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Truss Damage

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TRUSS DAMAGE

A Thesis

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Master of Fine Art

in

The Department of Art

by

Hira Tariq

B.Arch. National College of Arts, Lahore, 2010
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Dedicated to my mother Rubina Tariq and my fiancé Justin Roberts.

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TABLE OF CONTENTS

ACKNOWLEDGEMENTS.....	iii
ABSTRACT.....	v
INTRODUCTION.....	1
BACKGROUND INFORMATION.....	4
Cultural Background.....	4
Significant Past Works.....	5
PROCESS.....	9
Interactive Art.....	9
Kinect Integration.....	10
Research and Methodology.....	18
Kinect Interaction.....	18
Installation Piece.....	20
Inspiration Artists.....	20
GALLERY DISPLAY.....	24
Layout for the Display.....	24
RESULTS AND CONCLUSIONS.....	29
Future Development.....	29
BIBLIOGRAPHY.....	30
VITA	32

ABSTRACT

Truss Damage examines negative cultural restrictions are imposed on family structures. It is an exploration of experimental and interactive narratives formed within virtual and real spaces. My research and implementation includes creating multisensory experiences through immersive technologies. With the use of devices such as Microsoft's Kinect controller, large LCD panels, and framed digital prints I am to bringing forth fragments of my past in order to create an interactive experience through movement and discovery of symbolic features.

INTRODUCTION

Truss Damage stems from my experience growing up in Pakistan. The work explores how meaning and experience shape each other through spatial features, movement, and discovery of symbolic features embedded within a space. I am interested in how interactive art works involve viewers and allow them to form connections. The architectural elements in this work are important to me due to my undergraduate degree and my passion architecture design.

Virtual and real architecture have a very different design methodology. In the virtual world there are unlimited forms that can be built where as in the real world the form is dependent on physics. I am building narratives within virtual architectures and developing experiential spaces with sensors capable of measuring presence and motion such as the Microsoft Kinect. Through these sensors I am connecting the real and virtual environment to form spatial narratives. In the real world it is easy to leave a physical mark through usage of space whereas in the virtual world architecture does not necessarily age. This is important to me as it is a way people connect to each other across the world.

People in Pakistan are using virtual spaces, social media or platforms like second life, to come together to form social and political movements. It is next to impossible to get the voice of the public heard. Their opinions are overlooked and ignored and the only voice that counts is that of the elite. Social media has become a place where your social status does not matter.

Narratives have a various meanings and definitions in different contexts. Paul Cobley broadly describes narrative as "a form of representation bound with sequence, space and time."

¹ When talking about fiction film David Bordwell notes narrative is regarded as "structure, a particular way of combining parts to make a whole." He goes on to say narration is "the activity of selecting, arranging and rendering story material in order to achieve specific time-bound effects on a preceiver."²

In her book *Architecture and Narrative* Sophia Psarra states "...buildings are experienced gradually through movement."³ and it is through experiences we develop

¹ Paul Cobley, *Narrative: The New Critical Idiom* (New York: Routledge 2001)

² David Bordwell, *Narration In The Fiction Film* (London: Routledge 1985)

³ Sophia Psarra, *Architecture and Narrative: The Formation of Space and Cultural Meaning*, (New York: Routledge 2009), Kindle Edition, location 330.

connections and cultural relationships. If buildings are capable of doing so in the real world, is it also possible to generate connection and meaning within virtual environments using the language of architecture?

In the real world, architects create meaning within spaces through materials and strategic placement of objects. My aim is to create meaning and generate a sense of connection between and within real and virtual spaces. In *Truss Damage*, I want the audience to experience an emotion that will help them relate to the work by placing them in a space that is the reflection of another. The real space installation piece is the base for the design of the virtual environment. It is placed in a different segment of the gallery which is meant to be seen before the virtual piece. By doing so, I am placing objects that symbolize the same concept in both the real and the virtual world. These spatial elements help the viewer put the pieces together. The different sections within the gallery will help form a narrative through placement of the pieces. The meaning of the individual pieces also contribute to the overall narrative structure.

The placement of the objects included in the display is important as it helps contribute to forming meaning. When Sophia Psarra talks about placement of objects within a gallery space they

...can be viewed for their own importance, but the design of the exhibition has the potential to construct additional meanings for each piece based on the spatial and visual interrelationships with others.⁴

The show's layout explores an interdependent web of connected virtual and physical objects. Each highlights a part in the overall story that I wish to communicate. The **prints** show the viewer what the confining element is. The **installation** shows who or what is confined. Lastly the **virtual space** asks the viewer to try and feel empathy rather than sympathy.

