done studies where people see themselves as the elderly, as different races, and as color blind (Ahn et al., 2013; Oh et al., 2016).

Bailenson and Zaki (2018) designed a VR experience to help Bay Area residents see their homeless neighbors in a new light. Their research question was, "Could VR build more empathy than traditional perspective taking approaches"? The results were that those who participated in the VR experience, rather than in traditional PT, were more likely to sign a petition for change. They also found the VR created longer lasting empathy, as VR participants remained more supportive of homeless ballot initiatives (Herrera et al., 2018).

Most studies about empathy and VR have used self-report scales to measure whether a VR intervention correlates to a change in empathy, and most of these surveys

measure empathy in terms of attitude rather than as a trait. For example, Gelbach et al. (2015) used a self-report scale to allow participants to rate their interactions with a target in an IVE. In the VR intervention, participants assumed the role of a golf-course owner and were asked to take the perspective of a ranger. Additional means were used to measure negotiations emotions (anxiety, enjoyment, efficacy), perceived similarity to target, social perspective taking (SPT) (confidence, effort, and perception of target's SPT effort), and motivation to be competitive and cooperative.

Oh et al. (2016) asked participants in their study to take the perspective of an elderly person by either engaging in a traditional perspective taking exercise or using an IVE. To find out if perspective taking impacted attitudes on the elderly, the authors used the KOP, a survey that measured attitudes towards the elderly, as well as other instruments that measured perceived threat (used before the intervention), self-other overlap, and future communication intentions. They also used some more novel measures. They had participants play ball toss in the IVE with 2 other players to see if the participant excluded the elderly person from the game, as well as an empathic listening task to measure the participants motivation to empathize with the elderly speaker.

Groom et al. (2009) sought to determine how the race of a perspective taker would affect racial prejudices using both MS and IVEs. They used the Implicit Association Test (IAT) to assess implicit racial bias, a self-esteem measure, and the MRS and RAS to measure conscious self-reported beliefs and attitudes towards black people. They also looked at interpersonal distance, basically looking at how close participants stood to targets, inferring that people with attractive avatars would stand closer.

Ahn et al. (2013) used the IRI (Davis, 1980) as a pretest to attain a baseline empathy measure before the intervention. In this study, the authors looked at participants' attitudes towards persons with color blindness, using IVET and traditional perspective taking

exercises. They used a measure to look at the success of the participant taking the perspective of the color-blind target, as well as a oneness measure to look at self-other overlap. In addition, they measured how many color matching boards participants helped color blind targets complete, as well as the total number of seconds of helping. Additional measures included a 10-item attitude measure adapted from the Attitude Toward Disabled Persons survey, and a five-item survey to measure presence.

Rosenberg et al. (2013) measured helping behaviors in relation to a IVE intervention, and in addition to using surveys to measure presence and intention to help, counted the time it took participants to help, and the number of pens participants picked up off the floor after the confederate spilled them.

## **Summary**

As mentioned previously, most of the museum digital content and virtual learning resources are focused on digitizing collections. However, collections can be difficult to navigate without meaningful interpretation. Like on-site visitors, virtual visitors require intervention to synthesize digital content (Taub, 2016). Guidance is necessary to help people make sense of digital resources of a cultural institution (Sánchez Laws, 2015).

Museums should encourage learning online through critical thinking, collaboration, and problem solving. Humans hunger for connection (Erickson, 2019). As with learning in a classroom or other physical space, online learning must move beyond passive learning as well. Museums are in the experience business (Erickson, 2019), so therefore online resources that museums offer should do the same.

Sustained face to face dialogue can foster greater empathy (Erickson, 2019). Technology should be used to go further and plan undisciplined spaces and unplanned

interactions. Digital spaces should be activated in new and interesting ways to welcome broader audiences and bring the museum to underserved and displaced communities.

Technology should be a conduit, not the defining experience (Gaylord-Opalewski & O’Leary, 2019). It should encourage learning through critical thinking, collaboration, and problem solving. Museum educators, when approaching IVL, should think outside the role of traditional educators because learners are not in the same room as the educator (Gaylord-Opalewski & O’Leary, 2019). Instruction must translate across a virtual medium, and more research needs to be conducted to understand digital museum resources better.

Storytelling in media can impact individual’s mindsets and produce empathy by generating empathic reactions from audiences to promote action (Hodge & Knesset, 1988; Bunn & Parker, 2003). It can be a way to disseminate culture and share personal narratives in captivating ways. It is an example of using technology in creative ways across many forms to tell stories.

The researcher will now shift focus to the growth mindset framework. Mindset researcher has been conducted in relation to empathy. It is also a framework that guides some of the curriculum developed at the afore mentioned museum to implement in gallery tours.

## **GROWTH MINDSET**

Growth mindset is a framework that leans towards constructivist learning theory. Specifically, growth mindset promotes a belief that intelligence can be developed, and that human abilities are not fixed, but can be enhanced. Belonging, ability, purpose, and self-reflection are among the goals of growth mindset, and context to reflect on what motivates individuals to succeed is emphasized. To accomplish these goals, learners must engage in

experiential learning, and new knowledge must be transferable to real-world situations (Dweck, 2006, 2014).

Mindset, when compared to other interventions meant to encourage longer lasting empathy, is less demanding. Two examples of nudges using mindset are self-fulfilling prophecies, and teaching others. Self-fulfilling prophecies allow an individual to adopt habits of mind that work over the long term, and research shows that when people try to convince other people of something, they often convince themselves (Higgins & Rholes, 1978).

## **Contact**

People effortlessly divide the world into insiders and outsiders (Gair, 2012). Insiders, or the in-group, might consist of people who are the same age, same gender, same race, and same ethnicity. The outgroup is everyone else. Relating to empathy, studies show that people feel less empathy when they encounter an outsider in pain compared to more empathy for an insider (Gair, 2012).

Mindset research shows that groups are capable of change (Dweck, 2006), and a belief in change also makes contact more fruitful. People who imagine a stronger, more connected version of their group might be inspired to make it a reality. Contact can offer evidence for outsiders' worth and help us believe in our own. Contact can help us imagine a future in which outsiders are no longer outsiders (Dweck, 2006).

Nudges can make it easier for people to get to know outsiders and makes it harder to stereotype them. Contact can change how people view themselves. For example, people can improve their self-compassion, or their willingness to take a kind, forgiving attitude towards their own mistakes (Neff & Pommier, 2013). People who lack self-compassion

often become rigid during conflict and refuse to compromise during disagreements (Yarnell & Neff, 2013).

Nudges using media, including video, photos, and art trigger empathy, but using data as a nudge does not (Berkman, 2021). Contact through media gives people a reason to care about outsiders. Part of this is because humans crave connection, and empathy aligns with this goal. Empathy for one outsider can lead to caring for their entire group (Batson, 1991, 1997), and contact makes avoiding empathy harder (Johnston & Glasford, 2018; Selvanathan et al., 2018; Tam et al., 2007).

Each choice results in a tug of war in our minds, and specifically with empathy, we choose it in some situations and avoid it in others. Empathy is a choice and conflict gives people great reasons to avoid it (Davis, 1980, 1983, 2014; Zaki, 2014). Emotions are built on thought, and feelings and reason are in constant dialogue with each other (Arnold, 1969; Barrett, 2017; Bloom, 2016; Lazarus & Folkman, 1984). Empathy triggers in an individual in response to a friend's pain but does not trigger in response to a stranger's pain. Empathy fires in response to people who look like us but does not fire in response to strangers.

Dehumanization silences empathy at the most basic levels, and conflict worsens the situation. However, the better people know outsiders, the less they hate them (Allport, 1985). Bigotry often boils down to a lack of acquaintance, and the antidote is to bring people together to awaken in them their common humanity (Hainmueller & Hopkins, 2014). Contact theory states that contact can fix hatred and misunderstanding, and this was illustrated in a study done by Ryan Enos (Enos, 2014) where he planted Latinos on a train. Individuals who had contact with the planted Latinos on the train scored lower on a racist attitude survey than individuals without the contact.

However, contact by itself is not enough, but concrete goals are also needed (Allport, 1985). To make contact useful, it is important to give groups equal status, focus

on mutual goals, make it personal, and support cooperation. The more time someone spends with outsiders, the less prejudice they express (Pettigrew & Tropp, 2006, 2008). When people work, live, or play alongside each other, divisions between them melt away (Gilin et al., 2013; Porat et al., 2016).

Sometimes compromise is best served regarding empathy, not by building empathy for outsiders, but by reducing empathy for insiders (Bruneau et al., 2017). Social norms and conformity are more useful interventions or nudges for building empathy in older students (Schultz et al., 2007; Steinberg & Monahan, 2007). An additional intervention that can be important to empathy building is to build healthier learning environments (Paluck et al., 2016).

The mindset framework asserts the belief that people can cultivate their basic qualities through effort, strategies, and help from others (Dweck, 2016, Hong et al., 1999; Levy et al., 1998). This cultivation of qualities rests on a belief in change (Dweck, 2016). When people practice and learn new things the brain grows by forming new connections (Blackwell et al., 2007).

Research has differentiated two domains of mindset: fixed and growth. People with the growth mindset thrive when they are stretched (Grant & Dweck, 2003), feel smart when they are challenged (Elliott & Dweck, 1988), and put forth effort to be able to do things they couldn't before (Good et al., 2012). People with growth mindset know that it takes time for potential to mature (Rattan et al., 2012).

In one study, students who answered a survey that categorized them as having growth mindset took action and felt more determined when faced with setbacks as well as depression that often times follows setbacks (Grant & Dweck, 2003). In other studies, students whose survey results aligned with growth mindset showed an increase in grades when transitioning to Junior High (Blackwell et al., 2007), and in another study students



with growth mindset earned better grades when transitioning to college (Grant & Dweck, 2003).

Praise has an effect on mindset. Specifically, in one study researchers found that praise of effort pushed students towards growth mindset whereas praise of ability pushed students towards a fixed mindset (Mueller & Dweck, 1998). Praising children's intelligence harms their motivation and hurts performance. This is the major difference between fixed and growth mindset. As stated earlier, growth mindset is based on a belief in change through effort contrasted with fixed mindset which is based on a belief that individuals' qualities are based on natural ability.

Unlike growth minded students that are more resilient to setbacks, students with fixed mindsets had higher levels of depression due to ruminating of problems and setbacks (Grant & Dweck, 2003). Fixed mindset creates an internal monologue that is focused on judging, both others and self (Hong et al., 1997). One study found that people with fixed mindsets are not good at estimating their own abilities (Ehrlinger & Dunning, 2003) which follows a lack of belief in growth due to effort and a fixation on inert ability.

As previously mentioned, the genesis of empathy comes from art. Viewing art can provoke emotional empathy as well as cognitive empathy through immersion in other points of view. More importantly, having an experience with art (Dewey, 1934; 1959; 1998) can function as an intervention that can lead to the growth or further growth of empathy based on research, applicable to people that either already are more aligned with a growth mindset or who align more with a fixed mindset. However, there is a gap in research dealing with the relationship between growth mindset and art.

## **Empirical Studies**

A standard approach in conducting mindset research is to present participants scientific information about the malleability of the brain and then invite them to reflect on what they learned (Dweck & Yeager, 2019). More contemporary studies with mindset interventions have sought to shorten interventions presented and offer interventions digitally. Studies have found that brief, online growth mindset interventions have produced effect sizes comparable to more traditional face-to-face interventions which are more extensive and costly. The data show that brief online interventions can change mindsets and academic outcomes like more traditional interventions (Paunesku et al., 2015; Yeager et al., 2019).

Choosing to ignore the emotions of outsiders makes it easier to oppress them (Lanzetta & Englis, 1989; Xu et al., 2009). This is a part of dehumanization. For example, in one study people guessed that a black person would feel less pain from a syringe, or a burn, compared to a white person (Hoffman et al., 2016; Trawalter et al., 2012). In another study during the 2016 republican primary, those who viewed Mexican immigrants as less evolved also endorsed Donald Trump as a presidential candidate, an individual who used racist dialogue against immigrants to promote his platform (Kteily & Bruneau, 2017; Kteily et al., 2015).

Several studies showed that mindsets can play a discrete role in how people judge other individuals and groups (Dweck, Chiu, & Hong, 1995; Levy, Plaks, Hong, Chiu, & Dweck, 2001; Plaks, 2017). Other studies have shown that those with a fixed view of human attributes more readily inferred traits from behavior and made stronger forecasts about what a person would do in the future based on inferred traits compared to those with a growth mindset (Chiu, Hong, & Dweck, 1997; Erdley & Dweck, 1993).

Studies have also shown that manipulating mindsets suggest a causal role in stereotyping. Mindsets were able to predict differences in stereotyping of groups. People that endorsed a fixed mindset made stronger stereotypical judgments of ethnic and occupational groups and formed more extreme trait judgments of new groups compared to people that endorsed a growth mindset (Levy, Stroessner, & Dweck, 1998).

Stereotyping can be influenced by beliefs about human nature. Mindsets can lead people to apply group labels with greater meaning, make judgements more quickly, and grasp them more firmly (Plaks, Stroessner, Dweck, & Sherman, 2001). Mindset studies have showed that fixed mindsets were associated with more attention to information that supported individual's existing stereotypes (Plaks et al., 2001). Studies have shown mindsets have predicted altered attention to information that supports or rejects stereotypes.

Other studies have found that behaviors considered prejudice can grow out of mindsets. In one study participants that believed that prejudice was fixed were more worried about discovering prejudice in themselves or looking prejudiced to others. They showed lower interest in interracial interactions and diversity related activities, and displayed heightened symptoms of anxiety (Carr, Dweck, & Pauker, 2012).

Mindsets also impact mental health. Studies have found that high school students with a fixed mindset about social qualities (labeling others as bullies, losers, smart, etc.) viewed these attributes as fixed traits. They were more likely to view a student that bullied others as a bad person. They also associated others' behaviors as impacting their own worth (Yeager, Trzesniewski, Tirri, Nokelainen, & Dweck, 2011; Dweck & Yeager, 2012). Studies have also shown that people had the potential to change using mindset interventions, especially in adolescence (Williams, Cheung, & Choi, 2012).

In a study conducted with Israelis and Palestinians, one group received a growth mindset intervention to compare results with a control group. The intervention focused on teaching that groups do not have a fixed, inherent nature and always have the potential to grow and change. Those in the intervention group that showed more positive attitudes towards the other party and greater willingness to compromise for the sake of peace when compared to the control group (Halperin, Russell, Trzesniewski, Gross, & Dweck, 2011; Goldenberg et al., 2017).

In one study, students read an essay suggesting the idea of intelligence being malleable, or mobile, and as a result these students tried harder at intellectual tasks (Broda et al., 2018; Yeager et al., 2019). Relating to empathy, people who believed that empathy was a trait avoided empathy during tough moments, whereas people who believed it was a skill tried to show empathy, even when it was hard (Schumann et al., 2014).

Using the Growth Mindset framework (Dweck, 2006) offers a less demanding alternative to building long term empathy. There is evidence that simply believing it is possible to change is enough to impact an individual's empathy (Hong et al., 1999). This evidence relates to Dweck's (2006) research on mindset, or the belief that intelligence and personal qualities are malleable.

According to growth mindset, the brain is not hardwired. Although our genes play a role in who we are, people also grow new neurons throughout their lives (Boldrini et al., 2018; Spalding et al., 2013). There is MRI evidence that experiences, choices, and habits impact our brain chemistry (Draganski et al., 2004; Elbert et al., 1995; Sapolsky, 2000).

Although there is empirical research with mindset interventions on the malleability of the brain, much, if not all, of this research used either workshops or empirical data as interventions. There exists a gap in research relating to evaluating other forms of mindset

interventions. There exists an opportunity to use art and immersive technologies to create an intervention relating to mindset.

## **Summary**

In conclusion, the experience of learning with art and learning in a museum is one that is unique from other ways of learning. The experience is multifaceted and can lead to a praxis of understanding. It is a demanding way to learn as viewers seek to construct new knowledge and wrestle with long periods of time looking closely at objects, but the reward comes in an experience that may not exist anywhere else. Important components of learning with art consist of interpretation, dialogue, constructivism, social justice, and empathy. These components, gathered as a whole, embody what Dewey describes as “an experience.”

The genesis of empathy comes from art. Viewing art can provoke both emotional and cognitive empathy through immersion in other points of view. More importantly, having an experience with art can function as an intervention that may impact an individual’s empathy. Sustained face to face dialogue can foster greater empathy.

Museums should encourage learning online through critical thinking, collaboration, and problem solving. As with the experience of learning a museum, online learning with art must move beyond passive learning to more constructivist models that can lead to digital experiences. Digital spaces should be activated in new and interesting ways to welcome broader audiences and bring the museum to underserved and displaced communities.

Unfortunately, the majority of museum digital content and virtual learning resources are focused on digitizing collections. This poses a challenge as art collections can be difficult to navigate without meaningful interpretation. Like on-site visitors, virtual

visitors require intervention to synthesize digital content. Guidance is necessary to help people make sense of the digital resources of a cultural institution.

Technology should be a conduit, not the defining experience, of online museum education. It should encourage learning through critical thinking, collaboration, and problem solving. Museum educators, when approaching IVL, should think outside the role of traditional educators because learners are not in the same room as the educator. Instruction must translate across a virtual medium, and more research needs to be conducted to understand digital museum resources better.

Storytelling in media can impact individual's mindsets by generating empathic reactions. It can be a way to disseminate culture and share personal narratives in captivating ways. It is an example of using art and immersive technologies, among other forms, in creative ways across many forms to tell stories. Digital storytelling is a powerful medium that may have the capacity to be implemented as a mindset intervention.

The Growth Mindset framework consists of two different assumptions people may have about the malleability of personal attributes. On one end is the implicit belief in a fixed, nonmalleable trait like entity, and on the other end is an implicit belief that traits are malleable and can change and develop. According to growth mindset, the brain is not hardwired. Although empirical research exists showing evidence interventions can impact individuals' implicit theories on the malleability of traits, these interventions almost exclusively consist of the presentation of empirical evidence of brain malleability to subjects.

There exists a gap in research relating to other forms of mindset interventions. There is an opportunity to use art and immersive learning technologies to create an intervention relating to mindset. This intervention may be a valuable contribution to museum education.

## **Chapter 3: Methods**

The goal of this research study was to develop a digital online museum resource, including art and an oral history, to use as an intervention to statistically measure subjects' changes in empathy towards undocumented immigrants from Mexico, implicit theories of self, beliefs about social mobility, and views of malleability of intelligence.

This study consists of one overarching research question that guides the overall method, as well as three specific research questions that correlate to each phase:

How can art, digital storytelling, and immersive learning technologies be used to develop an online museum digital resource?

- What is the process of transforming existing museum curriculum to an online learning experience?
- How can qualitative results, gathered through ethnography, be reported through art, digital storytelling, and immersive learning technologies?
- Does an intervention using art, digital storytelling, and immersive learning technologies produce a statistically significant difference in implicit theories of self, beliefs about social mobility, views of malleability of intelligence, and empathy towards undocumented immigrants from Mexico?

The researcher employed an exploratory sequential mixed methods design for this study. This method has three main phases: qualitative, development, and quantitative. Each phase builds sequentially off the prior. Creswell and Plano Clark (2018) indicate that when investigators do not know what questions need to be asked, what variables should be measured, or what theories should guide a study, they should "... first explore qualitatively to learn what questions, variables, theories, and so forth need to be studied and then follow

up with a quantitative study to generalize and test what was learned from the exploration” (p. 9).

The primary intent of an intervention development design is to “... develop and apply a quantitative measure, survey, intervention, digital tool, or new variables that are grounded in qualitative data” (p. 84). In this study, the researcher needed to explore the processes of museum curriculum transformation and development of new digital online museum experiences, and to follow up that exploration with the development and application of a new digital online museum experience.

In the first phase of this study an ethnography was conducted between 2016-2018 to collect qualitative data to use as a narrative in relationship to the pre-selected artwork presented in the digital online museum resource. An ethnography was chosen as the qualitative method to explore the lived experience of an undocumented immigrant to better “live a little...” (Dewey, 1934) in the pre-selected artwork, a sculpture named *Border Crossing* depicting undocumented immigrants crossing the Mexican/American border.

In the second phase of this study a digital online museum resource was developed based on qualitative data collected in phase 1 and was tested for content validity. Per findings found by the researcher in the review of literature, development of the digital online museum resources, based on the ethnographic data in phase 1, was guided by theoretical and empirical literature about museum education, digital storytelling and immersive learning technologies.

In the third phase the digital online museum resource was used as an intervention that was administered to a sample of participants as part of an experimental design to quantitatively measure change in four domains of mindset. To increase the rigor of the study, two intervention conditions are included in this phase. Intervention condition A was a more immersive digital online museum resource developed using data from phase 1, and



intervention condition B was a less immersive digital online museum resource using the same data from phase 1. Two conditions within the intervention are included to strengthen the design.

	<b>Procedures</b>	<b>Products</b>
Qualitative Data Collection and Analysis	Ethnography Purposive Sampling ( $n = 1$ ) Data collection: observations, semi-structured interviews, field notes, reviewing artifacts Data analysis: coding for descriptive labels, sorting data for patterns, development of themes, peer examination of codes and themes	Testimonio
Builds to	Qualitative findings inform the development of the intervention	
Intervention Development	Develop intervention Content validity Member checking	Intervention
Tested by	Plan quantitative assessment of intervention	
Quantitative Data Collection and Analysis	Survey Purposive sample – 237 undergraduate college students Independent variable – intervention Dependent variables – mindset, empathy Additional variables – ethnicity, gender Multivariate analysis of variance Analysis of variance	F values Main effects Interaction effect
Interpret	Discuss extent to which qualitative phase enhanced the validity of the intervention Discuss extent to which the qualitative data informed the development of a quantitative intervention Discuss extent to which the intervention made a difference in mindset and empathy	Digital online museum resource

Figure 1: Procedural Diagram

Pertinent information is that while the researcher was conducting phase 2 of this study, the museum referenced was closed due to the COVID-19 pandemic. The education department, as well as reassigned museum staff from other departments, shifted focus to remote learning. New outreach materials, including videos, remote tours using Zoom, and modules on learning management systems (LMSes) were developed to meet the needs of university, K-12, and community outreach.

### **Phase 1: Qualitative**

As this artwork represents undocumented immigration, it was important to explore this phenomenon to develop the oral history. Attitudes towards immigrants are complicated and nuanced. People's attitudes may result from three interrelated factors (Bishop & Bowman, 2020). One of those factors is one's own firsthand social experiences with immigrants. This relates to Allport's (1954) Social Contact Hypothesis. In this hypothesis, intergroup contact could reduce negative attitudes of a majority group towards a minority group. Majority individuals who have contact with minority individuals are less likely to harbor negative attitudes towards minority groups (Pettigrew & Tropp, 2006). Research shows that individuals living in areas with a substantial population of undocumented immigrants were more tolerant towards the target group (Hackett, 2015).

Another factor involves ways undocumented immigrants are portrayed in U.S. media. Mass media can create an illusion of a relationship between individuals portrayed and their audience (Horton & Wohl, 1956). Fifty-nine percent of undocumented immigrants live in six states (Pew Research Center, 2016), so a large portion of the U.S. population is unlikely to have undocumented friends or family, which allows the media to influence public opinion more.

People may also have vicarious contact, meaning that they know someone who is friends with someone in the outgroup (Cadenas et al., 2018). It is when someone imagines the experiences of the outgroup (Miles & Crisp, 2014; Pettigrew et al., 2011) and has been shown to reduce prejudice towards outgroups (Miles & Crisp, 2014; Pettigrew et al., 2007; Pettigrew et al., 2011).

Qualitative research is useful when little is known about a topic (Corbin & Strauss, 2008). An advantage of using an exploratory sequential design is that open-ended questions in the qualitative phase allow participants to provide detailed and meaningful insights that may ground the development of an intervention in theory (Mack et al., 2005). Qualitative data may also be useful in identifying major dimensions of complex concepts for further study (Lunt, 1996).

In this qualitative phase the researcher employed the method of ethnography to explore the lived experience of Reyna Vazquez, a 39-year-old woman from Veracruz, Mexico. Reyna came to the U.S. without documents at the age of 16. Currently she is recognized as one of the most talented chefs and successful local business owners in Austin, Texas.

Reyna's story is intersectional because race, gender, and class all play critical factors in her lived experience. Reyna's story challenges the dominant ideology about undocumented immigrants that is widely accepted in the U.S. and portrayed in media. A goal of this ethnographic research was to value and legitimize Reyna's lived experience and experiential knowledge and to give her voice through her storytelling, allowing her to name her own reality (Fernández, 2002).

Reyna's story is a stellar example of growth mindset, and her experience navigating capitalistic America as an undocumented immigrant to become a successful small business owner will be the story that is related in phase 2 as a digital intervention. Her experience

also serves as an example of contact with an outgroup, therefore making it an effective empathy intervention as well for phase 2.

The method of ethnography was chosen because researchers can come to understand their subjects' beliefs, motivations, and behaviors more profoundly through this method of research than through any other approach (Hammersley, 1992). This is due to the close and prolonged interaction ethnographers experience with their subjects in their everyday lives. Ethnographic research is, "... an ongoing attempt to place specific encounters, events, and understandings into a fuller, more meaningful context" (Tedlock, p. 455). It brings together various methods of inquiry, research designs, and fieldwork to provide data that is contextually situated in human lives, history, and politics.

When researchers choose to conduct an ethnographic study, they become a marginal native (Van Maanen, 2011). In other words, they almost become a part of a group or culture being observed, but not quite. They establish enough rapport with their subjects to gain access to a group but keep enough distance as to not establish friendship. If ethnographers cross this line, they risk going native (Van Maanen, 2011).

Ethnographic fieldwork is an ongoing process that connects personal experiences of the researcher with an area of knowledge. Writing an ethnography should be an extension of fieldwork. Ethnographic research is both a process and a product. The life of an ethnographer is embedded within his/her field experiences to the degree that all the researcher's interactions involve moral choices. An ethnography is both an autobiography and a cultural analysis. Experience in the field is meaningful and human behavior is generated from and informed by this meaningfulness.

Ethnography is the art and science used to describe a group or a culture (Fetterman, 1998) and has many important characteristics. It is research that is conducted onsite with multiple ways to collect data. It is personalized, both for the observer and the participants.

It is inductive, including general conclusions from instances in fieldwork. It is holistic, as the researcher understands individual parts as interconnected and explicable only by reference to the whole. It is dialogic, because findings are informed by feedback from those being studied (Sangasubana, 2011).

Because the ethnography conducted in this study was centered around one individual, Portraiture (Lawrence-Lightfoot, 1997; 2005; Bruhn & Jimenez, 2020) and Person-Centered Interviewing (Hollan, 1997; 2005; Levy, 1973) were important to move ethnography past the study of a group or culture. Both Portraiture and Person-Centered Interviewing place attention on effective communication between the researcher and subject of the study with the purpose of deepening perception, expanding frames of reference, and pushing readers to expand the way they see the world (Bruhn & Jimenez, 2020; Hollan, 2005). They both seek to develop experience-near ways of describing and analyzing human behavior and experiences through focusing on individuals and their subjective experiences (Hollan, 1997). They tell the researcher what it is like “to live there” (Hollan, 1997).

Ethnography is essential to the study of identity (Urrieta & Hatt, 2019). Identity shifts and develops over time and is tied to a person’s identifications of belonging. Through interviews, researchers can learn about another’s identity, personal experience, and meaning-making through careful listening. By actively engaging with the interviewee, a researcher can learn what they think about and what they feel. The researcher can learn what people most value and what they most dread (Levy, 1973).

Ethnography also has potential disadvantages. It is labor intensive and time consuming, and balancing observation and participation can be challenging. Conducting data collection through fieldwork lacks structure compared to other research methods. There are ethical dilemmas present in data collection and analysis. These dilemmas consist

of confidentiality and privacy issues, deception and misrepresentation by the researcher, and biases brought into the research by the ethnographer. It is possible for the researcher to violate his/her own moral standards to conform to the group or setting being studied, and it may be a challenge to publish research findings that may be truthful but at the same time unflattering to the participants.

### ***Research Question***

What is the process of transforming existing museum curriculum to an online learning experience?

### ***Theoretical Framework***

***Ethnography.*** This study was guided by several ethnographic frameworks. Sangasubana's (2011) framework for conducting ethnography consists of five stages that the researcher employed in phase 1 of this study. The first stage is problem formulation. During this stage the researcher defines the focus of the ethnographic study by formulating the problem statement. For the present ethnographic study, the research question is, "How did an undocumented woman from Mexico navigate the United States capitalistic system to become a successful small business owner in Austin, Texas?"

In stages 2-4 of Sangasubana's (2011) framework for conducting ethnographies, the researcher selects a research setting that will permit clear observation. Next, the researcher focuses on gaining access to the research setting and participants of the study and presents themselves to participants within the research setting. Questions to consider are whether the research will be covert, what roles the researcher will adopt in the research setting, how active the researcher's participation will be, and whether the participants will accept the researcher in their daily lives.

The final stage of Sangasubana's (2011) framework is assessing the need for equipment to record data in the field and gathering and recording the data. She recommends that the researcher always carry a notepad during this stage and record observations as soon as possible. Field notes should include running descriptions, including daily observations about the setting, people, individual actions and activities, group behaviors, and perspectives. Notes should also include thoughts for further information use like spontaneous ideas, personal impressions and feelings, and methodological notes.

Also guiding this study was a framework of narrative inquiry designed to understand a phenomenon or experience (Kramp, 2004). Many unstructured interviews were conducted over several years with Reyna, and those close to her, to learn about her lived experience. All interviews were conducted in Spanish. Reyna speaks English very well but expressed that she felt like she could express herself better in Spanish. As interviews were translated into English, the researcher iteratively involved Reyna in verifying her voice. A goal for all interviews conducted in this study was to promote a comfortable and safe environment where all participants could freely share their thoughts and ideas (Krueger & Casey, 2000; Wilkinson, 2004).

The Portraiture framework (Lawrence-Lightfoot, 1997, 2005; Bruhn & Jimenez, 2020) guided the researcher in telling Reyna's story by grounding it in theory and attempting to be honest and transparent about politics and power throughout the ethnography. The researcher adhered to three main tenets of Portraiture: first, an understanding that at the center of each research encounter there is a set of relationships between people with different needs, desires, and motivations for engaging in the study; second, that the researcher is expected to illuminate and explore goodness within the topic under study; and third, a consideration of how the results of this study would be read outside of academics (Bruhn & Jimenez, 2020). The researcher sought to see beyond



conventional frames of reference through dialogue with Reyna to understand her narrative better (Lawrence-Lightfoot, 2005).

Finally, Person-Centered Interviewing (Hollan, 1997, 2005; Levy, 1973) was an important ethnographic framework in this phase. The researcher sought to ground interviews in Reyna's daily life. The researcher did not wish to change Reyna's subjectivity, but to observe and present Reyna's narrative as faithfully and consistently as possible. Rather than make inferences, the researcher iteratively asked Reyna questions over multiple interviews (Hollan, 1997).

Rather than assume the identity of an anonymous bystander disconnected from Reyna's life, the researcher became an active member of Reyna's community. This was accomplished by grounding conversations in places and at times that flowed with Reyna's normal work and personal schedule and conduct interviews in Reyna's native Spanish language. The researcher sought to explore more intimate conceptualizations of and experiential knowledge of identity with Reyna and her community (Urrieta & Hatt, 2019). Reyna's identity and self-understandings were very important for the researcher to understand and present.

In interviews, the researcher listened to Reyna narrate her life, her lived experiences, her explorations of self, and her relationships with persons, places, and things. She explained how she understood her own identity, her community, and the identities of those surrounding her (Urrieta & Hatt, 2019).

### ***Research Design***

***Participants and settings.*** Purposive sampling (Onwuegbuzie & Collins, 2007) was used to select Reyna Vazquez as the participant and her business as the primary setting for this ethnographic study ( $n = 1$ ). The research setting for this study seemed implicit as the

physical locations of Reyna's business where she spends most of her time. However, the researcher wanted to be open to other settings that might factor into Reyna's narrative. Part of discovering these other settings necessitated shadowing Reyna regularly in her day-to-day life.

The story of Reyna Vazquez centered on her experience as an undocumented immigrant woman from Mexico attempting to start a business in the U.S. It is a story of risk, of challenges, and of perseverance. The desire to understand Reyna's lived experience was also to explore Reyna's own mindset and the empathy she was shown by others.

**Data collection.** An ethnographic researcher should always carry a notepad and record observations as soon as possible (Sangasubana, 2011). Field notes should include running descriptions, including daily observations about the setting, people, individual actions and activities, group behaviors, and perspectives. Notes should also include ideas for further information use, personal impressions and feelings including subjective reactions from the field, and methodological notes including data gathering techniques.

The researcher began collecting data for phase 1 in 2016 and continued to collect data until 2018. Data collection began with a meeting with Reyna to establish the researcher's intentions for the study and set up behavior protocols for different settings. Next, data collection strategies were planned. Sangasubana (2011) writes that a characteristic of ethnography is employing multiple ways to collect data. Data collection in this study consisted of field notes, audio recordings, video recordings, gathering artifacts, viewing business and personal archives, various forms of media about Reyna and her business, and interviews.

**Data analysis.** Data analysis in ethnographic research should begin while data is being collected (Roper & Shapira, 2000). This is important because the researcher should begin to understand data as it is collected to avoid any preconceived notions about the

subject matter. Learning from data from the beginning of data collection is therefore critical. Strategies for analyzing data include coding for descriptive labels, sorting data for patterns, and developing themes (Creswell & Plano Clark, 2018). More specifically, the researcher should perform first-level coding which consists of grouping words into meaningful categories or descriptive labels, then organizing them to compare, contrast, and identify patterns to reduce the data to a manageable size. This also includes identifying outliers — categories or labels that do not fit.

In this ethnography the researcher sought to generalize constructs and theories by connecting findings to related theories and existing literature (Lawrence-Lightfoot, 1997, 2005). The researcher recorded collected data with reflective remarks and noted insights about the data. This aided the researcher in seeing if any data needed further clarification. To ensure trustworthiness of the qualitative analysis, the researcher conducted a peer examination of the data by inviting a nonparticipant to review codes and themes (Zohrabi, 2013).

It is vital for the researcher to control for quality in data collection and analysis. This can be done by noting three potential issues: reactivity, reliability, and validity (Monahan & Fisher, 2010). Reactivity refers to the degree to which the presence of a researcher influences the behaviors of others. Reliability refers to collecting data that is internally consistent and credible, or consistent over time and in different social contexts, and externally consistent and credible by verifying data with other sources. Validity refers to the researcher's confidence in collecting and analyzing data and representing the lives under study accurately. The results of an ethnographic study should have relevance beyond the study.

To lessen reactivity of the participant, the researcher sought to blend in as much as possible to the setting where data was being collected, as to not call any attention to the

data gathering. During interviews the researcher allowed the participant large portions of time to formulate answers to questions and started each interview with an icebreaker discussion to take focus away from recording devices (Levy, 1973). To make data collected more reliable, the researcher continually sought the participant's feedback in relation to interview transcripts, observation notes, and collected artifacts (Hollan, 2005). With respect to validity, the researcher used testimonio as the form of reporting the lived experience of the participant. The testimonio is the words of the participant.

***Positionality.*** In qualitative research, the researcher is the primary instrument for data collection and analysis (Marshall & Rossman, 2011). Specific steps were taken to ensure the trustworthiness and credibility of collected data. In qualitative research, trustworthiness is essential (Marshall & Rossman, 2011). The researcher used peer debriefing to ensure the thoroughness of the analysis of the data by asking a university peer to review coding and emerging themes (Marshall & Rossman, 2011). The researcher used a research log to document the entire research process, including data collection, data analysis, and all other phases of the research design to create an audit trail (Marshall & Rossman, 2011). Examples include notes from interviews to track the evolution of key findings and to confirm agreement between research steps (Mertens, 2009).

The researcher in this study is a 44-year-old male who identifies ethnically as white and racially as half Jewish and half Spanish. He speaks English natively and speaks Spanish as a second language. He is married to the main participant, Reyna Vazquez. Politically he identifies more towards the liberal side and most of the time votes as a Democrat. He considers his household to be middle class. The researcher and his wife do not have any children.

## **Phase 2: Development**

Ethnographies have been published in many different ways. The key to knowing the best way of publishing the results of an ethnographic study is for the researcher to have a clear idea of the audience that will consume the results. Examples of ethnographies include extended monographs, biographies, personal memoirs, narratives, novels, and documentaries. An extended monograph is a detailed written study of a single specialized subject or an aspect of the study. A biography is a life history. It is one of the earliest and most popular narrative genres of ethnography. The aim of a biography is to illuminate cultural, historical, and social facts rather than individual lives. It uses the story of an individual participant to represent an entire culture or group.

A personal memoir is a written account of the researcher's own life in the field, offering a window into the researcher's field experience. A narrative ethnography is an overlapping of biography and personal memoirs. The goal of publishing an ethnographic study is to accurately portray the subjects of the biography and at the same time share the researcher's own experiences from the field. An ethnographic novel must contain accurate information about the ethnic group being portrayed and is written in the narrative style of a novel. A subgenre to the ethnographic novel is ethnographic fiction, which introduces anthropological themes into science fiction in the form of short stories, novellas, and plays. Other creative examples of publishing ethnographies include travelogues, chronicles, and diaries. For the purposes of this research study, publishing ethnographic data in the form of documentary will be highlighted.

In this second phase, a digital online museum resource was developed based on the qualitative data in phase 1 and was tested for content validity. The intervention was an adaption of an existing lesson plan used in a museum of art to engage learners in growth

mindset, empathy, and social justice centered around a specific artwork and using oral histories.

The artwork used in the museum's lesson plan is a sculpture named *Cruzando El Rio Bravo (Border Crossing)* by Luiz Jimenez. *Border Crossing* is a painted fiberglass sculpture, measuring 126 inches by 40 inches by 51 inches, created by Jimenez in 1989 and currently on display at the a museum of art connected to a large university campus in the southwest U.S. This sculpture is regularly used in conjunction with student groups in the museum.

In the lesson plan, educators are directed to help students look closely at the sculpture for an extended amount of time, then discuss with learners what they see. The educator presents the learners with a series of opinion statements about immigrants and leads a discussion about their attitudes and how they know what they know. Next, learners are instructed to describe what they see in the statue and think about who the people are, what they are doing, and what emotions are expressed in the depicted individuals.

The last part of the lesson consists of sharing an oral history of an undocumented immigrant from Mexico (one paragraph) noting the purpose and value of oral histories in relation to understanding immigration issues. Over 150 short oral histories are available for students to read. Students are then assigned to conduct their own oral history interviews. The enduring understandings of this experience are for learners to understand immigration issues, learn that empathy is a skill that needs to be nurtured, and understand the value of oral histories in relation to how they know what they know.

The digital online museum resource that the researcher needed to develop, adapted from the existing lesson plan designed for in person tours, had to contain key core elements from the original, namely the artwork, an oral history of an undocumented immigrant from Mexico, and a learning experience that emphasized social justice, empathy, and growth

mindset. However, because this newly developed museum resource would be digital and accessed remotely, the researcher could not utilize learning experiences such as discussions and questioning. Therefore, mindset, empathy, and social justice would need to be embedded in the resource, specifically in telling the oral history, and to make it immersive.

### ***Research Question***

How can qualitative results, gathered through ethnography, be reported through art, digital storytelling, and immersive learning technologies?

### ***Conceptual Framework***

***Digital Testimonio.*** Film has been used to support ethnographic research since the late nineteenth century (Henley, 2010). Although video is a common way to record data in ethnographic research, it is less common to use video as a means for disseminating results.

Storytelling is older than both video and ethnographic research. Today, storytelling techniques are an essential part of documentary filmmaking. More pertinent to this research is that storytelling can also be a means for researchers to present findings (Walker & Boyer, 2018). Using multimedia to present ethnographic results can create an innovative way to communicate research (Heath, Hindmarsh, & Luff, 2010).

Walker and Boyer (2018) have created a framework to guide the potential use of research data to create a multimedia narrative to present a study. Research storytelling requires data analysis and reporting necessitates a different set of ethical standards when compared to storytelling in documentary (Dahlstrom, 2014; Nichols, 2010). Creating a story for research purposes is ethically bounded by expectations of trustworthy reporting and data analysis.

Important considerations of using research storytelling using multimedia include how the researcher uses video as a tool for storytelling research, the properties of the camera, how video will impact participants and the researcher, and the methods by which the researcher and viewers will consume the media (Walker & Boyer, 2018).

Choosing media to present research comes with affordances and constraints. Specifically, regarding video, there are similarities and differences that should be considered by the researcher. Video research differs from documentary filmmaking in how the researcher considers, records, and edits footage. For the researcher these key steps should be done in an exploratory way and not a predetermined way. All the video captured during data collection in an ethnographic study should be considered as part of the final narrative presented in the media according to ethnography standards for data analysis.

Where documentary filmmaking and video research are similar is in technical skills, interview techniques, and editing (Erickson, 2007). Video researchers should consider stylistic approaches of documentary filmmakers. Additionally, in both fields, informed decisions are made about what footage to capture and how to edit the footage to produce a cogent and effective final product. For both fields, post-production editing is vital, but goals in editing differ. Whereas documentary filmmakers may look for footage that supports a predetermined story, video researchers should look for clips that reflect emergent storylines in the data.

The concept of emergent storylines is very important and should be data driven. Researchers should pay careful attention to divergent statements, convergent statements, and unexpected statements from participants (Knoblauch et al, 2017). Video footage should be captured throughout the entire data collection process starting from the very beginning to accomplish this goal.



Augmented reality, virtual reality, and 360-degree video have the potential to change ethnographic data analysis and reporting (Walker & Boyer, 2018). One field where 360-degree video has made an impact in creating experiences for a person to “walk in the shoes” of another person or group is journalism, specifically short documentary journalism. For this research study, 360-degree video was used to present results.

### ***Research Design***

***Development of Intervention.*** Based on qualitative findings from phase 1, the researcher developed one intervention with two conditions. Both conditions sought to make a narrative analysis of data from phase 1. The researcher constructed a narrative, or storied analysis, to connect the narrative to the artwork. The goal of the researcher was to integrate data in Reyna’s story rather than separate it out into themes (Kramp, 2004). Although a research question is stated in phase 1, the researcher employed an unstructured interviewing method in phase 1 to allow Reyna to speak freely of her experiences and realities and tried to remain open to the directions the conversations would go. Phase 2 took place during the Fall semester of a large research university in the southwest part of the U.S.

Both conditions contained Reyna’s testimonio. Reyna took on the mantle of testimonialista (Yudice, 1991) as she shared her experiences in her interviews. For a story to be a testimonio, it must bear witness to a social urgency. The individual bearing testimony must, “... hope that his or her life’s story will move the reader to action in concert with the group with which the testifier identifies” (Tierney, 2000, p. 540). A moral or social imperative must exist as well as a connection to a marginalized group or class situation (Tierney, 2000).

Yudice (1991) says, “... testimonial writing may be defined as an authentic narrative, told by a witness who is moved to narrate by the urgency of the situation (p. 17).” A testimonio centers the marginal, generates and validates knowledge from experience, and honors personal experience (Yudice, 1991). It is a narrative told in the first person by a narrator who is also the protagonist who lived the events and is not forced to tell the story with the purpose to call people to action (Beverly, 1991).

Reyna’s story is a telling of *sobrevivencia* (Urrieta, Kilano, & Jo, 2015). It is a testimony to resilience and triumph. It is her counter story to the majoritarian stories of undocumented immigrants and Latinas, and her way of challenging assumptions about her *raza*.

***Content validity.*** Content validity refers to the degree to which the content of an instrument, or in this case a digital story, represents the content of what it aims to measure, and agreement among sampled experts is evidence of content validity (Fink, 2017; Groves et al., 2011). Member checking (Talbur, 2004) was done throughout the ethnography by asking Reyna and other participants to respond to the researcher’s inquiries and conclusions as well as written summaries and organization of data. Self-reflexivity demonstrated through iterative member checking through structured and unstructured conversation served to ensure trustworthiness of this study.

### **Phase 3: Quantitative**

#### ***Research Question***

Does an intervention using art, digital storytelling, and immersive learning technologies produce a statistically significant difference in implicit theories of self, beliefs about social mobility, views of malleability of intelligence, and empathy towards undocumented immigrants from Mexico?

## ***Research Design***

The overall intent of the data analysis in this study was to sequentially integrate qualitative data with the development and application of a digital online museum resource. This resource was used as an intervention that was administered to a sample of undergraduate students at a large research university in southwestern U.S. as part of an experimental design to quantitatively measure change in four domains of mindset. To increase the rigor of the study, two intervention conditions were included in this phase. Intervention condition A was a more immersive digital online museum resource developed using data from phase 1, and intervention condition B was a less immersive digital online museum resource using the same data from phase 1. Two conditions within the intervention were included to strengthen the design (Creswell & Plano Clark, 2018).

The researcher chose undergraduate students as the target population at the university mentioned above because many professors plan visits with a dedicated university outreach educator to tour the museum on that campus as part of their curriculum

This is a population that in years past has regularly participated in group tours at the museum; however, during the part of this study that took place during the COVID-19 pandemic, the museum was not able to accommodate the high numbers of group tour requests. Many museum tours viewing works of art were planned considering the Growth Mindset framework (Dweck, 2006, 2014) to focus museum experiences on themes and exercises that would support the academic success of these students in their courses.

The implementation of the Growth Mindset framework, with added emphasis on empathy and social justice, created a common focus for this diverse group of students. An example of this emphasis on growth mindset, empathy, and social justice is the museum lesson plan chosen for this study. The sample of participants in this phase represent a

purposive sample, as it is a non-probable sample meant to achieve representativeness or comparability to the larger population of the sample (Teddle & Yu, 2007).

To recruit students, the researcher worked with the University Audiences Museum educators to identify professors who might be interested in sharing study recruitment materials with their students. The researcher also worked with the Faculty Innovation Center and the Office of Instructional Innovation to recruit potentially interested professors. Both campus organizations work with undergraduate professors in curriculum design and learning technologies.

Fifty-three undergraduate professors and lecturers agreed to share this study with their students. Also, the Department of Mathematics, UTeach program, and First Year Experience Office in the School of Undergraduate Studies shared this study with students. From these recruitment efforts, 237 students responded.

Phase 3 took place during the Spring 2022 semester of a public R1 research university. Data collection for phase 3 took place online. The participants were randomly assigned to either intervention condition A or B and all responded to the same pre and post survey using either computers or portable devices (smartphones or tablets).

***Instruments and procedures.*** This study presents an intervention with two conditions. The researcher utilized an experimental design (Shadish, Cook, & Campbell, 2001). Differences in pre and post survey scores are reported. Intervention conditions developed in phase 2 were administered to a sample of 237 undergraduate college students. Two conditions were included in this phase. Condition A was a more immersive intervention based on the data from phase 1, and condition B was a less immersive intervention based on the data from phase 1. To strengthen the research design, two conditions were introduced. Content was held constant across both interventions.

Student participants were given a link by their professors to a Qualtrics form containing the pre and post surveys and intervention. Students were instructed to complete all steps in the research study in the same day. After providing two pieces of demographic information (gender and ethnicity), students were randomized using the standard Qualtrics randomized tool (blocking on gender/ethnicity) into one of the two conditions. Students in both conditions completed the mindset survey as a pre and posttest. The mindset survey contained four subscales — three from the Growth Mindset Questionnaires (Chiu et al., 1997), and one developed by the researcher.

The Mindset Questionnaires (Chiu et al., 1997) are measured on a scale of 1 (strongly disagree) to 6 (strongly agree). There are three subscales identifying three domains of mindset: malleability of intelligence, beliefs about social mobility, and implicit theories of self. Each domain in the Mindset Questionnaires has three items, described below.

Questions targeted at implicit theories of self are: The kind of person someone is, is something very basic about them, and can't be changed very much. People can do things differently, but the important parts of who they are can't really be changed. People can't really change their deepest attributes.

Questions targeted at malleability of intelligence are: You have a certain amount of intelligence, and you can't really do much to change it. Your intelligence is something about you that you can't change very much. You can learn new things, but you can't really change your basic intelligence.

Questions targeted at beliefs in social mobility are: You have a certain status in society, and you really can't do much to change it. Your status in society is something about you that you can't really change very much. You can do things differently, but you can't really change your status in society.

The reliability of this measure is good (Cronbach's  $\alpha = .80$ ). This survey has high internal reliability ( $\alpha = .90$  to  $.96$ ), and the test-retest reliability of the measure over a two-week interval was  $.82$ .

The researcher developed an additional subscale identifying a domain of mindset pertaining to empathy towards undocumented immigrants from Mexico. Questions are: I find it difficult to see things from the point of view of an undocumented immigrant from Mexico. Becoming extremely affected by media about undocumented immigrants from Mexico is somewhat rare for me. I don't feel much concern for undocumented immigrants from Mexico.

All survey items can be found in Appendix A.

Students in condition A viewed a 10-minute 360-degree video depicting visually the testimonio from Reyna, auditorily presenting Reyna's testimonio, and presenting a 3D rendering of the *Border Crossing* statue. Students in condition B read a short (8-10 minutes) testimonio from Reyna and viewed a photo of the *Border Crossing* statue. Both groups, when finished with the interventions, again completed the mindset survey (Chiu et al., 1997).

As mentioned above, all surveys were administered online through Qualtrics. Participation in all surveys was completely anonymous using the anonymity function in Qualtrics. Participants were given a URL to take all surveys and view interventions. Data was collected in Qualtrics and then exported to SPSS for analysis.

Data in Qualtrics was accessed only by the researcher. Data outputted from Qualtrics was temporarily stored on the researcher's password-protected home computer long enough to make any necessary edits before inputting to SPSS. Once the data was uploaded to SPSS, all data downloaded from Qualtrics was deleted.

**Data analysis.** The researcher used statistical analysis focused on pre and posttest comparisons of the mindset survey across both intervention groups and in consideration of gender and ethnicity of subjects. The researcher first used a repeated measures MANOVA to compare the difference between pre and posttest scores for the entire sample. A MANOVA was then performed to determine whether change in mindset was affected by the type of intervention (less immersive or more immersive). Hypothesis: Subjects will have significant change scores in both intervention conditions, and subjects will have a larger difference in scores on intervention condition A than on intervention condition B.

Next, the researcher used a mixed model analysis of variance (ANOVA) in SPSS Statistics software. The independent variables were condition A and condition B, and the dependent variable was change in mindset. The researcher used ANOVA to analyze the interaction of change in scores with participants' gender and ethnicity.

The researcher conducted two mixed model analyses of variance (ANOVA). The first was a 2 x 2 analysis focused on gender and the second was a 2 x 2 analysis focused on ethnicity. This data analytic approach allowed the researcher to test whether there were main effects for both demographics (gender, ethnicity) and intervention. In the case of this study, main effects refer to the effect of gender and ethnicity, averaging across all levels of the differences in scores on the mindset survey.

This data analytic approach also allowed the researcher to test whether there was an interaction between participant demographics and change in mindset. In the case of this study, an interaction is present when the effect of one independent variable is stronger at one level of the other independent variable than at the second level of that same independent variable. It was the researcher's purpose to test whether each of the three effects (two main effects and the interaction effect) were statistically significant. The following formula was used:

$$(Y1 + Y2) / 2 = b0 + b1X + e, (Y1 - Y2) / = b0 + b1X + e$$

$Y1$  is subjects' difference in scores in intervention condition A,  $Y2$  is subjects' difference in scores in intervention condition B,  $X$  is the division between subject's variable (gender), and  $e$  refers to the residuals (error) in the model. The first equation addresses the average in the difference in scores and the second equation addresses the difference in pre and posttest scores. The coefficient  $b1$  in the first equation represents the main effect of gender. If  $b1$  is statistically significant, we can conclude that females on average have reliably higher or reliably lower differences of scores than males, regardless of intervention.

The coefficient  $b0$  in the second equation estimates the effect of intervention (within-subjects independent variable) for subjects. In this study  $X$  centers (coded  $-.5$  and  $+.5$ ) so that  $b0$  represents the main effect of interventions. If this is found to be statistically significant, we may conclude that the subjects, regardless of gender, measured a greater difference in pre and posttest scores in one of the two intervention conditions.

The coefficient  $b1$  in the first equation represents the interaction effect between gender and intervention. If this coefficient is statistically significant, we may conclude that difference in gender is greater for one of the two intervention conditions.

The coefficient  $b0$  in the first equation is the average of all scores (grand mean) but will not be interpreted for this study. Hypothesis: Females will have a less significant difference in pre and posttest scores in both intervention conditions than males. Overall, all subjects will have a greater difference in scores between intervention conditions A and B.

The second analysis was a  $2 \times 2$  model where the intervention condition A and intervention condition B, the two independent variables and ethnicity (Hispanic and non-



Hispanic), were analyzed for interaction with ethnicity. The dependent variable is change in mindset. The following formula was used:

$$(Y1 + Y2) / 2 = b0 + b1X + e, (Y1 - Y2) / = b0 + b1X + e$$

$Y1$  is subjects' difference in scores in intervention condition A,  $Y2$  is subjects' difference in scores in intervention condition B,  $X$  is the division between subjects' variable (ethnicity), and  $e$  refers to the residuals (error) in the model. The first equation addresses the average in the difference in scores and the second equation addresses the difference in pre and post scores. The coefficient  $b1$  in the first equation represents the main effect of ethnicity. If  $b1$  is statistically significant, we can conclude that Hispanics on average have reliably higher or reliably lower differences of scores than non-Hispanics, regardless of intervention condition.

The coefficient  $b0$  in the second equation estimates the effect of intervention for subjects. In this study  $X$  is centered (coded  $-.5$  and  $+.5$ ) so that  $b0$  represents the main effect of intervention conditions. If this is found to be statistically significant, we may conclude that the subjects, regardless of ethnicity, measured a greater difference in pre and posttest scores in one of the two intervention conditions.

The coefficient  $b1$  in the first equation represents the interaction effect between gender and intervention. If this coefficient is statistically significant, we may conclude that difference in gender is greater for one of the two intervention conditions.

The coefficient  $b0$  in the first equation is the average of all scores (grand mean) but will not be interpreted for this study. Hypothesis: Hispanics will have a less significant difference in pre and posttest scores in both intervention conditions than non-Hispanics. Overall, all subjects will have a greater difference in scores between intervention conditions A and B.

## **Summary**

An exploratory sequential mixed methods design was used by the researcher in the present study. This method has three main phases: qualitative, development, and quantitative. Each phase builds sequentially off the prior. In this study the researcher explored the processes of museum curriculum transformation and development of new digital online museum experiences. This exploration led to the development and application of a new digital online museum resource to test as a mindset intervention.

In the first phase an ethnography was conducted between 2016-2018 to collect qualitative data to use as a narrative in relationship to the pre-selected artwork and museum lesson plan being transformed to a digital online museum resource. In the second phase a digital online museum resource was developed based on qualitative data in phase 1 and was tested for content validity. In the third phase the digital online museum resource was used as an intervention that was administered to a sample of participants as part of an experimental design to quantitatively measure change in four domains of mindset.

Purposive sampling (Onwuegbuzie & Collins, 2007) was utilized to select participants for all three phases of this study. To strengthen the design, two conditions were utilized in phase 3. Held constant in both conditions was the artwork, narrative, and pre and posttest employed to measure differences in mindset, but the learning technology varied in terms of immersive characteristics.

The researcher used statistical analysis focused on pre and posttest comparisons of the mindset survey across both intervention condition groups and in consideration of gender and ethnicity of subjects. To do this, the researcher used MANOVAs to analyze differences in participants' pre and post intervention mindset scores across four subscales and to analyze changes in mindset as a function of the experimental manipulation.

The mixed methods model of analysis included two ANOVAs. Both were a 2 x 2 analysis, the first focusing on gender, and the second focusing on ethnicity. The independent variables in each analysis were condition A (more immersive) and condition B (less immersive).

## **Chapter 4: Results**

As stated in Chapter 1, this study examined art education, immersive learning technologies, and mindset. The researcher developed a digital online museum resource to use as an intervention to statistically measure change in participants' implicit theories of self, beliefs about social mobility, views of malleability of intelligence, and empathy towards undocumented immigrants from Mexico pre and post intervention. The researcher sought to find out if there was a statistically significant difference in mindset.

This chapter is organized in terms of research method and research questions presented in Chapter 1. Phase 1 of this study examined the lived experience of an undocumented immigrant from Mexico; phase 2 focused on the development of an intervention in the form of a digital story with art. Lastly, a quantitative study was conducted in phase 3 to examine changes in mindset and empathy based on the intervention.

### **PHASE 1: QUALITATIVE**

The purpose for conducting a two-year ethnography was to craft an oral history for the selected artwork in the existing museum lesson plan. The original lesson plan contained a short one-paragraph oral history about an undocumented immigrant from Mexico to inform discussion of the *Border Crossing* sculpture. However, based on the reviewed literature of art and digital storytelling, it was necessary for the researcher to draft a new oral history more immersive in nature. To make the narrative more immersive, the researcher conducted an ethnography to relate the lived experience of an undocumented immigrant from Mexico to complement the sculpture.

In this phase, the researcher sought to make a narrative analysis of the collected ethnographic data of Reyna Vazquez between 2016-2018. Furthermore, the researcher

attempted to construct a narrative, or storied analysis, using the data from Reyna's story, and integrated data into Reyna's story rather than separating it out into themes (Kramp, 2004), although themes are mentioned throughout this section.

To understand and capture Reyna's story the researcher employed a narrative inquiry method. This method is designed to understand a phenomenon or experience (Kramp, 2004). To achieve this understanding, the researcher conducted various formal interviews and many informal conversations with Reyna over the course of two years to learn about her experience as an undocumented immigrant from Mexico. The researcher used an unstructured interviewing method to allow Reyna to speak freely of her experiences and realities and tried to remain open to the directions the conversations would go. All interviews and conversations were in Spanish. Reyna speaks English very well but expressed that she felt like she could express herself better in Spanish. As the researcher translated the interviews to English, Reyna iteratively participated to verify her voice. All formal interviews were audio and video recorded.

In addition to interviews, the researcher employed multiple additional ways of collecting data. The researcher spent a lot of time in the field observing and recording notes and insights in a field notebook. The researcher regularly summarized field observations, some of which are related in this chapter. The researcher also conducted archival research, which included looking through business journals and archives, photos, personal journal entries, and archival research about Reyna's business Veracruz All Natural on the internet.

This section ends with Reyna's testimonio. Reyna took on the mantle of testimonialista (Yudice, 1991) as she shared her experiences with the researcher over the course of this ethnography. For a story to be a testimonio, it must bear witness to a social urgency. The individual bearing testimony must "... hope that his or her life's story will move the reader to action in concert with the group with which the testifier identifies"

(Tierney, 2000, p. 540). A moral or social imperative must exist as well as a connection to a marginalized group or class situation (Tierney, 2000).

Yudice (1991) says, "... testimonial writing may be defined as an authentic narrative, told by a witness who is moved to narrate by the urgency of the situation" (p.17). A testimonio centers the marginal, generates and validates knowledge from experience, and honors personal experience (Yudice, 1991). It is a narrative told in the first person by a narrator who is also the protagonist who lived the events and is now forced to tell the story with the purpose to call people to action (Beverly, 1991).

Reyna's story was a story of *sobrevivencia* (Urrieta, Kilano, & Jo, 2015). It was a testimony to resilience and triumph. It was her counter story to the majoritarian stories of undocumented immigrants and Latinas, and her way of challenging assumptions about her *raza*. The majoritarian story of undocumented immigrants from Mexico tells us they are undesirable and dangerous, that they take jobs away from American citizens, they commit crimes, do not pay taxes, and cross the border because they are unwanted in Mexico. This mainstream story assures us it is okay to exploit undocumented immigrants from Mexico for labor, to work them long hours and pay them very little. Oppression of undocumented immigrants is justifiable, as well as deficit thinking, according to the majoritarian story.

The majoritarian story in the United States is a narrative commonly constructed by white people, or people in power, which distorts and silences the experiences of people of color (Solórzano & Yosso, 2002). It is important to give voice and listen to the marginalized to allow their stories to cure the oppression, othering, and dehumanization of these outgroups (Delgado, 1989).

Whereas the majoritarian story is constructed by the dominant race and silences people of color, the counterstory subverts the dominant story (Fernández, 2002) by exposing, analyzing, and challenging the ideas promoted therein (Solórzano & Yosso,

2002). These stories attack complacency, call readers to action, reject white norms that are embedded in our U.S. society, and humanize the outgroup (Delgado, 1989).

Through the lens of Critical Race Theory (CRT) the researcher has sought to capture and understand the (counter)story of Reyna Vazquez, a 39-year-old woman from Veracruz, Mexico, who came to the U.S. without documents at the age of 16 years old. Reyna's story was intersectional, as race, gender, and class are all factors. Reyna's story challenged the dominant ideology about undocumented immigrants that is widely accepted in the U.S. The researcher has sought to value and legitimize Reyna's lived experience and experiential knowledge, and give her voice through her storytelling, allowing her to name her own reality (Fernández, 2002).

Part of Reyna's lived experience — and the experience of others close to her — as an undocumented immigrant from Mexico consisted of both observing racism and being the target of racism due to her societal status. CRT describes racism as endemic in the U.S. and racialization as a byproduct of capitalism (Solórzano & Yosso, 2002). Because CRT was used as a lens to evaluate data in this study, the researcher was particularly interested in how Reyna navigated the U.S. capitalistic economic system as an undocumented immigrant to become a successful small business owner.

At the beginning of the ethnography, the researcher wanted to explore three broad categories: First, Reyna's life in Mexico and her experience coming to the U.S.; second, the history of her business, Veracruz All Natural, and the risks that were involved in starting her business that still are present; finally, the importance of family in her life and her thoughts on pursuing her "American Dream." The researcher tried to remain open to other topics that might arise, although these themes were outlined in the beginning. The remainder of this section is written in the first person by both the researcher and the subject.

## **Positionality**

Knowing what the researcher brings to the study allows transparency about what is more the result of the researcher's background and experiences and what is more the product of the lived experience of Reyna. It was necessary for me to explore my subjectivities and positionalities (Urrieta & Hatt, 2019). I wanted to avoid the pitfall of reification and relate Reyna's narrative as experience-near, not a description that was divorced from Reyna (Hollan, 1997). In my attempt to be reflexive about my own biases as a researcher I had to consider a few things that I believed impacted my view of undocumented immigrants from Mexico.

I grew up in Southern California with my grandmother, who adopted me when I was young. My grandmother was white and originally from Idaho, though she had lived most of her life in California. She had strong negative opinions about people from Mexico. When my biological mother, also white, became pregnant with me, my family narrowed my possible biological father down to two people — a man from Mexico and a man from Spain. My grandmother persisted that my biological father was the man from Spain. She would often refer to people from Mexico in derogatory terms, such as “beaners” and “wetbacks,” and would avoid driving through specific neighborhoods in Southern California because they were “Mexican neighborhoods.” She would get upset when people spoke Spanish instead of English in public, sometimes saying underneath her breath, “Go back to your own country.” She tended to “other” and “dehumanize” people from Mexico, and so the thought of me being related to these people might have been unsettling to her. I mean none of this as disrespectful to my late grandmother whom I love and cherish, but only to inform the positionality that I bring into this qualitative study.

I also brought into this research a religious background. Although at the time of this study I no longer considered myself as religious, I did participate in Christian missionary



work in San Antonio, Texas, when I was 21 years old. That is when and where I learned Spanish. As I proselytized Mexican American people I felt immersed into a new culture, and I fell in love with certain characteristics of Hispanic culture that I had not experienced in my own home or among my circles of friends and acquaintances growing up. I also loved speaking Spanish.

It was during this time that I started to feel a conflict with my religion. As a missionary I felt like a “colonizer.” I felt uncomfortable, like I wanted to honor the beliefs of these families and learn more about their culture instead of preaching about one universal religious truth that everyone should accept. These feelings intensified as I grew older, and eventually I abandoned religion.

By the time I met Reyna at her taco truck in 2013, I had lived with my changed perspective about Mexican immigrants, religion, and how I wanted to live for years. Her visible strength and courage affected my reflections on my own background and drew me to her as a life partner. We married in 2014, and as I engaged in my fieldwork for this study I reflected often on my own positionality and how it might affect my observations and conclusions.

### **March 19, 2016**

I spent many days in the field, observing Reyna and her business. Most of these field observations were located at one of Reyna’s business locations in Austin. Below is a description from my field notes of one such day.

On Saturday, March 19, 2016, I spent the afternoon observing a community of employees at a local Austin food truck. To be completely accurate, this food truck was a bus; literally a full-size school bus that had been converted into a mobile kitchen and painted white on the outside. On the inside it had been retrofitted with grills, stovetops, counters, and just about everything I imagine a commercial kitchen would need to operate. The floors were replaced with aluminum diamond

plate and the ceilings were ventilated. That afternoon I spent time both inside and outside the bus to learn more about these people.

Saturday was the last day of the South by Southwest (SXSW) festival, and although this particular food truck is always steady with business, things were at a more frantic pace that afternoon. At no point did I observe the line dropping down to less than 7 people, and some waited up to 45 minutes for their orders. I could tell that the hustle and bustle of the previous week had taken its toll on this group of workers. Still, they worked with urgency, but their eyes looked tired and their shoulders slumped as they went about their various tasks. There was no room for resting. Each employee depended on the other from the time a client made an order until the delivery of the order. One small mistake at any point could bring this process to a halt, and I was amazed at the accuracy in each individual's trade in making this business run.

On this Saturday there were five ladies working, ranging in age from teenager to ages greater than 50. Each lady had her own task. One person took orders at one window and another person made drinks and announced orders that were ready for pick up at the other window. Two women worked “la plancha” or the cooking grill, and one lady worked “la linea” garnishing the tacos and preparing them for customers. For the duration of my observation there was no change in duty, nor were there any breaks. These ladies were steady in their duty; focused on their job and determined in every movement.

I don't know much about the culture of the commercial kitchen, but I noted both a camaraderie and a tenseness to this atmosphere. This kitchen space was cramped, even though it was a bus. Two people could pass through the center aisle simultaneously if they turned to the side, and it was hot. Saturday happened to be a cooler day so I can only imagine what it would be like working in this kitchen on a typical Austin Summer day. I felt claustrophobic looking in from the periphery. These women normally work an eight-hour shift in this space together, six days a week. SXSW upped working engagements to maybe 12-hour work days for 10 days straight. These women work in a very intimate space.

I was impressed with the workflow these women had developed. They worked hard to keep up with the constant demand of tacos, and the demand was relentless. The line outside never decreased, but the morale of these ladies did not seem to falter. I did sense, however, somewhat of a power struggle in the kitchen. I observed that each lady had her moment of telling someone else what they should be doing, and this gesture was not welcome on the receiving end.

This was the workflow; once the woman at the window finished taking a client's order, she hustled over to la linea where there was a space above to post the order. After posting the order and rattling off a quick description of what was on the

paper, she hurried back to the window. Next, the lady at la linea communicated the order to one of the ladies on la plancha. This woman at la plancha seemed to work as the lead cook, and as she began to cook the order she also directed the other lady at la plancha in what she needed her to do for support. After the ladies on la plancha finished cooking up the food and tortillas, they passed it on to the lady on la linea to garnish the food and wrap it up ready for pick up. This lady also did what appeared to be an inspection of the food, making sure it matched what was written down on the order. Finally, the food was passed on to the lady at the other window, who then called out the food order, and all the meanwhile prepared drinks. If no drinks were ordered, this woman would tidy up tables and chairs and replenish salsa and napkins outside the trailer.

All conversations between the women in the trailer were in Spanish, and the music they listened to was in Spanish; a mix of Cumbia, Salsa, and Bachata genres. The music seemed to have almost a hypnotic effect on the women as they remained focused on their individual tasks. A couple of times I caught a couple of the ladies moving their hips to the beat of a song. Only the youngest of the ladies spoke English, and she only spoke English when she was conversing with customers. The lady who called orders out as being ready did so in English but did so in a very heavy accent.

### **Petition for U.S. Residency**

During my ethnography, Reyna started and completed the process for becoming a U.S. citizen. In total it took her over two years. The application was extensive and time consuming, consisting of much writing, evidence gathering, and letters of recommendation. In her application, she wrote about her business and her life here in the United States.

She wrote in her application:

I have lived in the United States for more than half of my life. I arrived in Austin Texas in 1999 at the age of 16. Since I arrived in this country I have worked hard, and I have put forth a lot of effort to learn English and the American way of life. I love living here. My life is here...I deserve to receive this waiver because I am already contributing to the United States as a normal citizen, and I will continue to contribute for the rest of my life. I pay my taxes, both personal and for my business. I am blessed to own my own business, which to me is an example of the freedom we as Americans have to follow our dreams and make a living doing what we love. I opened my business in 2008 because I saw an opportunity to not

only to improve my life, but to improve the life of my family and the opportunity to create jobs. The name of my business is Veracruz All Natural, and I currently employ 17 people. My employees depend on me as they use their salary to support their own families.

She went on to express how important her business was to her personally, what her business meant to the city of Austin, and the success she had achieved with her business.

Not only is my business an important part of who I am, but it is a very important part of the culture of Austin. I grew up loving to cook, and now I get to do that everyday for the citizens of Austin, and they love my food. Not only do the citizens love it, but so does the media. My business and I have been featured on *The Food Network*, *The Travel Channel*, *The Rolling Stone*, *Huffington Post*, *LA Times*, *Bon Appetit*, and in the local *Austin Chronicle* and *Austin Eater*. *Austin Eater* promotes my food as being in the top 38 in the city, and *The Food Network* promotes my tacos as being one of the five best in the United States.

Finally, she expressed how she would feel if she were to have to leave her business behind if she were forced to go back to Mexico.

If I were forced to leave Austin to go to Mexico, I would have to close my business, and this would be devastating for me and to my customers. I began my business in 2008, and I have worked hard and sacrificed much to achieve the success that I am experiencing today. My business is my passion, and cooking, training my employees, and interacting with my customers are my loves in life. I do not want to think of a future that does not contain this reality. There would be no way for me to replicate what I have built here in Austin if I were forced to go to Mexico.

### **Trip to Mexico**

On September 29, 2016 Reyna received news that her petition for U.S. residency had been accepted. Her next step was to report to the consulate in Juarez, Mexico for an interview, fingerprints, and physical. If she were to successfully pass all those steps she would wait in Mexico for her Green Card and would then be able to cross the border back into the U.S. with proper documentation. I had the privilege of accompanying Reyna on this trip. What follows are excerpts from my field notes during my travels with Reyna.

***Friday, November 25, 2016***

I am here in Juarez, Mexico with Reyna. She is completing the final steps for her Visa. Today is her physical and tomorrow she has fingerprints. Monday is her interview, and then on Tuesday I fly with her to Veracruz where she will wait for her Green Card to arrive in the mail, and while she waits she will get to see her family. It's been over 20 years since she has seen them.

***Tuesday, November 29, 2016***

Yesterday was Reyna's interview at the Consulate. We arrived at the Consulate at 9am and she got in line. I waited outside in the little restaurant next door, then outside. There was no waiting area inside, and it was a very cold and windy morning. I waited outside from 9:45am until almost noon. There was a fence on the side of the Consulate, a chain link fence with strips of metal to block people from looking in, although there were a lot of pieces removed. That is where most people waited, to spy through the fence at the exit in anticipation of family, friends, and loved ones hopefully leaving their interviews with good news.

***Saturday, December 3, 2016***

Reyna and I are out on the terrace at her hotel in downtown Veracruz, eating breakfast. The spot is beautiful, with a view of the Zocalo. The Zocalo is a historic downtown park that can be found in most Mexican cities. In Veracruz the park is not that big, but there is a lot of activity. Last night there was music, dancing, and other activities that lasted until 5am in the morning.

Reyna has spent most of her time here in Veracruz with her grandmother Cecilia and aunt Amelia. We arrived in Veracruz lat Tuesday, and Wednesday we went out to Amelia's home for the day. The three of them cooked mojarras fritas for lunch.

Thursday, Amelia and Cecilia met Reyna and me at our hotel downtown to eat breakfast, and after that we went together to the fish market, then back to Amelia's home again.

Yesterday I went furniture shopping with Reyna. She wanted to buy new furniture for Amelia's home. Her aunt doesn't work, she cares for Reyna's grandmother Cecilia full time. The apartment where they live is very small and relatively bare of what we would consider here in the U.S. furniture basics. Reyna bought them a new sofa, dining table, and chairs.

***Tuesday, December 6, 2016***

I am with Reyna in the Houston, Texas airport. She is passing through immigration for the first time with her Green Card. This is the first time she has crossed the border from Mexico to the U.S. since she crossed the river illegally when she was sixteen. I am in a waiting room and Reyna is in an office speaking to an immigration officer.

She just exited, Green Card and luggage in hand, and is approved to enter the U.S. She is happy. Reyna doesn't really get nervous, or at least, doesn't show it, and entering the U.S. didn't seem to phase her. Now I see more expression on her face. She is happy, and I can also tell she is relieved.

## **Interviews**

Reyna loved to drink coffee and enjoyed going to coffee shops, and I had noted in past experiences that she tended to open up emotionally over a cup of coffee. Coffee seemed to represent something to her. For our first formal interview we decided to sit at one of her favorite spots in Austin, Flitch Coffee. There was a nice outside area that offered a lot of shade and privacy where I believed Reyna would feel comfortable talking about some deep and personal topics.

***March 29, 2017***

Reyna and I drove to Flitch Coffee together. The first thing we did was order, and then we found a table in the shade where we felt comfortable. Our conversation began very naturally. We had already been talking in the car about casual topics, like television shows we were currently watching. We continued to talk casually as we sat down for coffee.

I wanted to explore the theme of risk that morning. To me, crossing a country border without proper documentation and living in a foreign place seemed incredibly risky. However, this didn't detour Reyna, nor did it stop her from chasing her lifelong dream of starting her own business. I wanted to focus on her experience navigating those risks. In addition, I wanted to explore the topic of how it felt to be an undocumented immigrant in

Austin and misconceptions citizens might have, or at least what Reyna felt citizens had about her and others that have been in situations of undocumented status.

Reyna already knew that I wanted to record our conversation and she didn't seem concerned about that. Her business is always on her mind, but she didn't seem too concerned about that either. Once I started the recorder we continued to speak casually, and that led into the formal interview. There wasn't a clear start to the interview, which I liked, because I wanted it to be more like a conversation. On this occasion we spoke for about 50 minutes.

From my field notes:

Reyna has a good memory. She doesn't keep a journal but remembers details and dates. She remembers interactions and feelings. Reyna is very thoughtful when she speaks. I watch her closely as she thinks over a question or topic. As she begins to formulate her thoughts verbally, she starts speaking slow, then gets into a flow. She becomes more animated, both with how she speaks and with her body language. She articulates her story very well and it is very easy to follow what she is saying, even though Spanish is my second language.

She often investigates the space right above my head when she is thinking about what she wants to say next. I enjoyed this interview. I really didn't have to ask a lot of questions. I started by asking about the history of Veracruz All Natural, and I would say that most of my questions throughout the rest of the interview were clarifying questions. Reyna was very open about not only the business, but her experiences as an undocumented immigrant and as a business owner.

Reyna has been very willing to sit down with me to conduct interviews about the history of Veracruz All Natural and about her immigration to Austin and experiences living here as an undocumented immigrant. She knows that I'm also collecting multimedia data about her, including video, and has been very supportive, although filming can be intrusive.

### **May 3, 2017**

I invited Reyna's sister Maritza to be a part of a sit-down interview. Reyna and Maritza were co-owners of Veracruz All Natural and best friends, and I believed that

having Maritza present would enhance the conversation by allowing both to converse about the topics that involved memories from Mexico. I also printed some old photos I found of them when they first opened their business to bring to the interview, hoping that it might start conversations about memories.

From my field notes:

My interviews with Reyna have gone very well so far; we've had long conversations about the history of her business and the obstacles that stood in her way as an undocumented immigrant trying to start and run a business in Austin. Reyna has gone into a lot of detail about her experiences and has openly shared her thoughts about risks and rewards of being an undocumented business owner. Reyna and I have both felt very comfortable discussing these topics. Now I want to go even deeper in discussing her family and about her perceptions of how citizens perceive undocumented immigrants.

I spoke to Reyna and Maritza at their restaurant location in Round Rock, Texas. We spoke in the afternoon after the restaurant had closed for the day and after their employees had gone home. I video recorded this interview.

The two large themes I wanted to explore during this interview were family and citizenship. First, I wanted to understand better the role that family played in Reyna's personal and business life and explore the significance that her relationship with her sister Maritza had for her personally and professionally. I was intrigued by Reyna's close personal and professional relationship to her sister Maritza because I had usually heard negative things about business partner relationships, as well as about mixing professional life with family life. Second, I was interested in learning more about Reyna's lived experience in Mexico, her journey to the United States, and her life in Austin as both an undocumented and documented immigrant.

Reyna and Maritza had recently participated in a national protest day referred to as "A Day Without Immigrants." On this day many immigrants chose not to go into work,



and Reyna and Maritza chose to close their business. They received overwhelming support for their decision to close, but there was contempt as well. One individual's social media post about the sisters' closing struck me, as he attempted to belittle the sisters for their support of people who come to the U.S. undocumented. He expressed that it was so easy and inexpensive to come legally to the U.S. from Mexico, and reading his post prompted me to want to learn more about why people chose to come to the U.S. undocumented. I wanted to learn from the lived experiences of Reyna and Maritza to better understand this phenomenon.

I wrote my questions before the interview, questions that were direct but also open, and sent them to the sisters ahead of our meeting to help them feel calm and comfortable about our conversation on the themes of family and citizenship.

From my field notes:

Reyna and her sister Maritza came to this interview dressed very nice. Maritza wore a nice, flowered shirt, nice jeans, and a sports coat, and Reyna wore a nice black dress. They both wore makeup and had done their hair. At the beginning of the interview, they had a conversation about whether they should wear their hair up or down. I filmed this interview with a video camera, so I think both wanted to look nice for the camera. Often, when they are working, they dress more casual because of the conditions in the kitchen.

We conducted the interview at their brick-and-mortar restaurant in Round Rock. Their location there closes at 3pm, so we did the interview in the afternoon when the restaurant was empty. It was nice and cool inside, and they both sat together at the corner of the bar. We took breaks every 15-20 minutes. We were there for a couple of hours talking.

I brought my friend Noah to help me with sound. I am hoping to use some of this footage for phase 2 of my study, so not only did I need to pay attention to the interview, but I also needed to check audio and video. Both Reyna and Maritza know Noah well and felt comfortable with him being present for the interview. Having Noah there was extremely helpful as he was able to monitor the technical side of the interview which allowed me to focus on the conversation.

The beginning of the interview dealt with similar topics from my first interview with Reyna, but I wanted to revisit those again with both Reyna and Maritza together. Both spoke about the risks and obstacles, but not once did they doubt or question their choices concerning their business. Reyna spoke about her decision to invite her sister Maritza to be her business partner, and what it was like for Maritza to make the decision to accept. They also spoke more about the trials and hardships at the beginning, specifically about having to work other jobs while they ran their business. I have noticed themes of risk, fear, and determination. In my opinion these sisters are fearless and through their determination they have accomplished something very special.

Days before the interview I gave Reyna and Maritza copies of the questions and topics I wanted to discuss in the interview. I followed up with them the day before the interview to see if they had any questions or wanted to add/subtract anything from the plan. They liked this as they commented that they had good warning as to what we would discuss so they could think and remember past experiences.

With each segment I had either Reyna or Maritza clap. This clap helps me as a director sync the audio and video when I go to edit this interview. I had fun with the clapping, sometimes asking them to do it faster, slower, or louder, and giving them both turns to do it. This lightened the mood and made us smile.

## **Broader Strokes**

Overall, from my interviews and conversations with Reyna, a few themes emerged. She expressed several times that she didn't feel like people in the United States understood her or her situation, and that language could be a big barrier. Reyna believed that the language barrier was a problem for both sides. She thought that sometimes immigrants were afraid to get close to white people, that it was difficult to live in a culture where you didn't know their language. She said, "...we [immigrants] also prefer to go to a Mexican restaurant where everybody speaks Spanish rather than go to a restaurant where there are purely white people because we know the language." She went on to say, "I believe that one thing that is very important for our part is learning the language [English], to communicate and in order for them [U.S. citizens] to know us better and have more empathy towards us. It is the only way they can know us is if we speak with them..."

The word empathy came up many times over the course of my ethnography of Reyna. She believed that white people just didn't understand her situation. Reyna said, "...simply put, they [white people] don't understand our situation like they understand their own, or in other words, they don't know what we know." She added that it was not just speaking, but it was about white people putting themselves in the place of an immigrant that could ease misunderstandings between the two groups. She said, "Unless you put yourself in another's place, more than just listening, but getting involved in that culture, living among them for a certain amount of time, and speaking with the people, getting to know the people and their needs that one can actually have empathy for someone else."

Reyna also spoke a lot about the risks she had to take in starting her business and the risks that still existed as she and her sister ran their day-to-day operations. She spoke about limits she faced as an undocumented business owner and how she dealt with those limits and the risks she had to take on a regular basis.

Reyna spoke about some of the barriers and limits she and her sister experienced as they started their business. People around them told them it would be impossible to start a business because they were undocumented. There was a lot of paperwork involved, and Reyna said they had to be very creative in how they navigated undocumented entrepreneurship. They had to find other ways, ways around the normal procedures to accomplish their dream, and she described it as being very frustrating and expensive. When one sister came close to wanting to give up, the other sister rallied, and vice versa. They picked each other up, supported each other, and were still best friends.

From my field notes:

As I have begun to reread the interviews I have conducted with Reyna and Maritza, several themes have stood out to me. Themes of perseverance, survival, persistence, and womanhood stand out. Fear may be the biggest theme that I see, or rather, how Reyna defines and reacts to fear. The way that Reyna views

obstacles and fear is very different from what I am used to. She views it more as motivation rather than an obstacle. Reyna and Maritza had already lived through tough situations. They had survived worse, and therefore spoke as if there wasn't anything that could be thrown at them that they hadn't overcome or couldn't overcome.

## **Testimonio**

People around Reyna told her it would be impossible to start a business in Austin because she was undocumented. That did not stop her from building a successful restaurant business that in 2017 provided work for over 70 employees and was hailed as serving one of the five best tacos in America (Food Network, 2015). She enlisted her sister Maritza as her business partner, and together they rallied to overcome the odds. In 2016 Reyna became a documented, permanent resident of the U.S. and was legally able to live what many consider the American Dream, a dream in which she believed.

In my couple years of interviewing, observing, and getting to know Reyna, I came to these conclusions. She moved to the beat of her own drum. She knew exactly how she felt and didn't hesitate to act, even if that decision was risky. She acted on her instincts and was willing to take risks. She was a courageous individual, and in her mind everything was possible. She knew her fullest happiness when she was working towards what she wanted and doing what she loved in life. It was with this drive that Reyna fulfilled her lifelong dream of owning her own restaurant with her sister Maritza, Veracruz All Natural.

At the time of this writing, Veracruz All Natural was recognized both nationally and internationally as serving one of the best tacos in America. Major media outlets, including *The New York Times*, *Rolling Stone*, *Bon Appetit*, the Food Network, the Travel Channel, the Discovery Channel, and many others, had written about Veracruz All Natural to this effect. Suffice it to say, Reyna and her sister Maritza had made a name for

themselves. It took a lot of hard work and sacrifice for these two sisters from Mexico to get to that point.

Reyna grew up in Veracruz, Mexico, and moved to Austin when she was sixteen years old looking for a better life. She crossed the Rio Grande with only a black garbage sack containing a change of clothes and a few family photos. The risk of capture, danger, and safety were worth it to Reyna. Her journey from Veracruz, Mexico to Austin, Texas was dangerous and long.

When she arrived in Austin she started working as a waitress at a local Mexican restaurant. She was not happy at this job even though those around said it was all that was possible for her, given her status. She dreaded going to work and began feeling restless. She started working extra shifts and saving money with the goal of buying a trailer that she could use as a food truck. When she wasn't working, she spent a lot of time in her own kitchen experimenting with recipes, then later investigating different scenarios and venues where she could sell her food.

In May of 2006, she had saved up enough money to buy her first trailer, and a month later she opened it up and started to sell smoothies and juices. She had to close a few months later to care for a family member who had been in a car accident, but persistent with her dream she reopened in April of 2008 in East Austin, and a month later asked her older sister Maritza to be her business partner. Maritza already had a family to support, so going into business was risky as there was no guarantee they would be successful. They both kept their other jobs and worked nonstop to get their business going, often taking turns sleeping on the trailer floor while the other sister attended customers to keep it open. Everyday brought risk and sacrifice.

There was always the risk that in a moment they would send me back to Mexico and everything that I had achieved, everything I had created here, all the years of

sacrifice and hard work, and everything for which I had fought would come to an end in a moment. I was an alien in this place. I was illegal, even though I was doing something good.

It has always been my dream to own my own business. I was never comfortable working for someone else. In all the time I worked as a waitress I was never happy. I was never content. There were times when I didn't want to go to work. I would start to feel sick to my stomach just thinking about going to work.

From a very young age I learned to be independent. My parents were my example when I was young. My father owned his own business. He was his own boss. My mom didn't have a boss either. She cooked and sold food in our house growing up. It was a little restaurant, but at least it was her own. My mom taught me that only through hard work and perseverance you can accomplish whatever you desire in life, and that dreams are only dreams without action.

My experience crossing the border was, to begin with, it took a few days. I remember that you wait days at the border until they tell you that it's the right moment to cross and you must be ready to do it. In my case I waited three days at the border in a hotel just to be able to cross. So, we crossed the river. We crossed illegally, my mother and I. Really, I was a minor. I was sixteen and I really don't think I was fully conscious of what I was doing. But I remember there was a moment when we were going to cross the river and the person who was helping us cross wanted my mother to go in front of me, he wanted her to cross the river before I did, and I would come after. I remember my mother getting very upset and telling that person "No I'm crossing with her, and if I don't go with my daughter I will not cross." In that moment I realized the risk we were taking, because if my mom would have said, "Okay I'll go in front, its fine" I'm not sure what would have happened, because these are people you don't know.

I begin to think ok, as parents, like my dad and mom making the decision to come and bring their kids along with them because they wanted something better for us their kids, to give us a better future, better opportunities because unfortunately in our country opportunities are very low. My dad was a mechanic, and my mom had a fonda in her kitchen. They both worked for themselves and had to be very creative and industrious in making money to support our family. Our house was made of wood, it was a small room and we all lived in that room. Our floor was not a floor, it was just dirt. A lot of people live this way. Money was always very limited.

Starting my business was extremely difficult, especially in the beginning. A lot of people told me that to start or think about opening a business without documents was impossible, that there was a lot of paperwork and requirements, and it would be impossible to meet these requirements without a social security number. On

the other hand, I believed that with perseverance and hard work anything was possible, and that people put limits on themselves through negative thinking. In any case I decided to start Veracruz All Natural. I knew the risk that I was taking and that didn't matter to me. I thought it was worse to not take the risk rather than never know if I could have done it.

After a year of doing it on my own I knew I needed help economically and also physically because it was a lot of work to do by myself. In 2008 was when I asked her to be my partner and she accepted. From then on, we have been inseparable. My sister is my best friend.

I had my ups and downs, but in the moments when I had my lows it was Maritza, my sister, who lifted me up and when she had her lows I was the person who lifted her up, so yes there were hard times. We had to go through a lot of things. There comes a point where you start to think, I'm doing all this work, I'm tired, I was in the sun all day, or it's really cold and I'm not seeing the results that I was hoping.

I would sometimes feel frustrated in the beginning because, when I started the business, I did not have a lot of money. I started without any kind of investment. Even after my sister Maritza became my business partner we still didn't have enough money to invest. I couldn't take out a loan because I didn't have a social security number. Everything I bought for the business was with money that came out of my own pocket because we weren't making any money with the business.

In order to buy equipment for the business I had to sell the only thing I owned that was worth anything, my car. I remember that when I sold it I thought that someday I would have something even better, and that material things come and go, but the freedom that I had and that made me happy at that time was more important than anything else.

There were times when circumstances made me think of quitting. In those moments when I returned to my house and the electricity was shut off because I couldn't pay my bills, or when I didn't have money to buy food, or to pay my rent. Those first three years were all investment and no earnings, it was very difficult and frustrating. I would think, "How can I continue, how can I persevere without losing hope?"

The place where I put the trailer for the first time on Cesar Chavez was a very hidden place, very small. We would stand there on the sidewalk with a sign so that we could get attention so that people would buy our fruit. Honestly it wasn't a very good location because we were hidden in this corner, so when cars would drive by they would drive by too fast and they wouldn't see us. It really wasn't a good location, we sold very little. I think our highest sale in that location was

maybe eighty dollars. All day from 7am that we opened to 9pm that we closed. It really was a lot of work in that location to gain customers because there wasn't a lot of visibility.

Also at the beginning, I worked at night and Maritza would work in the mornings at the restaurant next door, so we would switch, so whoever worked in the morning (in one place) would work in the afternoon (in the other place). We always had two jobs, in the morning and at night because we needed to pay rent and pay everything, and honestly with the 70-80 dollars that we made daily it wasn't enough.

When it was hot, Maritza would put out a little pool for her son so he wouldn't get too hot. He would be in the pool for hours. On school days we would pick him up in the afternoon and take him to the trailer, and would stay there with us. Sometimes he would sleep on top of the freezer. It was a really hard time because we didn't have a lot of sales or customers but we had to stay open so people could get to know our business. We sacrificed a lot of time, and we didn't really have time to socialize, partly because we didn't have the money and partly because we didn't have the time. That's how it was for the first few years. It was hard, it was very hard.

For a lot of people who would've seen us at the time, I think they said, "These girls have a small trailer and they're there all day and their business is very small." But the way we saw it, or at least how I saw it, was this is all I have, and in my eyes it was very big and very special. I saw it as the best place for juices, the best place for fruit, and the best place for snow cones. It didn't matter what we did, I always had the mindset that this was the best place to eat what we had, what we offered, so I always thought our business was the best, it didn't matter how small or how large it was, but it's a question of putting yourself in the mindset of already being a winner because you took the step of no longer working for someone else and you have something of your own, to me that was enough to do something big. Because not a lot of people do it. Not a lot of people take the risk of leaving their full time job, to open something so small that might or might not work, and for me that alone was a lot.

I started to learn how things worked and I found ways to accomplish what I needed to do to run my business. At the beginning I had to put Veracruz All Natural in someone else's name. I was relieved when I could finally put my business in my own name. I still didn't have a social security number, but I paid my own taxes and the taxes of the business, and finally we were making money. Everything was more expensive because I had to pay penalties, but at least I could do it.



There are undocumented people like I was who want to do things like me. They want to start their own business, and always because of fear, because of this fear of being sent back to Mexico, or fear that something will happen to them, that they will lose their business, they think better not to try. There are a lot of people that don't do it because they prefer not living in fear, or say to themselves, "why work so hard for years and years if I know I am not going to have a social security number and I will never be a legal resident in this country."

I have always thought that limits are what we put on ourselves, and I have always thought that the greatest enemy to the human race is fear. Fear is the only thing that will stop you from fulfilling your dreams. If I begin to think about what is the most important thing for me, whether that is fulfilling my dreams or being successful, my answer would be my personal satisfaction and fulfilling my dreams. It doesn't matter if the day comes and everything I have worked for is taken away or if they take me back to Mexico. I will remain with the satisfaction that I took the risk, I did it and I was successful in this country. These are things that will remain forever. These are things that remain inside of you. They are your dreams that no one can take away. Even if they take away the physical part, the memories, the memories no one can take away. So, I decided that I would take the risk to start my business because it was my dream, and I decided to fight for my dream even though bad things might come to pass. At least if I have children or grandchildren one day, I will be able to tell them all about my experiences and be able to be an example to them of how important it is to pursue your dreams even though circumstances may be bad. Even in the worst circumstances there is always a way to achieve your goals when you focus on getting rid of your fear.

## Summary

In this phase of the study, the researcher conducted a two-year ethnography to transform an existing museum lesson plan about a sculpture named *Border Crossing* to a digital online learning experience. Accompanying the artwork in this existing lesson plan was a one paragraph oral history about the experience of an undocumented immigrant to compliment the theme of the sculpture.

The researcher employed a narrative inquiry method to explore the phenomenon of crossing the Mexican/American border and living in the U.S. without legal documents. The researcher conducted field observations, archival research, and various formal and informal interviews with an undocumented immigrant ( $n = 1$ ) over the course of two years in order

to write a narrative in the participant's own words describing her lived experience. The result was an oral history, or testimonio, that could be used to develop a digital online museum experience in phase 2.

Careful consideration is necessary in transforming existing museum curriculum to digital online learning experiences. It is not a simple transformation of digitizing a physical piece of art for learners to view online. Rather, it is the translation of the art into a digital format — the translation is itself an art. The word empathy has its roots in art (Vischer & Yanacek, 2015). Creating new work to assist in translating the art while maintaining and communicating the empathy inherent in the art is delicate work. The researcher took great pains to carefully consider this during development in phase 2.

## **PHASE 2: DEVELOPMENT**

This section reports how results from the ethnography, conducted in phase 1, were used by the researcher to develop a digital online museum resource using art, digital storytelling, and immersive learning technologies. These results specifically address the multimedia narrative used by the researcher in condition A, which is the more immersive condition of the intervention used in phase 3. The final multimedia product was a ten-minute 360-degree video which includes a digitally 3D-rendered model of the sculpture *Border Crossing* by Luis Jimenez, narration by Reyna Vazquez, in Spanish, of select portions of her testimonio, and seven scenes of different locations, where the researcher filmed Reyna in relation to her oral history.

Also included in this section is the transcript from the 360-degree video matched to screenshots of the scenes. The transcript is an English translation, done by the researcher and approved by Reyna, of her Spanish oral history in her own words. The video is located on YouTube (<https://youtu.be/MLjeHw8ijDU>).

It is not common to use video to report ethnographic results (Heath, Hindmarsh, & Luff, 2010). It requires trustworthy reporting and data analysis. It is like a documentary in that technical skills, sound interview techniques, and familiarity with editing are important, and for this reason the researcher enrolled in a documentary film course during the Spring 2017 semester to learn and practice these skills.

The multimedia presented in this phase is from 2016 through Spring 2022. In total the researcher gathered 860 minutes of multimedia data. Multimedia captured by the researcher represents data from over 20 different locations, including multiple business branches, car rides, stores, warehouses, and multiple locations in Mexico.

When exploring the multimedia, the researcher looked specifically for footage that pertained to the themes of growth mindset, empathy, social justice, and Reyna's experience crossing the border. As these were the themes and goals of the original museum lesson plan, it was important to focus on them in developing the digital online museum resource for the same artwork.

The video researcher looked for clips that reflected emergent storylines in data post-production. Video footage was captured throughout the entire data collection process to capture possible emergent storylines. This large bank of data afforded the researcher space for deep exploration of the multimedia, and ample latitude to develop a final product that was an innovative way to communicate research (Heath, Hindmarsh, & Luff, 2010). It was the goal of the researcher to use the multimedia captured as a means for disseminating results, not just recording data.

The researcher used a Ricoh Theta S 360-degree video camera. This camera can capture 25 minutes of continuous video footage at 30 frames per second and can record at full high-definition resolution (1920 x 1080). The researcher downloaded an accompanying application to be able to remotely start and stop recording as well as preview

scenes beforehand. This is a consumer-grade camera, and although there are many 360-degree cameras that have higher specifications, these cameras are much more expensive and targeted more at professionals in the video industry.

For sound, the researcher used a Zoom H6 portable audio recorder on a tripod. This device allowed the researcher to capture much higher quality of audio than is capable with the 360-degree camera, as well as capture ambisonic audio. This device also allowed the researcher to use an additional lavalier microphone to isolate audio from Reyna during interviews, in addition to contextual sound of the scene.

The researcher took the following steps to develop the digital online museum resource:

1. Convert video footage into a format acceptable for Final Cut Pro, the editing application.
2. Match separate audio files with the corresponding video files.
3. Organize the matched audio/video files into folders based on filming locations.
4. Transcribe all audio and translate to English.
5. Isolate audio/video selections based on themes of growth mindset and empathy.
6. Import audio/video media into Final Cut Pro and create multiple projects based on themes from step 5.
7. Sync audio files to video files in Final Cut Pro.
8. Edit a rough cut of all multimedia footage and present it to Reyna for feedback.
9. Re-edit the rough cut based on Reyna's feedback.

10. Take photos and videos of the *Border Crossing* sculpture in the museum of art as well as record LiDAR data. The researcher took 127 high-resolution photos of the *Border Crossing* sculpture and 5 high-resolution videos.
11. Construct 3D model of the *Border Crossing* sculpture by compiling high-resolution photos and videos with the LiDAR data using the Polycam application.
12. Import 3D model into Blender application to clean up polygonal edges, touch up color, eliminate artifacting and extra polygons, and use the sculpting tool for more detailed editing.
13. Import 3D model into Motion application for insertion into the video, specifically into the Rio Grande River footage. The researcher also added lighting as a visual effect to enhance the feeling of the sculpture being in the scene.
14. Import Motion file into Final Cut Pro project.
15. Export the final movie from Final Cut Pro and import video into YouTube.
16. Add English subtitles, with correct timing, to video, and instructions for participants to help turn subtitles on and navigate the 360-degree footage.

Content validity was conducted from the beginning of Phase 1 through the end of Phase 2. Self-reflexivity demonstrated by the researcher through iterative member checking through both structured and unstructured conversation served to ensure trustworthiness of the results presented in the digital story. Reyna responded to the researcher's inquiries and conclusions, written summaries, and organization of data, and at the end of this phase there was complete agreement that the final product was ethically bounded by expectations of trustworthy reporting and data analysis.

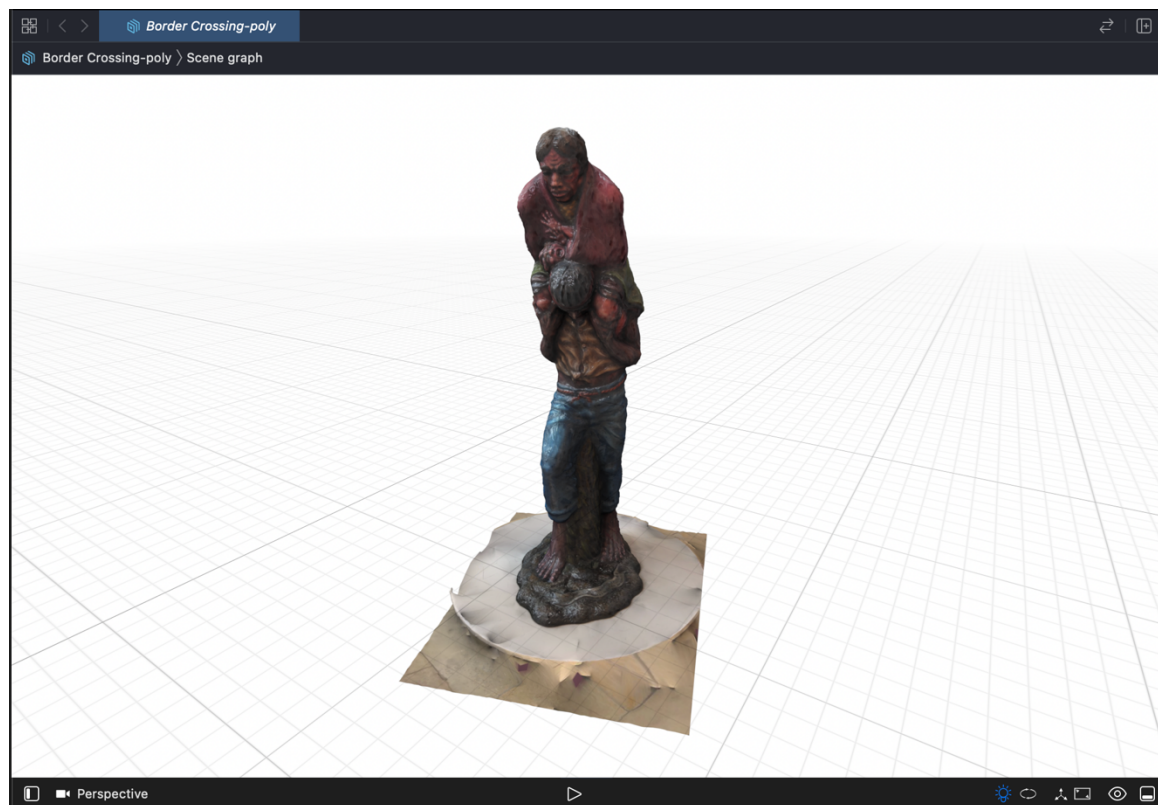


Figure 2: 3D Model

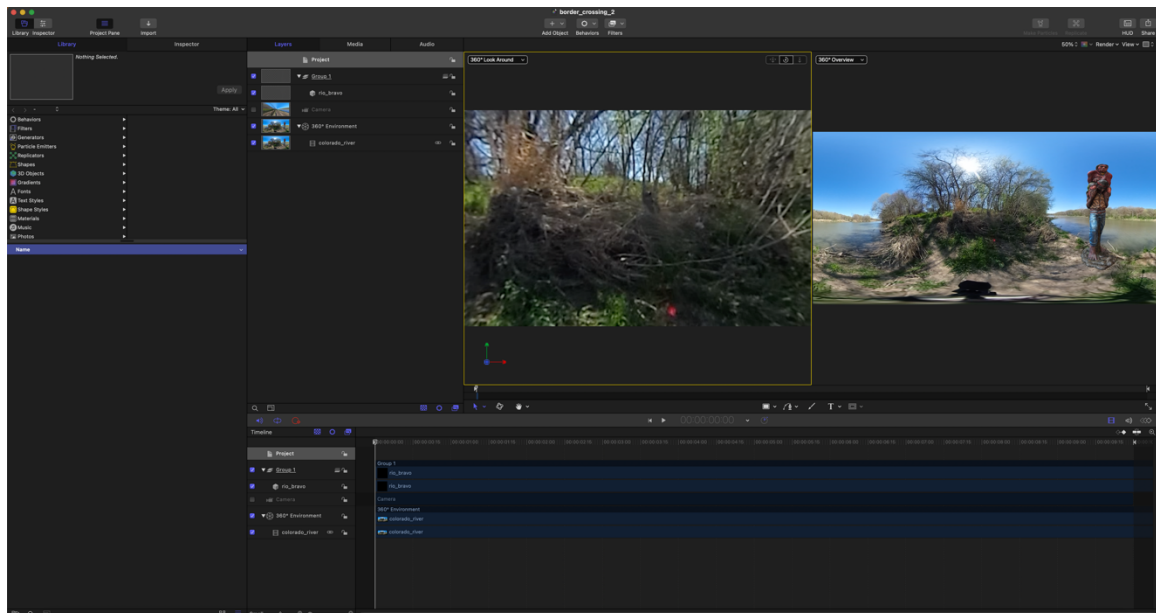


Figure 3: Inserting Model in the Film



Figure 4: Editing 360 Video

The final multimedia product (condition A) contains 360-degree video of interviews with Reyna and her sister Maritza and video footage of Reyna returning to her home in Veracruz, Mexico for the first time in 17 years. This footage was a part of her petition for residency in the U.S. No longer fearing deportation, she was able to finally see her grandmother again and visit the home where she first learned how to cook with her grandmother and mother. The film also shows activity at the Veracruz All Natural trailers, including footage of customers outside and the cashiers, cooks, and food prep handlers hard at work inside. A digitally 3D-rendered model of the *Border Crossing* sculpture by Luis Jimenez, developed by the researcher, is included in the second scene of the film.

### **Narrative of Intervention**

This section contains screenshots from the more immersive condition (condition A) with the accompanying narrative Reyna provided in her own words and voice.





Figure 5: Scene 1: Reyna on the South Lamar Bridge in Austin Looking at the City

Reyna's words:

There was always the risk that in a moment they would send me back to Mexico and everything that I had achieved, everything I had created here, all the years of

sacrifice and hard work, and everything for which I had fought would come to an end in a moment. I was an alien in this place. I was illegal, even though I was doing something good.



Figure 6: Scene 2: Rio Grande River Separating Mexico from Texas with Border Crossing Sculpture

Reyna's words:

My experience crossing the border was, to begin with, it took a few days. I remember that you wait days at the border until they tell you that it's the right moment to cross and you must be ready to do it. In my case I waited three days at the border in a hotel just to be able to cross. So, we crossed the river. We crossed illegally, my mother and I. Really, I was a minor. I was sixteen and I really don't think I was fully conscious of what I was doing. But I remember there was a moment when we were going to cross the river and the person who was helping us cross wanted my mother to go in front of me, he wanted her to cross the river before I did, and I would come after. I remember my mother getting very upset and telling that person "No I'm crossing with her, and if I don't go with my daughter I will not cross." In that moment I realized the risk we were taking, because if my mom would have said, "Okay I'll go in front, its fine" I'm not sure what would have happened, because these are people you don't know.

I begin to think ok, as parents, like my dad and mom making the decision to come and bring their kids along with them because they wanted something better for us their kids, to give us a better future, better opportunities because unfortunately in our country opportunities are very low.











Figure 7: Scene 3: Grandma's House in Veracruz, Mexico

Reyna's words:

Our house was made of wood, it was a small room and we all lived in that room. Our floor was not a floor, it was just dirt. A lot of people live this way. Money was always very limited.



Figure 8: Scene 4: Inside Reyna's Food Truck in East Austin

Reyna's words:

Starting my business was extremely difficult, especially in the beginning. A lot of people told me that to start or think about opening a business without documents was impossible, that there was a lot of paperwork and requirements, and it would be impossible to meet these requirements without a social security number. On the other hand, I believed that with perseverance and hard work anything was possible, and that people put limits on themselves through negative thinking.

I would sometimes feel frustrated in the beginning because, when I started the business, I did not have a lot of money. I started without any kind of investment. Even after my sister Maritza became my business partner, we still didn't have enough money to invest. I couldn't take out a loan because I didn't have a social security number.

To buy equipment for the business I had to sell the only thing I owned that was worth anything, my car. I remember that when I sold it, I thought that someday I would have something even better, and that material things come and go.





Figure 9: Scene 5: Inside Food Truck in East Austin (Different Time of Day)

Reyna's words:

There were times when circumstances made me think of quitting. In those moments when I returned to my house and the electricity was shut off because I

couldn't pay my bills, or when I didn't have money to buy food, or to pay my rent. Those first three years were all investment and no earnings, it was very difficult and frustrating. I would think, "How can I continue, how can I persevere without losing hope?"

My mom taught me that only through hard work and perseverance you can accomplish whatever you desire in life, and that dreams are only dreams without action.



Figure 10: Scene 6: Outside Reyna's Food Truck in East Austin

Reyna's words:

I have always thought that limits are what we put on ourselves, and I have always thought that the greatest enemy to the human race is fear. Fear is the only thing



that will stop you from fulfilling your dreams. If I begin to think about what the most important thing for me is, whether that is fulfilling my dreams or being successful, my answer would be my personal satisfaction and fulfilling my dreams.



Figure 11: Scene 7: Reyna Eating with Her Family in Veracruz, Mexico

I decided that I would take the risk to start my business because it was my dream, and I decided to fight for my dream even though bad things might come to pass. At least if I have children or grandchildren one day, I will be able to tell them all about my experiences and be able to be an example to them of how important it is to pursue your dreams even though circumstances may be bad. Even in the worst circumstances there is always a way to achieve your goals when you focus on getting rid of your fear.

## **Conceptual Framework**

In addition to developing an online museum resource to be used as an intervention in phase 3 of this study, the researcher developed a conceptual framework to guide others in developing this kind of resource. This framework (see Figure 12) outlines three phases, similar to the three phases used in the exploratory sequential design employed in this study.

The first phase guides the exploration of identifying how learners will experience important variables of having an experience with art, identifying the way to find out if learners experienced the variables in a meaningful way after using the developed resource, and choosing what context to include.

The second phase guides the development of the resource based on the exploration in the first phase and the tenets of the Portraiture Framework (Lawrence-Lightfoot, 1997), digital storytelling, and close looking (Tishman, 2018). Each of these frameworks/concepts outlines meaningful guidance, such as communicating aesthetic artwork, deepening learners' perceptions, fostering dialogue, using multimedia to share narratives, and using the five senses intentionally to construct meanings. In this phase, the forms of media, technologies, and platforms are selected and implemented.

The third phase is the culmination. In this phase, learners account for their experience with the developed resource. Learners demonstrate how variables outlined in the first phase were present in their experiences through qualitative or quantitative means.

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## Exploration

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Is this an adaption of an existing museum lesson plan?

If yes, move to Step 2 with consideration of objectives already outlined in the lesson plan.

**Step 1** Choose artwork.

**Step 2** Identify HOW learners will experience (variables): empathy/immersion, appreciation/fulfillment, and meaning making/interpretation.

Remember, each learners' experiences will be different. This step is only about considering how to ensure learners experience each of the variables.

**Step 3** Plan to assess.

How will you know that learners experienced the variables identified in Step 2? Think about ways learners can report about their experience after they have used the digital online museum resource.

**Step 4** What context is important and/or essential?

This is a balance of not decontextualizing the artwork as you move it to a digital space, but at the same time allowing learners the freedom to have their own personal experiences with the artwork.

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## Development

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Design the digital online museum resource according to answers from your exploration and using the following frameworks and concepts.

**Portraiture Framework (Lawrence-Lightfoot, 1997):** The digital online museum resource should communicate the aesthetic of the artwork, deepen learners' perception regarding the artwork, and foster a relationship of dialogue within the learner about the chosen artwork.

**Digital Storytelling:** The digital online museum resource uses media to tell a story that can combine various forms of technologies. This story can disseminate culture, share knowledge, and share narratives in captivating ways through digital media platforms. The story of the artwork may be different for each learner.

**Close Looking (Tishman, 2018):** The digital online museum resource allows close, extended, intentional, and slow use of the five senses to construct meanings from the artwork.

- Step 1** What form(s) of media fit best? This digital online museum resource is not bound by the same rules as a physical artwork displayed in a museum, nor confined to just the sense of sight.
- Step 2** What technology fits best? By what digital means can learners “live a little” in the artwork?
- Step 3** How will learners access and experience this digital online museum resource? On what platform will the resource be hosted? Will it be widely accessible?
- 

### **Culmination**

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Assess the experience learners had with the digital online museum resource. This can be qualitative through interviews and open-ended questions, quantitative through Likert-style survey questions, or through another means that addresses the variables from the exploration phase.

Figure 12: Conceptual Framework: Designing an Online Digital Museum Resource

### **Summary**

In this phase, the researcher developed a digital online museum resource, incorporating a digitally 3D-rendered model of the sculpture *Border Crossing* by Luis Jimenez, and Reyna’s oral history (testimonio) presented as a digital story through 10 minutes of 360-video and ambisonic sound relating Reyna’s lived experience crossing the border and living in the U.S. as an undocumented immigrant.

Although video can be a common component to capture ethnographic results, it is not as common to use video to report ethnographic results. As with other forms of qualitative research, reporting ethnographic results through video requires exploration of data collected throughout the ethnographic study to find themes. As with documentary filmmaking, emergent storylines appear in the post-production/editing. The researcher learned basic to advanced video and sound editing and 3D modeling skills to practice trustworthy multimedia reporting.

Because learning with physical art is “an experience” that allows viewers to “live a little in the work” (Dewey, 1934), learning with digital online art should theoretically be “an experience” as well. The learning experience theoretically should have the same goal, but the forum for learning (physical museum space vs. digital online space) is different.

To create an immersive online learning experience where participants could “live a little in the work,” the researcher chose to film in 360-degree video and ambisonic sound to create a more immersive, interactive digital space. The researcher developed a 3D digital model of the *Border Crossing* sculpture for the same reason. To further develop an immersive digital space, unique from what learners could experience in an art museum, the researcher embedded the 3D model of the sculpture in real-life video footage of the Rio Grande River, the southern U.S. border separating from Mexico.

### **PHASE 3: QUANTITATIVE**

In Qualtrics, the researcher created a splash page with IRB information about this study, a demographics page, pre and post survey, and conditions A and B. The researcher formatted the Qualtrics survey to be usable on phones. Condition A consisted of instructions and a link to the YouTube video described above. Condition B consisted of a text version of Reyna’s testimonio and a high-resolution photo of the *Border Crossing* sculpture. The total text length was 876 words, including a brief introduction to the artist and description of the sculpture. Reyna’s testimonio is identical in content in both conditions. The researcher used the randomizer in Qualtrics to assign participants to condition A or B. The researcher recommended that participants use earphones.

A total of 237 undergraduate students responded to the survey. Of that number, seven surveys were thrown out due to incomplete responses. Therefore, a total of 230 surveys were used across both experimental conditions. Condition A (more immersive)



had 116 participants and condition B (less immersive) had 114 participants. Ninety-three participants self-identified as male and 134 self-identified as female. Two participants self-identified as other; however, these two participants did not finish their surveys and therefore the researcher did not include this data. Sixty participants identified as Hispanic, and 169 participants identified as non-Hispanic. Of the 169 participants that identified as non-Hispanic, 144 identified as white, 8 identified as black or African American, 3 identified as American Indian or Alaska native, 41 identified as Asian, 0 identified as native Hawaiian or Pacific Islander, and 22 identified as other. For the purposes of this study the researcher only delineates between Hispanic and non-Hispanic as this is the most pertinent categorical difference in relation to the digital story presented in the intervention.

Table 1: Demographic Characteristics of Study Participants

<b>Characteristic</b>	<b>Number</b>
<b>Gender</b>	
Female	134
Male	93
<b>Race</b>	
Hispanic	60
White	144
Black or African American	8
American Indian or Alaska Native	3
Asian	41
Native Hawaiian or Pacific Islander	0
Other	22

## **Exploratory Factor Analysis**

The first step in analysis was to conduct an exploratory factor analysis (EFA) on responses to the mindset survey — 12 pretest items measuring three established subscales of change in mindset (three intelligence questions; three society questions; three self-questions) and one subscale of change in mindset in terms of empathy containing three questions developed by the researcher. The purpose of conducting this EFA was to confirm these four separate domains. The researcher used the principal components factor analysis extraction method. It accounts for more variance, is conceptually simpler than other extraction methods, brings about sufficient results, and when compared directly to the results of other methods there is little difference (Meyers, Gamst, & Guarino, 2013). A preliminary analysis revealed three factors with eigenvalues greater than 1, and a fourth with a value of .977 (see Table 2). No other eigenvalues approached 1. The researcher specified eigenvalues of .97 or higher for extraction.

The researcher used the oblique rotation method. According to Meyers, Gamst, and Guarino (2013) this is the rotation method that most researchers currently prefer and advise that when deciding whether to use oblique or orthogonal (including varimax) rotations, oblique rotation is usually best when factor correlations generally range in the high 0.3s or better, and orthogonal rotations are usually best when factor correlations range in the teens or less. The researcher looked for factor loadings of 0.3 or above for validity of items' assignment to domains.

Four factors were found to have eigenvalues of 0.97 or greater and accounted for approximately 86% of the total variance. This EFA verified four subscales, each subscale having 3 items. All 12 items loaded highly on the intended factors; none loaded lower than .77.

All 12 items loaded as expected onto four distinct domains (see Table 3). The first three items loaded onto the change\_IQ domain, the second three items loaded onto the change\_society domain, and the third three items loaded onto the change\_person domain. This pattern is consistent with the three separate existing survey groups measuring distinct facets of mindset that had previously been found to be reliable and valid (Chiu et al., 1997). The last three questions were drafted by the researcher to measure mindset in terms of change in empathy and the EFA confirmed these three questions as a separate domain, change\_empathy. Based on these findings, four pretest variables were constructed by summing totals from the three questions making up each of the four factors, and four posttest variables were constructed via the same process. The correlations among four scales, and their internal reliabilities, appear in Table 2.

Table 2: Table of Correlations Among the Four Scales

	Pre_IQ	Pre_Status	Pre_Person	Pre-Empathy
Pre_IQ	.94	.595	.565	.560
Pre_Status	.595	.96	.559	.465
Pre_Person	.565	.559	.94	.364
Pre_Empathy	.560	.465	.364	.84

Alpha coefficients ranged from .84 to .96. Four components were extracted, confirming existing domains.

Table 3: Total Variance Explained

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %

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1	6.562	54.682	54.682
2	1.632	13.602	68.284
3	1.223	10.192	78.476
4	.977	8.138	86.613
5	.443	3.695	90.309
6	.314	2.618	92.926
7	.248	2.065	94.991
8	.179	1.491	96.482

Table 3 continued.

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
9	.172	1.437	97.919
10	.107	.895	98.814
11	.078	.652	99.466
12	.064	.534	100.000

Table 4: Pattern Matrix. Summary of Items and Factor Loadings from Principal Components Analysis with Varimax Rotation ( $n = 230$ )

	Component			
	1	2	3	4
You have a certain amount of intelligence, and you can't really do much to change it.	.027	.015	.009	<b>-.931</b>
Your intelligence is something about you that you can't change very much.	-.024	.003	-.036	<b>-.961</b>
You can learn new things, but you can't really change your basic intelligence	.017	.001	.016	<b>-.933</b>
You have a certain status in society, and you really can't do much to change it.	.060	-.003	<b>-.915</b>	.034
Your status in society is something about you that you can't really change very much.	-.007	-.002	<b>-.957</b>	-.034

Table 4 continued.

	Component			
	1	2	3	4
You can do things differently, but you can't really change your status in society.	-.021	.021	<b>-.948</b>	-.026
People can't really change their deepest attributes.	<b>.916</b>	-.030	.031	-.093
People can do things differently, but the important parts of who they are can't really be changed.	<b>.928</b>	.013	-.071	.025
The kind of person someone is, is something very basic about them and it can't be changed very much.	<b>.961</b>	.022	.018	.043
I find it difficult to see things from the point of view of an undocumented immigrant from Mexico.	.015	<b>.774</b>	-.009	-.093
Becoming extremely affected by media about undocumented immigrants from Mexico is somewhat rare for me.	.006	<b>.945</b>	.094	.058
I don't feel much concern for undocumented immigrants from Mexico.	-.004	<b>.785</b>	-.177	-.029

## Confirmatory Factor Analysis

### *Construct Validity*

A factor analysis ( $N = 230$ ) was performed to evaluate construct validity. Specifically, a confirmatory factory analysis (CFA) was used to confirm the four separate domains revealed in the EFA. Standardized root mean square residual (SRMR), root mean square error of approximation (RMSEA), the Tucker-Lewis index (TLI), and the comparative fit index were the statistical indices evaluated in examining the model fit.

The model achieved excellent values of the identified model fit indices (RMSEA = .052, SRMR = .035, CFI = 0.989, TLI = 0.984). Therefore, the CFA confirmed the four mindset domains found in the EFA.

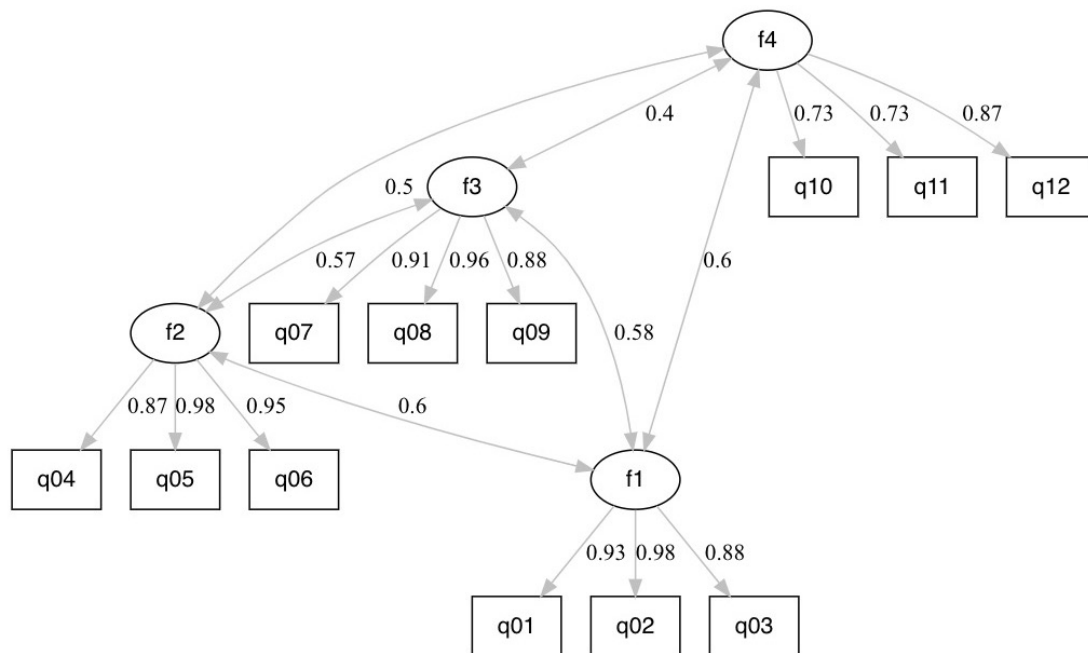


Figure 13: Factor Loadings 1

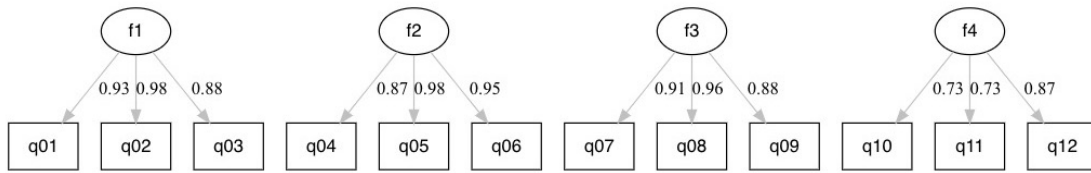


Figure 14: Factor Loadings 2

### ***Internal Consistency/Reliability***

The results indicate an excellent overall consistency of the mindset scale.

Table 5: Internal Consistency/Reliability

Factor	Cronbach's Alpha	Number of Items
Mindset_IQ	.942	3
Mindset_society	.955	3
Mindset_person	.939	3
Mindset_empathy	.836	3

\*All correlations are significant at the 0.01 level (2-tailed)

Table 6: Factor Correlations (Component Correlation Matrix)

Factor	Mindset_IQ	Mindset_society	Mindset_person	Mindset_empathy
Mindset_IQ	1	.302	-.525	-.551
Mindset_society	.302	1	-.380	-.496
Mindset_person	-.525	-.380	1	.562
Mindset_empathy	-.551	-.496	.562	1



Table 7: Scale Correlations (Pearson Correlation)

Factor	Mindset_IQ	Mindset_society	Mindset_person	Mindset_empathy
Mindset_IQ	1	.595	.565	.560
Mindset_society	.595	1	.599	.465
Mindset_person	.565	.559	1	.364
Mindset_empathy	.560	.465	.364	1

\*All correlations are significant at the 0.01 level (2-tailed)

Table 8: Item-Item Correlations (Mindset\_IQ)

	Q01	Q02	Q03
Q01	1	.904	.802
Q02	.904	1	.838
Q03	.802	.838	1

\*All correlations are significant at the 0.01 level (2-tailed)

Table 9: Item-Item Correlations (Mindset\_society)

	Q04	Q05	Q06
Q04	1	.864	.828
Q05	.865	1	.938
Q06	.828	.938	1

\*All correlations are significant at the 0.01 level (2-tailed)

Table 10: Item-Item Correlations (Mindset\_person)

	Q07	Q08	Q09
Q07	1	.867	.799
Q08	.867	1	.846
Q09	.799	.846	1

\*All correlations are significant at the 0.01 level (2-tailed)

Table 11: Item-Item Correlations (Mindset\_empathy)

	Q10	Q11	Q12
Q10	1	.584	.639
Q11	.584	1	.674
Q12	.639	.674	1

\*All correlations are significant at the 0.01 level (2-tailed)

As shown in all four of the item-item tables, each individual subscale achieved excellent convergent validity with significant item-item correlations all above .5. Discriminant validity between the four scales was also demonstrated through significant item factor loadings from principal components analysis conducted in the EFA (table 3).

## Multivariate analysis of variation

### *Assumptions*

Preliminary checks were performed to assess normality, outliers, linearity, homogeneity of variance-covariance matrices, and multicollinearity. Shapiro\_Wilk tests indicated that all four dependent variables were normally distributed in both groups ( $ps > .05$ ), supporting the assumption of univariate normality. All Mahalanobis distance values

were below critical value 18.46, supporting the assumption of multivariate normality and suggesting that there were no multivariate outliers.

Box plots indicated that there were 17 mild univariate outliers across all 4 dependent variables (see Figures 15–18).

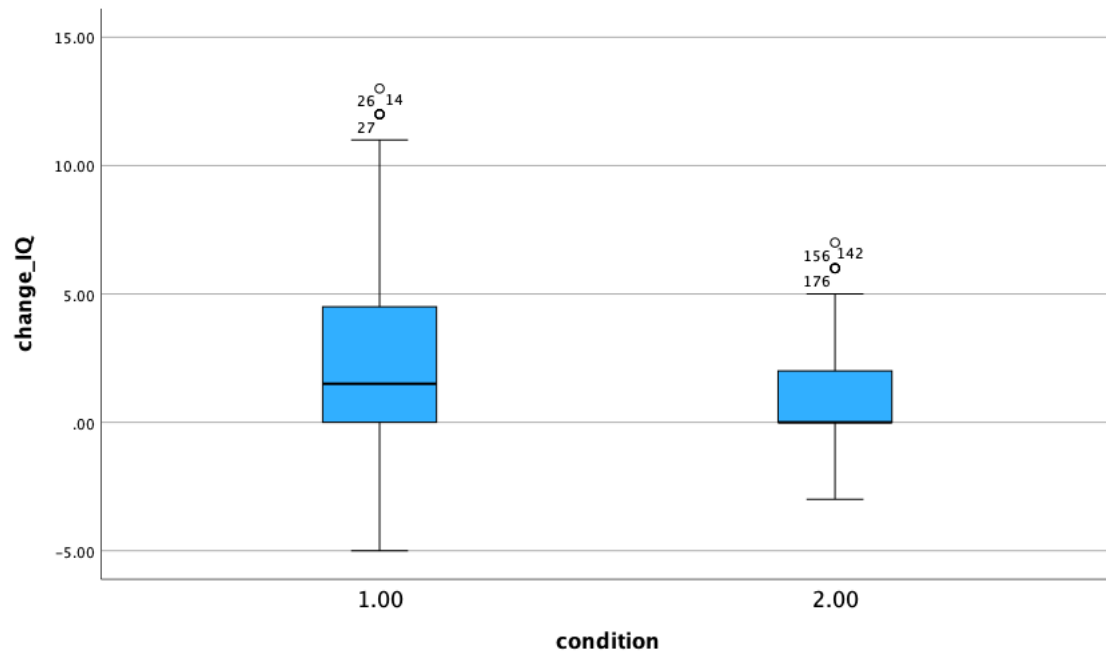


Figure 15: Box Plot change\_IQ x Condition

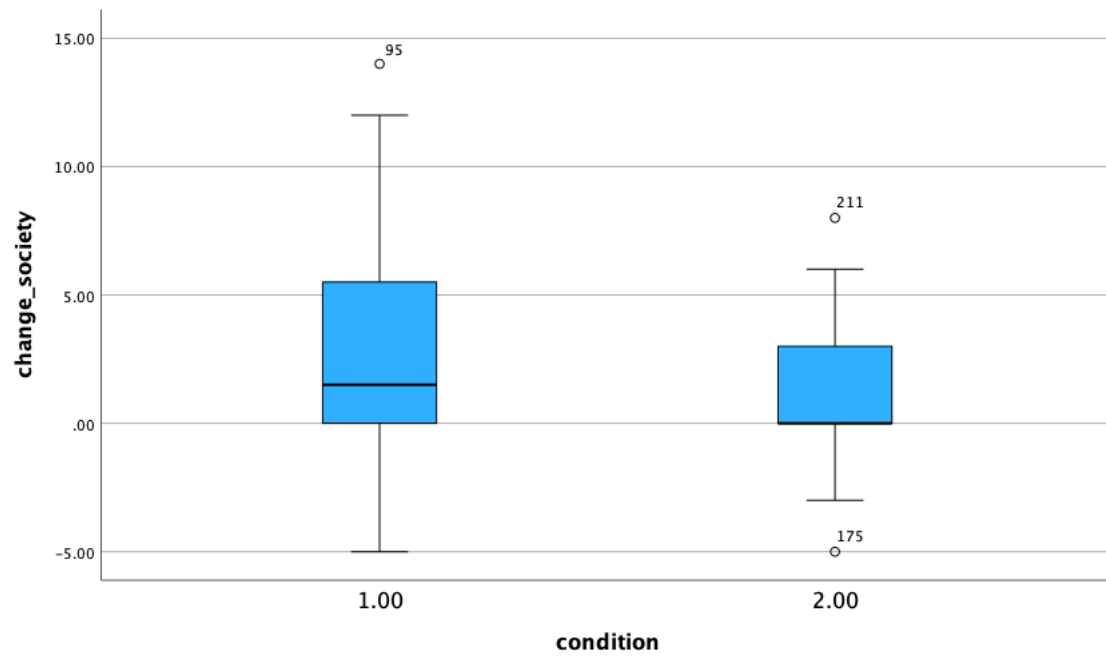


Figure 16: Box Plot change\_society x Condition

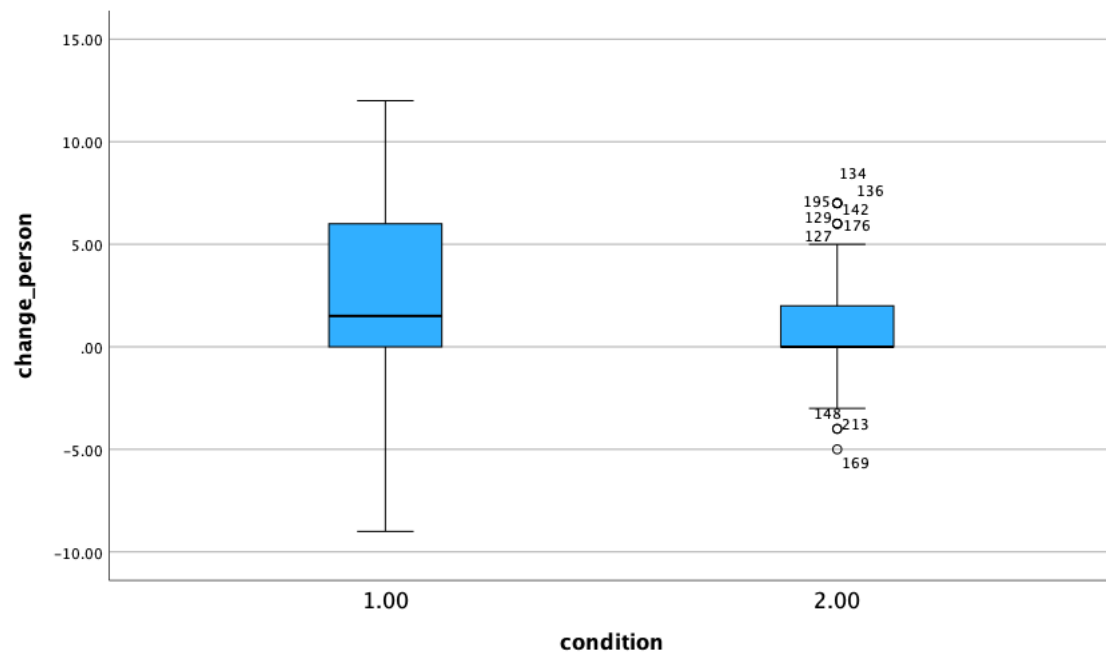


Figure 17: Box Plot change\_person x Condition

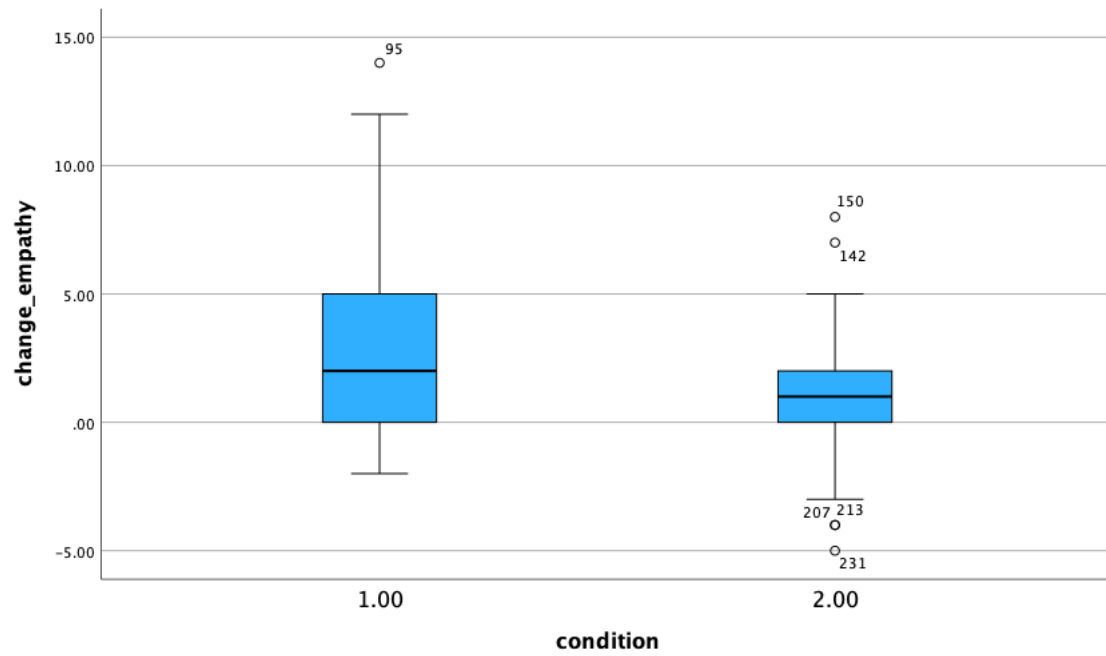


Figure 18: Box Plot change\_empathy x Condition

Scatterplots indicated that the dependent variables were linearly related in both conditions A and B (see Figures 19–24).

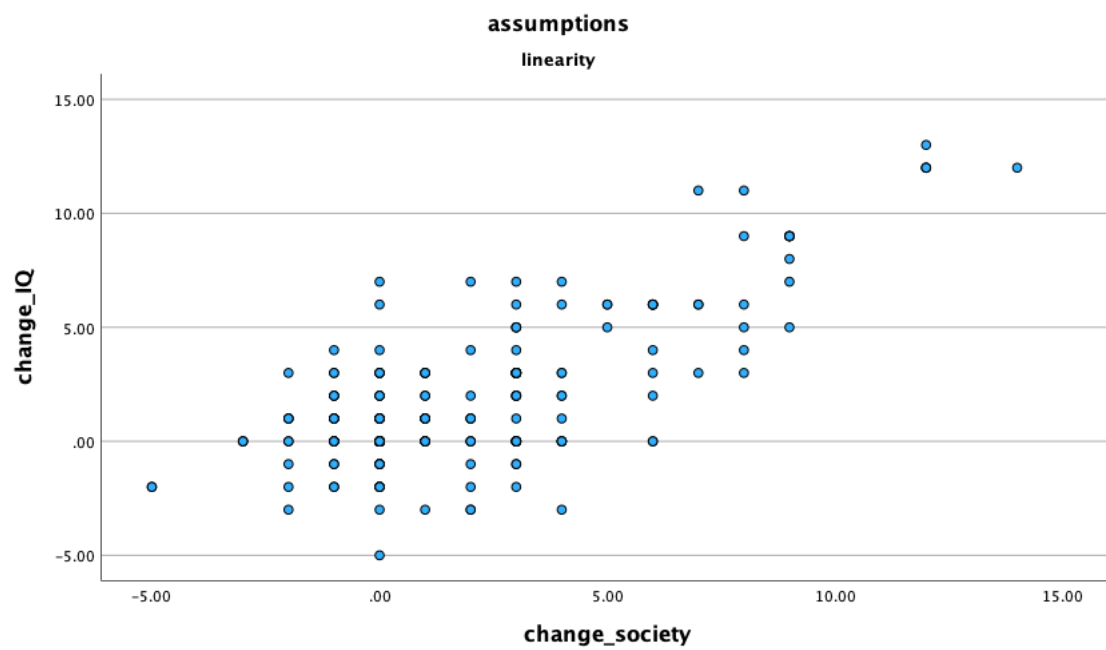


Figure 19: Linearity change\_IQ x change\_society

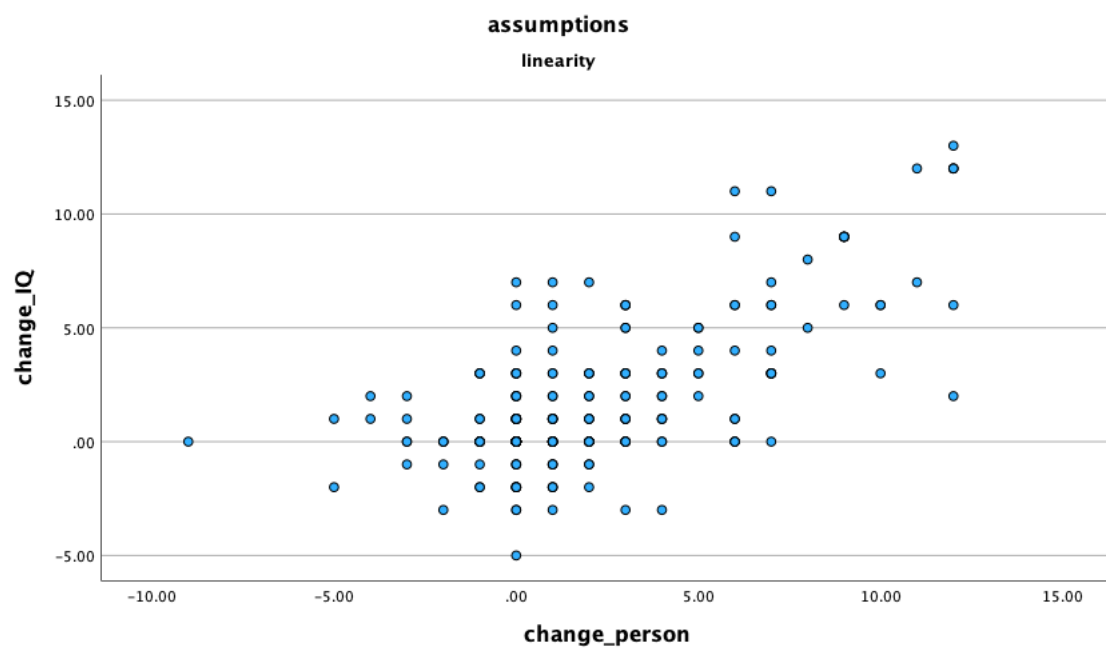


Figure 20: Linearity change\_IQ x change\_person

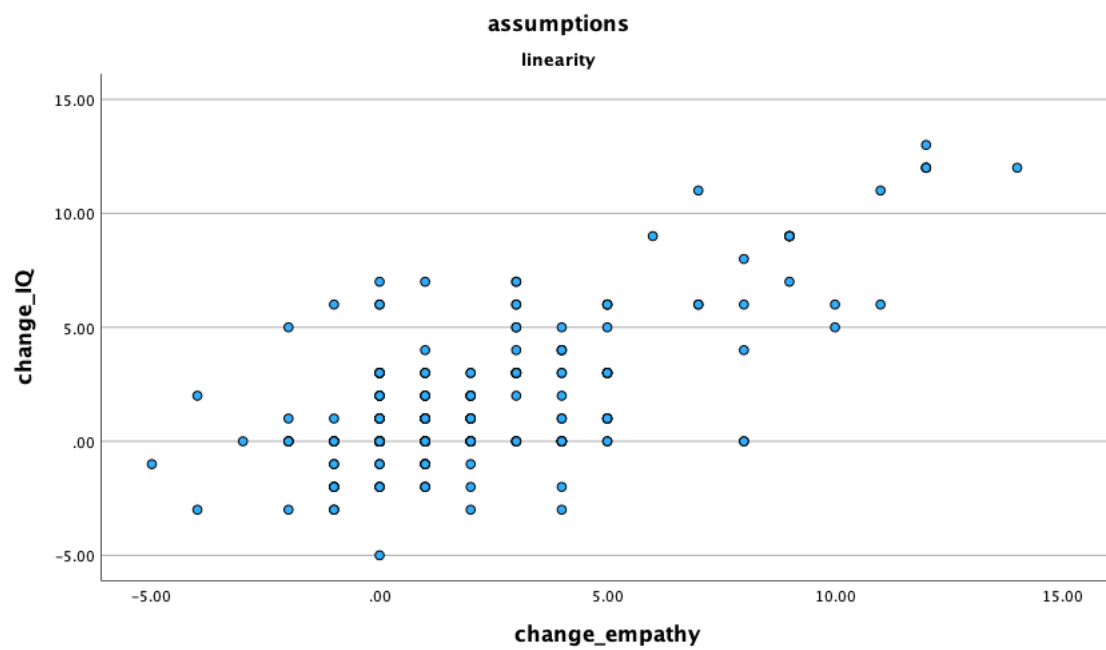


Figure 21: Linearity change\_IQ x change\_empathy

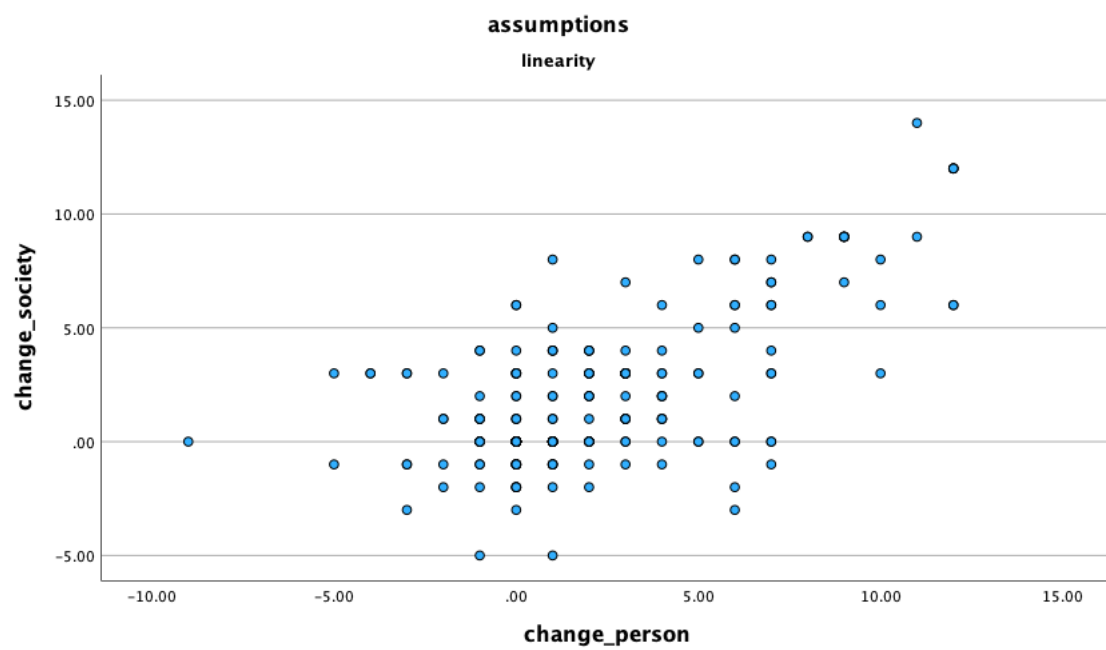


Figure 22: Linearity change\_society x change\_person

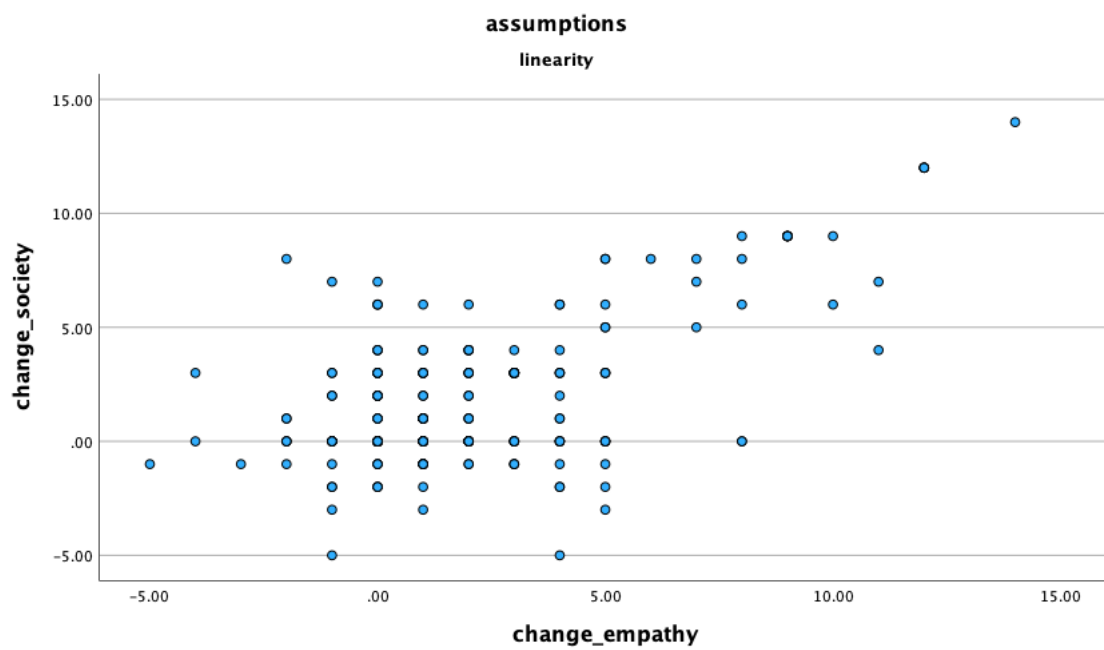


Figure 23: Linearity change\_society x change\_empathy

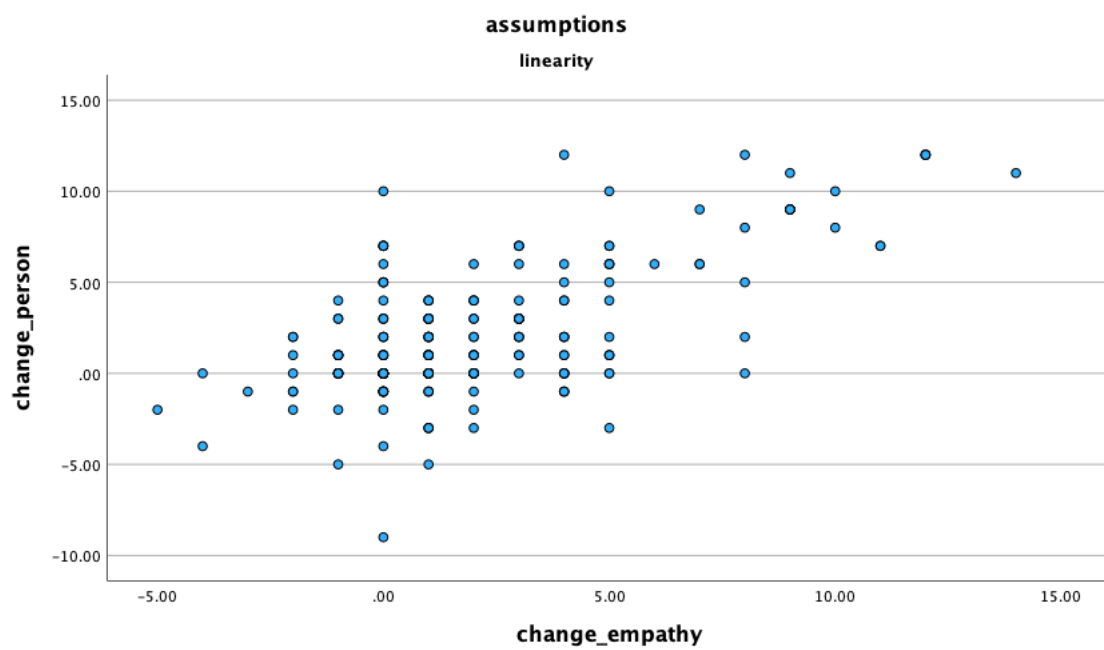


Figure 24: Linearity change\_person x change\_empathy



Box's M test indicated that the assumption of homogeneity of variance-covariance matrices was met,  $p = .712$ . A Pearson's correlation analysis suggested that the assumption of multicollinearity was met for all dependent variables, with all  $r$  values falling between .3 - .8 and  $ps < .001$ . (See Table 12.)

Table 12: Correlations

		change_IQ	change_society	change_person	change_empathy
change_IQ	Pearson Correlation	1	.754**	.678**	.706**
	Sig. (2-tailed)		<.001	<.001	<.001
	N	230	230	230	230
change_society	Pearson Correlation	.754**	1	.672**	.628**
	Sig. (2-tailed)	<.001		<.001	<.001
	N	230	230	230	230
change_person	Pearson Correlation	.678**	.672**	1	.663**
	Sig. (2-tailed)	<.001	<.001		<.001
	N	230	230	230	230
change_empathy	Pearson Correlation	.706**	.628**	.663**	1
	Sig. (2-tailed)	<.001	<.001	<.001	
	N	230	230	230	230

\*\* Correlation is significant at the 0.01 level (2-tailed).

## Results

Collapsing across experimental conditions, a repeated measures MANOVA was conducted to analyze differences in participants' pre and post intervention mindset scores across four subscales (change\_IQ; change\_society; change\_person; change\_empathy). There was a significant multivariate effect,  $F(4, 214) = 24.20, p < .001$ , indicating an overall change from pretest to posttest. Follow-up univariate analyses revealed significant effects for each of the four mindset variables, with mindset scores higher at posttest in all cases. (See Table 13.)

Table 13: Mean Pretest and Posttest Scores for the Four Mindset Variables (Standard Deviations Appear in Parentheses)

Variable	Pretest	Posttest	MANOVA Results
IQ	12.13	13.72	$F(1, 217) = 47.09, p < .001$
	(4.04)	(3.62)	
Society	12.68	14.37	$F(1, 217) = 55.33, p < .001$
	(3.95)	(3.22)	
Person	10.97	13.01	$F(1, 217) = 64.785, p < .001$
	(3.93)	(3.73)	
Empathy	12.28	14.14	$F(1, 217) = 79.951, p < .001$
	(3.85)	(3.08)	

Next, a MANOVA was conducted to analyze changes in mindset as a function of the experimental manipulation. (See Table 14.) There was a significant multivariate effect,  $F(4, 213) = 6.72, p < .001$ , indicating an overall effect of condition. Follow-up univariate analyses revealed significant effects of condition for each of the four mindset variables (change\_IQ; change\_society; change\_person; change\_empathy). There was a significant

mean difference in all four categories between the two conditions. A significant difference was found for change\_IQ,  $F(1, 216) = 20.71, p < .001$ , change\_society,  $F(1, 216) = 12.55, p < .001$ , change\_person,  $F(1, 216) = 16.49, p < .001$ , and change\_empathy,  $F(1, 216) = 18.10, p < .001$ . In each case, participants exposed to the more immersive condition displayed greater change.

Table 14: Effect of Experimental Condition on Change from Pretest to Posttest  
(Standard Deviations Appear in Parentheses)

Variable	Condition A	Condition B	MANOVA Results
IQ	2.58 (3.77)	.56 (2.65)	$F(1, 216) = 20.71, p < .001$
Society	2.45 (4.07)	.89 (2.10)	$F(1, 216) = 12.55, p < .001$
Person	3.02 (4.32)	1.03 (2.70)	$F(1, 216) = 16.49, p < .001$
Empathy	2.70 (3.56)	.97 (2.29)	$F(1, 216) = 18.10, p < .001$

### Analysis of Variance

To determine the effect of experimental conditions gender and ethnicity on mindset change, the researcher carried out two series of ANOVAs. The first was a 2 (Condition) x 2 (Ethnicity) ANOVA; the second was a 2 (Condition) x 2 (Gender) ANOVA. The dependent variables in each series were the difference scores created by subtracting pre-intervention scores from post-intervention scores for each of the mindset and empathy variables.

Table 15: Descriptive Statistics (Ethnicity)

	condition	Are you of Hispanic, Latino, or Spanish origin?	Mean	Std. Deviation	N
change_IQ	1.00 (consistent with prior)	yes	2.4286	2.79455	28
		no	2.6265	4.06265	83
	2.00	yes	.6333	2.26645	30
		no	.4737	2.76875	76
	Total	yes	1.5000	2.67050	58
		no	1.5975	3.65631	159
change_society	1.00	yes	2.6429	3.03332	28
		no	2.3855	4.37797	83
	2.00	yes	1.5000	2.20892	30
		no	.6184	2.01968	76
	Total	yes	2.0517	2.67819	58
		no	1.5409	3.55916	159
change_person	1.00	yes	2.4286	4.40058	28
		no	3.2169	4.30555	83
	2.00	yes	1.5667	2.44503	30
		no	.7895	2.78240	76
	Total	yes	1.9828	3.52182	58
		no	2.0566	3.84386	159

Table 15 continued.

	condition	Are you of Hispanic, Latino, or Spanish origin?	Mean	Std. Deviation	N
change_empathy	1.00	yes	1.5000	3.09719	28
		no	3.1084	3.62919	83
	2.00	yes	1.0000	1.46217	30
		no	.9342	2.55257	76
	Total	yes	1.2414	2.38644	58
		no	2.0692	3.33398	159

In the first series of analyses, there were significant main effects of condition for all four of the variables: change\_IQ,  $F(1, 213) = 15.39, p < .001$ , change\_society,  $F(1, 213) = 8.44, p < .01$ , change\_person,  $F(1, 213) = 8.742, p < .001$ , change\_empathy,  $F(1, 213) = 8.552, p < .001$ .

However, there were no statistically significant effects of ethnicity for all four of the variables: change\_IQ,  $F(1, 213) = .001, p = .970$ , change\_society,  $F(1, 213) = 1.293, p = .257$ , change\_person,  $F(1, 213) = .000, p = .992$ , change\_empathy,  $F(1, 213) = 2.846, p = .093$ .

Finally, there were no significant Condition x Ethnicity interaction effects for any of the variables: change\_IQ,  $F(1, 213) = .126, p = .723$ , change\_society,  $F(1, 213) = .388, p = .534$ , change\_person,  $F(1, 213) = .1980, p = .161$ , change\_empathy,  $F(1, 213) = 3.352, p = .069$ .

Table 16: Descriptive Statistics (Gender)

	condition	What is your gender?	Mean	Std. Deviation	N
change_IQ	1.00	male	2.7255	4.25243	51
		female	2.4500	3.34170	60
	2.00	male	.4595	2.08959	37
		female	.5735	2.90299	68
	Total	male	1.7727	3.66947	88
		female	1.4531	3.24306	128
change_society	1.00	male	3.0000	4.49889	51
		female	1.9833	3.63827	60
	2.00	male	.5135	1.55673	37
		female	1.0735	2.34563	68
	Total	male	1.9545	3.76282	88
		female	1.5000	3.04300	128
change_person	1.00	male	3.5490	4.75106	51
		female	2.5667	3.90726	60
	2.00	male	1.1081	3.11612	37
		female	.9559	2.49437	68
	Total	male	2.5227	4.29642	88
		female	1.7109	3.32055	128

Table 16 continued.

	condition	What is your gender?	Mean	Std. Deviation	N
change_empathy	1.00	male	3.7255	4.06487	51
		female	1.8333	2.81742	60
	2.00	male	1.2432	2.65000	37
		female	.7941	2.09162	68
	Total	male	2.6818	3.73103	88
		female	1.2812	2.50334	128

In the second series of analyses, there were significant main effects of condition for all four of the variables: change\_IQ,  $F(1, 213) = 20.411, p < .001$ , change\_society,  $F(1, 213) = 13.940, p < .01$ , change\_person,  $F(1, 213) = 15.958, p < .001$ , change\_empathy,  $F(1, 213) = 18.312, p < .001$ .

In contrast, there were no statistically significant effects of gender for all four of the variables: change\_IQ,  $F(1, 213) = .119, p = .888$ , change\_society,  $F(1, 213) = .153, p = .858$ , change\_person,  $F(1, 213) = .626, p = .536$ . There was a statistically significant effect of gender for change\_empathy,  $F(1, 213) = 4.049, p = .019$ .

Finally, there were no significant Condition x gender interaction effects for any of the variables: change\_IQ,  $F(1, 213) = .181, p = .671$ , change\_society,  $F(1, 213) = 3.004, p = .085$ , change\_person,  $F(1, 213) = .670, p = .414$ , change\_empathy,  $F(1, 213) = 3.075, p = .081$ .

## Summary

In this phase, the researcher conducted statistical analyses to test the digital online museum resource, developed in phase 2, as a mindset intervention. The intervention was administered to a sample of undergraduate college students. Participants took a pre and post intervention survey to measure change in four domains of mindset: implicit theories of self, beliefs about social mobility, views of malleability of the brain, and empathy for undocumented immigrants from Mexico.

To increase the rigor of the study, two intervention conditions were included in this phase. Intervention condition A was a more immersive digital online museum resource developed using data from phase 1, and intervention condition B was a less immersive digital online museum resource using data from phase 1. Two conditions within the intervention are included to strengthen the design.

The results presented above indicate clearly that there was a significant difference in pre and post intervention survey scores for all four domains as well as significant mean differences in all four domains between the two experimental conditions. In each case, participants exposed to the more immersive condition displayed greater change.

The researcher found significant main effects of condition for all variables; however, there were no statistically significant effects of ethnicity for the variables, and only a significant effect of gender on empathy. Additionally, there were no significant interaction effects for Condition x Ethnicity nor Condition x Gender for any of the variables. A more detailed summary and a discussion of the findings are presented in the next chapter.



## **Chapter 5: Discussion**

The study described in this dissertation was conducted to understand how art education, immersive learning technologies, and the mindset framework connect to one another to develop a digital online museum resource. The final chapter of this dissertation restates the research questions, provides an overview of the methodology used in this study, and provides a summary of the results and a discussion of the findings for all three phases.

### **RESEARCH QUESTIONS**

How can art, digital storytelling, and immersive learning technologies be used to develop an online museum digital resource?

- What is the process of transforming existing museum curriculum to an online learning experience?
- How can qualitative results, gathered through ethnography, be reported through art, digital storytelling, and immersive learning technologies?
- Does an intervention using art, digital storytelling, and immersive learning technologies produce a statistically significant difference in implicit theories of self, beliefs about social mobility, views of malleability of intelligence, and empathy towards undocumented immigrants from Mexico?

### **REVIEW OF METHODOLOGY**

As explained in Chapter 3, the researcher conducted an exploratory sequential mixed methods study to develop a digital online museum resource to use as a mindset intervention. The digital resource was based on an existing museum lesson plan. The existing lesson plan was designed around a specific piece of art, a sculpture named *Border*

*Crossing* depicting a Mexican man and a woman crossing the Mexican/American border. The existing lesson plan also included an oral history from an undocumented immigrant who had crossed the border.

In phase 2 of this study, the researcher conducted an ethnography between 2016-2018 to explore the lived experience of an undocumented immigrant from Mexico. The purpose of this exploratory phase was to write a new oral history to use in the new digital online museum resource. The ethnography was guided by Sangasubana's (2011) ethnographic framework containing five stages: problem formation, selection of research setting, gaining access to the setting and participants, presentation of researcher to participants, and assessing the need for equipment to record data in the field. The researcher was also guided by Kramp's (2004) framework of narrative inquiry. The ethnography focused on one participant ( $n = 1$ ).

In phase 2 the researcher developed a digital online museum resource based on the results of phase 1 to use as a mindset intervention in phase 3. The researcher developed two intervention conditions: a more immersive condition using multimedia data collected in phase 1, and a less immersive condition using text from phase 1. Two conditions were developed for comparison purposes in data analysis and to make the study more rigorous.

The researcher used Walker and Boyer's (2018) framework for using research data to create multimedia narratives. Video is a common way to record ethnographic research data, but it is uncommon to use video for disseminating ethnographic results. This framework delineates the similarities and differences between multimedia research presentation and documentary filmmaking and conceptualizes exploration of multimedia data.

In phase 3 the researcher quantitatively assessed change in mindset based on the two intervention conditions developed in phase 2. Data collection for phase 3 took place

online during the Spring 2022 semester of a large public research university. A sample of 237 undergraduate college students were randomly assigned to either intervention condition A or B and all responded to the same pre and post survey using either computers or portable devices (smartphones or tablets). Students in both conditions completed the mindset survey as a pre and posttest. The mindset survey contained four subscales — three from the Growth Mindset Questionnaires (Chiu et al., 1997), and one developed by the researcher.

The researcher used statistical analysis to look for differences in pre and posttest scores in both conditions. The researcher used MANOVA to compare differences in pre and posttest scores in both intervention conditions, and ANOVA to analyze the interaction of change in scores with participants' gender and ethnicity.

## **SUMMARY OF RESULTS**

### **Phase 1**

The output of phase 1 was an oral history (testimonio) of the participant: a written narrative in the participant's own words describing her lived experience. In addition to this written testimonio, the researcher also recorded 860 minutes of audio/video footage using a 360-degree camera. The researcher constructed a narrative, or storied analysis, using the collected ethnographic data.

The researcher spent over 500 hours in the field observing, recording notes, capturing multimedia content, and conducting archival research. The researcher conducted field observations and recorded notes and insights in a field notebook. In addition, the researcher conducted relevant archival research.

A narrative inquiry method was employed to understand the phenomenon of crossing a country border undocumented and the experience of crossing and living in a

country undocumented. The researcher conducted various formal interviews and many informal conversations with the participant over the course of two years. The participant iteratively participated in data analysis to verify her voice. The result is Reyna's testimonio, approved by her. An oral history becomes a testimonio when the testimonialista bears witness to a social urgency, and a social imperative exists and a connection to a marginalized group (Tierney, 2000). Reyna's testimonio is a counterstory. It challenges majoritarian ideas about undocumented immigrants from Mexico (Solórzano & Yosso, 2002).

Reyna came to the U.S. without documents at the age of 16 years old. Reyna relates her life in Mexico, her experience coming to the U.S., her experience founding her business, and the risks that were involved in pursuing her "American Dream." Reyna's story is testimonio because it is authentic, generates and validates knowledge from her experience, and honors her lived experience (Yudice, 1991). She is the narrator who lived the events and now relates her story to all (Beverly, 1991). It is a testimony of resilience and triumph, which exemplifies growth mindset.

## **Phase 2**

The final multimedia product (condition A) was a ten-minute 360-degree video which includes a digitally 3D-rendered model of the sculpture *Border Crossing* by Luis Jimenez, narration by Reyna Vazquez in Spanish of select portions of her testimonio with accompanying subtitles in English, and seven scenes of different locations where the researcher filmed in relation to Reyna's oral history. The video includes interviews with Reyna and her sister Maritza and video footage of Reyna returning to her home in Veracruz, Mexico for the first time in 17 years, since she left at age 16. The film also shows activity

at the Veracruz All Natural food trucks, including footage of customers outside, and the cashiers, cooks, and food prep handlers hard at work inside.

Both conditions present the same content from Reyna's testimonio. It is told in the first person. Content validity was conducted from the beginning and the researcher verified data with Reyna to assure that the results presented the content of what it aimed to measure. The goal was complete agreement from Reyna, and this is the evidence for content validity in this study. This member checking with Reyna was done throughout the entirety of the ethnography. Reyna responded to the researcher's inquiries and conclusions, written summaries, and organization of data.

The researcher used two techniques to construct the 3D model. The first technique was using the LiDAR sensor on the iPhone and connecting the output bit map to photos the researcher took of the sculpture from multiple angles (127 photos total). The second was using an application on the iPhone to create the model using video footage of the entire sculpture. The researcher compiled the photos and LiDAR bit map, then used Blender to edit the model. The final model had 25.3k vertices. The primary focus of the edits was to remove unwanted artifacts, re-sculpt polygonal edges, and do color touchups to faithfully reproduce the sculpture in a digital 3D model.

The output for condition B was text of Reyna's testimonio and a high-resolution photo of the *Border Crossing* sculpture. The total text was 876 words, including a brief introduction to the artist and description of the sculpture. The text of Reyna's testimonio is identical to her spoken word narration in condition A.

The researcher also developed a conceptual framework for developing digital online museum resources. This conceptual framework was informed by the researcher's experience in this study developing a resource, assessing the resource's efficacy, and investigating current research in museum education, digital storytelling, and immersive

learning technologies. This new framework bears resemblance to the exploratory sequential research design the researcher used in this study, and includes concepts and frameworks utilized in this study.

### **Phase 3**

Confirmatory factor analysis (CFA) confirmed four different domains of mindset questions: implicit theories of self, beliefs about social mobility, views of malleability of intelligence, and empathy towards undocumented immigrants from Mexico. The model achieved excellent construct validity (RMSEA = .052, SRMR = .035, CFI = 0.989, TLI = 0.984), and each subscale achieved excellent internal consistency (mindset\_IQ  $\alpha$  = .942, mindset\_society  $\alpha$  = .955, mindset\_person  $\alpha$  = .939, mindset\_empathy  $\alpha$  = .836).

The survey the researcher used in this study had four subscales representing the four domains confirmed in the CFA. Each subscale had three questions, for a total of 12 questions.

A repeated measures MANOVA, collapsed across experimental conditions, was conducted to analyze differences in pre and post intervention mindset scores across the four mindset domains. The analysis found a significant multivariate effect,  $F(4, 214) = 24.20, p < .001$ , indicating an overall change from pretest to posttest.

The results of a follow up MANOVA found a significant multivariate effect,  $F(4, 213) = 6.72, p < .001$ , indicating an overall effect of condition. Additional univariate analyses revealed significant mean differences between condition A and B for change\_IQ,  $F(1, 216) = 20.71, p < .001$ , change\_society,  $F(1, 216) = 12.55, p < .001$ , change\_person,  $F(1, 216) = 16.49, p < .001$ , and change\_empathy,  $F(1, 216) = 18.10, p < .001$ . Participants exposed to the more immersive condition displayed greater change in all four subscales.

A 2 (Condition) x 2 (Ethnicity) ANOVA found significant main effects of condition for all four variables: change\_IQ,  $F(1, 213) = 15.39, p < .001$ , change\_society,  $F(1, 213) = 8.44, p < .01$ , change\_person,  $F(1, 213) = 8.742, p < .001$ , change\_empathy,  $F(1, 213) = 8.552, p < .001$ . However, there were no statistically significant effects of ethnicity for any of the mindset variables: change\_IQ,  $F(1, 213) = .001, p = .970$ , change\_society,  $F(1, 213) = 1.293, p = .257$ , change\_person,  $F(1, 213) = .000, p = .992$ , change\_empathy,  $F(1, 213) = 2.846, p = .093$ . There were no significant Condition x Ethnicity interaction effects for any of the variables: change\_IQ,  $F(1, 213) = .126, p = .723$ , change\_society,  $F(1, 213) = .388, p = .534$ , change\_person,  $F(1, 213) = .1980, p = .161$ , change\_empathy,  $F(1, 213) = 3.352, p = .069$ .

A 2 (Condition) x 2 (Gender) ANOVA found significant main effects of condition for all four of the variables: change\_IQ,  $F(1, 213) = 20.411, p < .001$ , change\_society,  $F(1, 213) = 13.940, p < .01$ , change\_person,  $F(1, 213) = 15.958, p < .001$ , change\_empathy,  $F(1, 213) = 18.312, p < .001$ . However, there were no statistically significant effects of gender for three of the four mindset variables: change\_IQ,  $F(1, 213) = .119, p = .888$ , change\_society,  $F(1, 213) = .153, p = .858$ , and change\_person,  $F(1, 213) = .626, p = .536$ . There was a statistically significant effect of gender for change\_empathy,  $F(1, 213) = 4.049, p = .019$ . There were no significant Condition x Gender interaction effects for any of the variables: change\_IQ,  $F(1, 213) = .181, p = .671$ , change\_society,  $F(1, 213) = 3.004, p = .085$ , change\_person,  $F(1, 213) = .670, p = .414$ , change\_empathy,  $F(1, 213) = 3.075, p = .081$ .

## DISCUSSION OF RESULTS

Qualitative research is useful when little is known about a topic (Corbin & Strauss, 2008). In the case of this study, the researcher knew little about what it was like to cross

the Mexican/American border. As an oral history of this experience was integral to the digital online museum resource, conducting an ethnography to better understand the lived experience of an undocumented immigrant from Mexico was deemed necessary by the researcher.

An advantage of using an exploratory sequential design is that open-ended questions in the qualitative phase allow participants to provide detailed and meaningful insights that may ground the development of an intervention in theory (Mack et al., 2005). The researcher's goal was to value and legitimize Reyna's lived experience and experiential knowledge, and give her voice through her storytelling, allowing her to name her own reality (Fernández, 2002). Another goal was to illustrate growth mindset through storytelling. Reyna's story is a stellar example of growth mindset, specifically of embracing setbacks and challenges. It was also a goal to allow participants contact with someone from a possible outgroup.

Ethnography allows researchers to understand their subject's beliefs, motivations, and behaviors more profoundly than through other approaches (Hammersley, 1992). As this first phase was exploratory, the researcher desired to comprehend better the experience of an undocumented immigrant from Mexico to develop a digital online museum resource on that topic.

The researcher was able to relate, through the words of the participant, how an undocumented young woman from Mexico navigated the United States capitalistic system to become a successful small business owner. The researcher included the participant, Reyna, as part of the data analysis process to validate her own story and approve translations from Spanish to English.

The final multimedia product (condition A) was data driven to present ethnographic results in an innovative way to communicate research (Heath, Hindmarsh, & Luff, 2010).



The researcher wanted to use the multimedia captured in the exploratory phase as a means for disseminating results, not just recording data. The final product is but a fraction of the total multimedia content gathered by the researcher. However, because the final product was not predetermined, but rather based on emergent storylines, the researcher sought to gather as much data, in the form of multimedia, as possible to explore.

Concerns from the literature about the use of video in research focus on the camera itself, specifically how video footage can increase the likelihood that viewers can experience what is filmed, but with the concern that the footage can be a selective lens that separates the subject from the context. The researcher chose to use a 360-degree video camera to enhance viewers' immersion in the settings and to remedy the concern of separating the subject from the context.

360-degree video was utilized to create an experience for viewers to “walk in the shoes” of Reyna. Immersion was the priority of the researcher in using video as a tool for this storytelling research. The 360-degree scenes allow viewers to freely adjust their gaze to where they want to look, and the researcher considered this when setting up the 360-degree camera to record footage.

Specifically, the researcher placed the camera in locations where the viewer would most feel like they were in the digital space. The researcher considered, recorded, and edited footage in an exploratory, not predetermined, way. All multimedia captured during data collection was considered as part of the final multimedia narrative.

To further immerse participants in the multimedia product, the researcher captured ambisonic audio. This captures audio spherically, rather than in stereo. The researcher also used an additional lavalier microphone to isolate audio from Reyna during interviews, in addition to contextual spherical sound of the scene.

Quantitative results indicated that both experimental conditions produced significant changes in mindset and empathy, verifying the researcher's hypotheses that digital storytelling can be an effective mindset intervention. Moreover, the results also indicate that the more immersive condition produced significantly larger changes.

The only significant demographic effect with change scores was empathy. There was a statistically significant effect of gender for empathy scores for men. This is not an unexpected finding, as women traditionally score higher on dispositional empathy surveys (Ahn et al., 2013; Gelbach et al., 2015; Groom et al., 2009; Oh et al., 2016). Even with men and women both experiencing significant change in empathy from pre to posttest in both conditions, because women more often than men begin with a higher baseline empathy, women's change scores would not be as significant.

Although digital storytelling has not previously been studied as a mindset intervention, the results in this study support theoretical literature about learning in a museum, and empirical research in immersive learning technologies and digital storytelling. In the following section the researcher seeks to connect findings from relevant studies to the results of this study.

### **Learning in a Museum**

The museum digital resource the researcher developed in phase 2 of this study constituted "an experience" as outlined by Dewey (1934). Dewey differentiated learning in a museum from typical classroom learning because of several important tenets. Learning in a museum means looking at artwork closely over extended periods of time, allowing learners to immerse themselves in the art, letting their thoughts more freely go in one direction or another (Elkins, 2004). The researcher assumed that the participants in this study would experience the same immersive mental processing through looking at the

digital 3D art sculpture and listening/watching/reading the testimonio of Reyna, as learners in a museum experience, causing participants' role in the intervention to be more active (Dewey, 1998), like in a museum.

In the more immersive condition, participants played an even more active role in learning because of the use of 360-degree video. Rather than passively viewing the video, or reading text like in the less immersive condition, participants actively moved the camera around, enabling them to more freely go in one direction or another (Elkins, 2004).

The researcher purposely narrowed down the number of total scenes to allow extended viewing times and close looking in each 360-degree setting. In the second scene specifically, the researcher allowed close to three minutes for viewers to solely view the 3D sculpture, superimposed digitally on the Rio Grande River, without any dialogue, for close looking.

Intense looking with deep concentration leads to construction of meaning for learners (Tishman, 2018). Participants in both conditions of this study observed the *Border Crossing* sculpture for an extended amount of time, which mirrored what Tishman (2018) refers to as an investigation through art observation. Additionally, in both conditions, participants were situated in the perspective of another individual, leading to a heightened sense of observation and investigation (Ertmer & Newby, 2013).

Another important facet of “an experience” learning in a museum, according to the literature, is social justice (Burnham & Kai-Kee, 2011). Art allows viewers exposure to things that might be foreign. This can be in the form of artwork from individuals from diverse backgrounds, orientations, and agendas. Artists can use their art as a platform to tell their stories, using Critical Race Theory (CRT) (Delgado & Stefancic, 2001) and Lat Crit Theory (Yosso, 2022).

The artwork *Border Crossing* presented in the intervention in this study tells the story of an undocumented man and woman from Mexico crossing the Rio Grande River to enter the U.S. The researcher used CRT to guide development of the digital story as this framework empowers experiential knowledge. The results indicate that the intervention successfully allowed participants to experience the lived experience of an undocumented immigrant from Mexico through the digital recreation of the *Border Crossing* sculpture as well as through the testimonio of Reyna as she voiced her own reality through her storytelling, relating a counterstory to participants. In both conditions participants experienced knowledge acquisition through the lived experience of another (Fernández, 2002) which led to an overall positive change in mindset.

Another very important facet of learning in a museum is empathy (Dewey, 1959; Laeng & Sulutvedt, 2014; Nyberg et al., 2001; Vischer et al., 1994; Vischer & Yanacek, 2015; Wheeler et al., 2000). Three questions were drafted by the researcher addressing change in the empathy domains of perspective taking and emotional concern (Davis, 1980, 1983), and in both conditions, participants experienced a significant change in these scores. This illustrates that both conditions prompted participants to experience empathy for an undocumented immigrant from Mexico, and more significantly in the more immersive condition.

Dewey (1998) stated that emotional involvement of the learner is a necessary precondition for learning in an art gallery. A learner must live a little in the work of art. Results indicate that in both conditions, participants were able to “live a little” in the *Border Crossing* statue by not only viewing it, but by experiencing a story from an undocumented immigrant from Mexico. In the more immersive condition participants had more control over how they viewed the sculpture and viewed Reyna’s story through multimedia that put them in a digital video sphere of the places Reyna was describing in her story.

In both conditions participants engaged in cognitive perspective taking and empathic emotional response (Davis, 1980, 1983, 1999), and results indicate that they were able to untether from their current surroundings by imagining Reyna's story (Laing & Sulutvedt, 2014; Nyberg et al., 2001; Wheeler et al., 2000). Empathy change scores indicate that participants experienced a deeper level of untethering in the more immersive condition, most likely due to its multimedia nature, and this may be a reason why participants had a greater positive change in mindset in the more immersive condition.

### **Immersive Learning Technologies and the Museum**

A conceptual framework for developing digital online museum resources emerged during the course of this study and was included in the results chapter as a potential future guide for museum educators. The researcher has identified in this study the importance and timeliness of developing these kinds of resources. The researcher patterned the flow of the framework similar to the exploratory sequential mixed methods used in this study. This felt like a natural fit because the goal is the same: to explore, develop, and assess. The researcher hopes that the developed conceptual framework in this study is only the beginning, or groundwork, for a more coherent and universal framework that can emerge from iterations from empirical studies that can lead to more dynamic digital online museum resources in the future.

In this study, the researcher concluded that using multimedia, specifically in the form of 360-degree video, was a unique affordance of an online setting that could further immerse learners into an artwork and oral history. In the original museum lesson plan learners read or listened to the oral history being read. Digital storytelling was referenced in the literature as a means to explore more linear narratives through art (Kabassi et al.,

2019) so the researcher took advantage of the unique affordance of the online setting in developing the museum digital resource (Kabassi et al., 2019).

The researcher in this study sought to not only reproduce the *Border Crossing* sculpture as a detailed digital 3D object, but to also situate the asset in an authentic digital space so as to not decontextualize it (Kabassi et al., 2019). The researcher did this by embedding the 3D digital model in video footage of the Rio Grande River, the river referenced by the artist as the location where the depicted Mexican man and woman were crossing to enter the United States.

As mentioned earlier, the museum is a distinct, special setting for learning (Dewey, 1959). The researcher did not seek to replicate the museum as a digital space in the more immersive condition. Rather, the researcher took a more novel approach. The goal of the researcher was to immerse participants in the artwork and the oral history of an undocumented immigrant from Mexico. Immersion and presence are two important affordances of virtual spaces for learning, especially when experienced in virtual reality (VR). Immersion refers to how enveloped a user is when viewing content, and presence refers to the perception a user has of being in that digital space (Aranson-Rath et al., 2015).

It was important to the researcher that participants heard Reyna's testimonio in her own voice and in her native language of Spanish in the more immersive condition. When people read each other's words, instead of hearing them, they are more likely to dehumanize (Meyer et al., 2013; Stinson & Ickes, 1992). This may be a reason why mindset change scores were significantly higher in the more immersive condition.

Digital storytelling combines various forms of technology, including videos, music, images, sound, narration, and text (Rule, 2010; Gladwin, 2020). Both conditions developed by the researcher meet the requirements for a digital story. They are both ways of sharing personal narratives in captivating ways as media artifacts ((Burgess, 2006; Hausknecht,

Vancouver-Orozco, & Kaufman, 2019), the less immersive condition doing so through the combination of art and text, and the more immersive condition doing so through 360-degree video, text, and audio narration. Digital stories have the capacity to amplify the voice of the narrator which maximizes the relevance and impact of a story (Gladwin, 2020; Henson et al., 2015) which may also be a reason why both conditions led to significant change scores in mindset.

Higher change scores in the more immersive condition may be due to the impact of the 360-degree space participants were presented to explore. Specifically, by being immersed in the spaces where Reyna describes in her oral history, participants are taking part in a perspective-taking exercise to learn about Reyna's lived experience as an undocumented immigrant from Mexico. Both conditions were perspective-taking exercises.

Perspective taking is effortful and has a high cognitive load on participants (Oh et al., 2016). As cognitive load increases it affects the effect of self-other overlap, or the inclination a participant has to take the perspective from a subject (Bailenson & Zaki, 2019; Oh et al., 2016). Immersive Learning Environments (ILE) require less cognitive effort and more presence, which allots participants a greater chance to experience what it feels like to be in another's shoes without as high a cognitive load (Oh et al., 2016). This may explain why participants in the more immersive condition had significantly higher change scores compared to participants in the less immersive condition, which demanded a higher cognitive load due to its more traditional perspective taking approach.

This opinion is supported by results of other studies that resulted in participants feeling greater empathy for targeted individuals and groups in VR experiences compared to the same targets in more traditional perspective-taking exercises (Ahn et al., 2013; Gelbach et al., 2015; Groom et al., 2009; Oh et al., 2016; Rosenberg et al., 2013). As most

studies in perspective taking, and some mindset studies, use self-report scales, the researcher used a mindset survey as a pre and posttest to measure change in implicit theories of self, intelligence, and society, with additional questions measuring change in empathy.

Studies show that empathy decreases in the presence of outgroups (Zaki et al., 2009; Zaki, 2014). For this reason, the researcher conducted two 2 x 2 ANOVAs considering ethnicity and gender. The researcher anticipated that non-Hispanics would have lower change scores, especially in implicit theories of empathy, compared to Hispanics. However, there were no statistically significant effects of ethnicity for all four of the mindset variables, nor was there a significant Condition x Ethnicity interaction effect for any of the mindset variables.

Additionally, the researcher anticipated that men would have lower change scores than women, because the subject of the digital story was a woman. However, there were no statistically significant effects of gender for all four of the mindset variables, nor was there a significant Condition x Gender interaction effect for any of the mindset variables.

## **IMPLICATIONS**

Standard mindset research typically presents scientific information about the malleability of the brain, then asks participants to reflect on what they learned from the intervention (Dweck & Yeager, 2019). Newer mindset studies have made interventions briefer, and in some cases online, but still with the same presentation of data about the malleability of the brain. These newer research studies have had effect sizes similar to the more traditional in-person studies (Paunesku et al., 2015; Yeager et al., 2019).

This study presents a novel approach to a mindset intervention, offering a digital story, rather than information about the malleability of the brain, as an intervention. This



study also presents a completely online intervention. This is significant in that storytelling is not only rooted in human culture, but ubiquitous in modern society in many forms. Storytelling continues to evolve through advancements in technology, and interventions using digital storytelling can have a broader appeal compared to presentations of scientific data. Digital storytelling can “nudge” participants towards experiencing contact with people, places, cultures, and ideas that may seem foreign.

Reyna’s digital story fits the description of a nudge, or a way to foster contact with others. Nudges using media, including video, photos, and art, trigger empathy more so than data (Berkman, 2021). Mindset interventions are also less demanding, in terms of cognitive load, than traditional perspective-taking interventions (Higgins & Rholes, 1978) and if the intervention in this study, which demands less cognitive load than more traditional perspective-taking exercises, can lead to similar positive change scores in empathy, this is a significant finding.

Reyna’s oral history illustrates important facets of growth mindset. Growth mindset promotes the belief that intelligence can be developed, and that human abilities are not fixed (Dweck, 2006, 2014). People can cultivate their basic qualities through effort, strategies, and help from others (Dweck, 2016; Hong et al., 1999; Levy et al., 1998). Setbacks are a way of learning, not proof of inferiority (Grant & Dweck, 2003). The researcher felt the urgency to present Reyna’s oral history as part of the intervention because of her example of learning through her setbacks, finding other ways to accomplish her goals when things looked impossible, cultivating her abilities, and learning more to establish and grow her business successfully. Reyna felt more determined and took more action when faced with setbacks, exemplifying a growth mindset to participants viewing, listening, and reading her story.

## **RECOMMENDATIONS FOR FURTHER RESEARCH AND CONCLUSION**

As mentioned in Chapter 1, phases 2 and 3 of this study were conducted during the worldwide COVID-19 pandemic and therefore readers may consider the results to be somewhat idiosyncratic. This may also make this study less replicable in terms of unaccounted variables inadvertently introduced due to the pandemic.

The researcher originally planned to include three conditions in this study. The third condition would have isolated participants into a group attending the physical museum and experiencing the existing lesson plan referred to in this study. This condition would have been a strong control group and change scores from this group could have been compared to the change scores of conditions A and B of this study.

Also due to the pandemic, participants were unable to use full virtual reality to experience the digital museum resource developed as an intervention for this study. Therefore, the researcher chose 360-degree video as the storytelling technology conduit, although most of the scholarly research is specific to VR and separates 360-video as a less immersive technology.

Measuring enduring mindset change as a result of interventions centered in art and digital storytelling is an important extension of this study. This study concluded with a posttest measurement of change in four domains of mindset taken directly after the intervention. Future studies might consider implementing additional posttests and/or interviews later after the intervention to compare results in mindset change.

Studies in empathy report that some interventions can lead to faster changes in empathy and other interventions can lead to slow-twitch changes. Fast-twitch interventions lead to more temporary change and slow-twitch interventions lead to longer-term changes (Thaler & Sunstein, 2009). Purposeful effort put forth to improve empathy builds longer-term empathy, and can even change brain chemistry; however it is extremely demanding

(Condon et al., 2013; Hildebrandt et al., 2017; Klimecki et al., 2014; Lumma et al., 2017; Valk et al., 2017).

Empirical studies in immersive learning environments (IVE) report greater cognitive and behavioral changes when compared to more traditional perspective taking (Ahn et al., 2013; Oh et al., 2016; Rosenberg et al., 2013). IVE's reduced higher cognitive loads that are required by traditional perspective taking (PT) interventions. Studies also show that immersive virtual reality experiences lead to longer lasting empathy compared to more traditional PT exercises (Gelbach et al., 2015; Herrera et al., 2018).

Mindset interventions, mostly conducted in-person using data on brain malleability, have led to an increase in grades when transitioning grade levels (Blackwell et al., 2007; Grant & Dweck, 2003). Shorter interventions, both in-person and digital, have been shown to produce results comparable to more traditional in-person interventions that use data, including academic outcomes (Paunesku et al., 2015; Yeager, et al., 2016). Mindset also offers a less demanding alternative to building long-term empathy, demonstrated through studies that simply believing it is possible to change leads to change (Dweck, 2006; Hong et al., 1999).

Lastly, dialogue is considered its own construct in research about museum education, set apart from conversation and discussion in the role of the teacher. Students and teacher explore art together, sharing inquiries, exchanging ideas, and cooperatively learning verbally. Museums that incorporate Interactive Virtual Learning in some cases look to this technology enable and foster dialogue online. This study did not contain dialogue, and an interesting further study of museum digital resources would be to include dialogue as an additional condition for testing.

In conclusion, the experience of learning with art is one that is unique from other learning experiences. It is multifaceted and can lead to a praxis of understanding different

from other learning settings. Important components of learning with art consist of interpretation, dialogue, constructivism, social justice, and empathy. These components, gathered as a whole, embody what Dewey (1934) describes as “an experience.”

The genesis of empathy comes from art. Viewing art can provoke both emotional and cognitive empathy through immersion in other points of view (Vischer et al., 1994). More importantly, having an experience with art can function as an intervention that may impact an individual’s empathy (Dewey, 1934; 1959; 1998). Sustained face to face dialogue can foster greater empathy (Berkman, 2021).

Storytelling in media can impact individual’s mindsets by generating empathic reactions. It can be a way to disseminate culture and share personal narratives in captivating ways (Burgess, 2006; Hausknecht, Vancouver-Orozco, & Kaufman, 2019; Valtolina, 2016). It is an example of using art and immersive technologies, among other forms, in creative ways across many forms to tell stories. Digital storytelling is a powerful medium that may have the capacity to be implemented as a mindset intervention.

The Growth Mindset framework consists of two different assumptions people may have about the malleability of personal attributes. On one end is the implicit belief in a fixed, nonmalleable trait like entity, and on the other end is an implicit belief that traits are malleable and can change and develop (Elliott & Dweck, 1988; Good et al., 2012; Grant & Dweck, 2003). According to growth mindset, the brain is not hardwired (Blackwell et al., 2007; Dweck, 2016, Hong et al., 1999; Levy et al., 1998). Although empirical research exists showing evidence interventions can impact individuals’ implicit theories on the malleability of traits, these interventions almost exclusively consist of the presentation of empirical evidence of brain malleability to subjects (Dweck & Yeager, 2019).

There existed a gap in research relating to other forms of mindset interventions. There is an opportunity to use art and immersive learning technologies to create an

intervention relating to mindset. This intervention may be a valuable contribution to museum education.

The researcher employed an exploratory sequential mixed methods design for this study. This method has three main phases: qualitative, development, and quantitative. Each phase builds sequentially off the prior. The researcher explored the processes of museum curriculum transformation and development of new digital online museum experiences and developed a digital online museum resource to use as an intervention to quantitatively test participants change in mindset.

In the first phase of this study an ethnography was conducted between 2016-2018 to collect qualitative data to use as a narrative in relationship to the pre-selected artwork presented in the digital online museum resource ( $n = 1$ ). In the second phase of this study a digital online museum resource was developed based on qualitative data in phase 1 and was tested for content validity. In the third phase the digital online museum resource was used as an intervention that was administered to a sample of undergraduate college students ( $n = 237$ ) as part of an experimental design to quantitatively measure change in four domains of mindset. To increase the rigor of the study, two intervention conditions were included in this phase: a more immersive and a less immersive condition.

The results presented clearly indicate there was a significant difference in pre and post intervention survey scores for all four mindset domains, as well as significant mean differences in all four domains between the two experimental conditions. In each case, participants exposed to the more immersive condition displayed greater change.

The researcher found significant main effects of condition for all variables; however, there were no statistically significant effects of ethnicity for the variables, and only a significant effect of gender on empathy. Additionally, there were no significant

interaction effects for Condition x Ethnicity nor Condition x Gender for any of the variables.

## **Appendix A**

### **SURVEY PARTICIPANT INSTRUCTIONS**

Please rate each statement on a scale of 1 (strongly agree) to 6 (strongly disagree). Please respond as honestly and accurately as you can. This survey is completely anonymous, and there are no “right” or “wrong” answers.

After you complete the survey, you will view a museum digital resource. Upon viewing the resource, you will complete an exit survey. Total participation time will be no longer than 8-10 minutes.

If you have any questions about the study, please contact the researcher Ryan Myers at (512) 669-2163 or send an email to [ryan.myers@utexas.edu](mailto:ryan.myers@utexas.edu). This study has been reviewed by The University of Texas at Austin Institutional Review Board and the study number is STUDY00002554.

If you have questions about your rights or are dissatisfied at any time with any part of this study, you can contact, anonymously if you wish, the Institutional Review Board by phone at (512) 232-1543 or email [irb@austin.utexas.edu](mailto:irb@austin.utexas.edu).

Thank you so much for your participation.

## **SURVEY**

### **Instructions**

Respondents use a 6-point rating scale (1 = strongly agree; 6 = strongly disagree) to show how much they agree with the statements below. Higher scores on the scale indicate that the participant has a growth mindset, which means they believe that their efforts can cause them to improve. Lower scores indicate that the respondent has a fixed mindset, which means they believe that they are born a certain way and can do little to get better.

### **Response Format**

- 1 = strongly agree
- 2 = agree
- 3 = mostly agree
- 4 = mostly disagree
- 5 = disagree
- 6 = strongly disagree

### **Questions**

#### **Malleability of Intelligence**

- You have a certain amount of intelligence, and you can't really do much to change it.
- Your intelligence is something about you that you can't change very much.
- You can learn new things, but you can't really change your basic intelligence.

#### **Beliefs About Social Mobility**

- You have a certain status in society, and you really can't do much to change it.
- Your status in society is something about you that you can't really change very much.
- You can do things differently, but you can't really change your status in society.

#### **Implicit Theory of Self**

- The kind of person someone is, is something very basic about them and it can't be changed very much.
- People can do things differently, but the important parts of who they are can't really be changed.
- People can't really change their deepest attributes.

#### **Empathy Towards Undocumented Immigrants from Mexico**

- I find it difficult to see things from the point of view of an undocumented immigrant from Mexico.



- Becoming extremely affected by media about undocumented immigrants from Mexico is somewhat rare for me.
- I don't feel much concern for undocumented immigrants from Mexico.

## Appendix B



### FORM: IRB Proposal - Exempt Submission

NUMBER	VERSION DATE
HRP-UT902	8/3/2020

## EXEMPT SUBMISSION FORM

*Submit this in the Research Management Suite – IRB when seeking an exempt determination for human subject research.*

*If research only involves the secondary use of information (e.g., chart review) or biospecimens, submit HRP-UT903 IRB Proposal Secondary Use Submission found in the document library.*

*For questions regarding definitions, policies, or terms referenced below see the [policies and procedures manual](#).*

### 1 Verifications

*Click on the check box (or double click and type an "X" if using Google Docs) if true.*

- ☐ The study is FDA regulated.
- ☐ The study involves prisoners.

### 2 Study Purpose or Hypothesis

*To input text click in the light grey area below.*

The purpose of this study is to understand how art education, immersive learning technologies, and the mindset framework connect to one another to develop a digital, online museum resource. This resource will be used as a quantitative intervention. The researcher will use pre and posttests to statistically test subjects' change in their implicit theories of self, change in beliefs about their social mobility, and change in mindset.

### 3 Describe the Study Procedures

*Provide a brief (1-2 paragraph) description of study procedures.*

*To input text click in the light grey area below.*

An exploratory sequential mixed methods design will be used by the researcher in the present study. In the first phase an ethnography was conducted between 2015-2021 to explore the lived experience of an immigrant from Mexico. The narrative related by this individual is an oral history and only functions in this study as informational and is not used for findings. No generalizable claims are made by the researcher.

In the second phase an online/digital museum resource will be developed. The content for this digital intervention is the oral history from the prior phase. In the third phase, the online/digital museum resource will be used as an intervention to be administered to a sample of participants as part of an experimental design to quantitatively measure the difference in mindset connected (Creswell & Plano Clark, 2018). The researcher will plan a quantitative assessment of the intervention that will be used to interpret differences in mindset using a survey that measures participants' implicit theories of self, beliefs about social mobility, and mindset. There are 2 conditions for this study. Condition A will take a pre survey, read the text of the uploaded oral history, and take a post survey. Condition B will take the same pre survey, watch a video of the same oral history ([https://youtu.be/MMASBHc\\_--Y](https://youtu.be/MMASBHc_--Y)), and take the same post survey.

The survey with intervention will take no more than 10 minutes in both conditions A and B. The pre and post survey are the same survey that are uploaded.

The expected study timeline is as follows. The intervention with pre and posttests will be administered to both conditions during the Spring 2022 semester. Data collection will begin as soon as IRB approval is granted and will end on the last day of the semester, May 6th. The researcher in this study will then analyze the data collected during the Summer 2022 semesters and defend the results in front of his dissertation committee during the first week of the Fall 2022 semester.

#### **4 Describe the study populations that will be targeted for enrollment.**

*To input text click in the light grey area below.*

Undergraduates at the University of Texas at Austin comprise the target population. This is a population that in years past has been a part of regular group tours attending the Blanton Museum on campus. However, in the last couple of years the museum has not been able to accommodate as many visits, and therefore the development of online digital museum resources has become increasingly important for this population to access the museum remotely. All participants are 18 years and older. The target number of participants is 200.

The sample of participants in this study represent a purposive sample. For convenience, undergraduate students who are currently enrolled in a course in the College of Education will be solicited for participation as the sample population. Therefore, it is a non-probable sample, but meant to achieve representativeness or comparability to the larger population of the sample (Teddlie & Yu, 2007).

## **5 Describe how participants will be informed about the research and provided an opportunity to decline to participate.**

*To input text click in the light grey area below.*

The researcher in this study will work with Dr. Karen French, co-director of the Office of Instructional Innovation in the College of Education at The University of Texas at Austin, to identify professors in the College of Education, currently teaching undergraduate courses, that might be interested in inviting their students to participate. Once professors are identified and contacted by Dr. French, the researcher will contact interested professors individually by email. This email will include a recruitment flyer that professors can share with their students.

Student participants will be sent a link, via email, to the present study on Qualtrics. In Qualtrics participants will take the pretest, read the text or watch the video of the oral history, and take the posttest. A consent form will be presented prior to the survey/intervention (uploaded cover letter) and participants will consent by continuing with the survey and may stop at any time.

Participation in the study is voluntary and participants will confirm with their professors their desire to participate or decline participation. The researcher, then, will email participants directly with the link to the intervention.

## **6 Describe processes for protecting the privacy of participants and confidentiality of participant data.**

*To input text click in the light grey area below.*

Participants will be taking an anonymous survey in Qualtrics, meaning that no other participant can see another participant's responses. Participants will input their birthdate on both the pre and posttest as a means for the researcher to compare results.

Data will be collected in Qualtrics, will be exported from Qualtrics, and imported to SPSS for data analysis. Data in Qualtrics will only be accessed by the researcher. Data outputted from Qualtrics will be temporarily stored on the researcher's password protected home computer, long enough to make any

necessary edits before inputting to SPSS. Once the data has been uploaded to SPSS, all data downloaded from Qualtrics will be deleted.

## OPTIONAL ELEMENTS

*Identify any of the following elements that apply to this study.*

### 7 Educational Practices

*If your study is focused on testing established educational practices this optional element may apply to you.*

*Click on the check boxes (or double click and type an "X" if using Google Docs) if true.*

*Both must be true to receive an exempt determination under this category.*

- ☐ This research is on educational practices in commonly accepted educational settings.
- ☐ Research activities are not likely to adversely impact students' opportunity to learn or educators' professional assessment.

### 8 Social Behavioral Methods

*Click on the check boxes (or double click and type an "X" if using Google Docs) if true.*

*Both must be true to receive an exempt determination under this category.*

- ☒ Research only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey, procedures, interview procedures, or observation of public behavior.
- ☒ Researchers will not interact with children as part of this research.

### 9 Benign Behavioral Interventions

*Click on the check boxes (or double click and type an "X" if using Google Docs) if true.*

*Both must be true to receive an exempt determination under this category.*

- ☒ This research involves interventions that are brief in duration, harmless, painless, not physically invasive, and not likely to have a significant adverse lasting impact on the subject.
- ☒ Researchers will obtain prospective agreement from participants.

## 10 Deception

*Click on the check boxes (or double click and type an "X" if using Google Docs) if true.*

- ☐ This research involves deception.
- ☐ Participants are informed prior to participation that deception is involved and have agreed to being deceived.

## 11 Taste and Food Quality Evaluation

*Click on the check boxes (or double click and type an "X" if using Google Docs) if true.*

- ☐ This research involves taste and food quality evaluation.

# ADDITIONAL DOCUMENTS

## Supporting Documents

*Please note, all of the following documents should be uploaded to the RMS suite as applicable.*

- Surveys
- Interview or focus group questions
- Research Information sheet
- Other study documents

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