By creating a replica of the installation piece within the virtual space I am attempting to tie a fragment of my past emotions that have been lingering, into an experience that is personal to the viewer. Ever since I moved to the United States from Pakistan I have been trying to overcome traditional cultural values while living in a society so focused on progress. This feeling of being stuck is what I want to create through my art. It is not just for viewing but for feeling and

⁴ Sophia Psarra, *Architecture and Narrative: The Formation of Space and Cultural Meaning*, pg 4 paragraph 2 In 9, (New York: Routledge 2009)

experiencing through movement and interaction in multiple spaces. By creating this interactive experience, I am asking the viewer to put themselves in my shoes to understand my experience.

The show includes different sections with some parts that require the viewer to interact with the piece to activate it and others that do not. I am shining a light the effect of hierarchy and control within a household.

BACKGROUND INFORMATION

Cultural Background

Greeting your guests at special events by throwing rose petals is customary in Pakistani and Indian culture. Besides showering guests with flowers, necklaces made of roses are given to important guests. These flowers are most commonly roses. This is an essential part of significant life events. It is an indication of welcoming someone, or something, like an achievement with great joy.

Despite such extravagant ways of displaying hospitality, the lives behind the walls of Pakistani homes are completely different -- even hypocritical. In a patriarchal society, there is very little freedom for women to choose a path of their own. A place where archaic customs are highly regarded it becomes harder to progress as a modern society. Implications of how you should live starts from within your home from the day you are born. In Pakistan you do not make your path -- your elders decide for you. In majority of the families things like what you wear on a daily basis, what your career path will be, or to whom you will be married is chosen for you by your elders. This turns your home into a prison, or a place that holds you back from being yourself and molds you into something you are not meant to be.

When I moved to America I noticed some stark differences between the culture in which I now found myself, and the culture I had grown up with. I was specifically interested in the role a person's upbringing has on how they view religion, freedom, and oppression in the two cultures. I came here to find myself, yet I found out very soon that it is very hard to escape from a troubling past. I am still bound by what my elder relatives think is acceptable. Religion and "proper" social rules are still imposed on me. I still am unable to question cultural and religious practices without facing dire consequences. I began to voice these convictions through my art work from which I have attempted to visually translate in my work by recontextualizing symbols from the traditional customs of my culture. Within the work I am utilizing them to convey a message of suffocation and lack of progress.

I utilize the Pakistani cultural symbol of rose petals in combination with roof structures that are commonly seen in residential buildings in the US. The blood cells disguised as roses falling are a link to my abusive patriarchal culture. Within them you see the duality of hospitality and oppression. These represent the abuse and violence I have faced in the past. The fallen trusses depict a place of security that has turned into a prison cell and trapped mind and body. I use a truss because it is a construction method rarely seen in Pakistan and is considered a

western construction method. It symbolizes my new life in America where I am still affected by the rules of my past. Using all of these symbols together, they show the idea that your location may change but you are still bound by cultural identities and their restrictions.

I want to put my viewer in an environment similar to how I feel so they can recognize that dark cloud over my head also hangs above many others that share my experiences. I would like them to visualize the negative aspects of imposing strict patriarchal cultural practices within a household. These are harmful traditions that only hold culture from any form of progress. If there is any change that we can hope for it starts by recognizing and accepting that there is a problem that is required to be solved.

Significant Past Works

In the past I have created works which explore the topic of cultural confinement. Amongst these I would like to mention two in particular. The first is a performance called *untitled 02* and an installation piece *the facade* which are the basis for the development of *Truss Damage*.

For the performance I wore a confining cylinder made of paper around my body. This represented boundaries or restrictions that are placed onto women since the day we are born (See Figures 1 and 2). The text that participants placed onto the cylinder represented the restrictions and expectations that they believed different cultures imposed onto women. At the end of the performance I tore off the cylinder along with the comments off, sending out a message that women should not be required to meet any cultural expectations imposed upon them.



Figure 1 (untitled 02: Cylindrical form with text worn around the body during performance)



Figure 2 (untitled 02: Tearing off the form during performance)

In the second project *the facade* I created an installation piece that was a visual representation of complexity that hides behind the social mask of a person. I did so by creating a particle effect with a subtle duality using blood cells that imitate the movement of rose petals falling (See Figures 3, 4, and 5)⁵. This facade was the face of a welcoming and hospitable person concealing aggression and violence.

⁵ Figure 3: Render of the blood rain using AfterEffects

Figure 4: Projection of blood rain onto the installation piece *the facade*

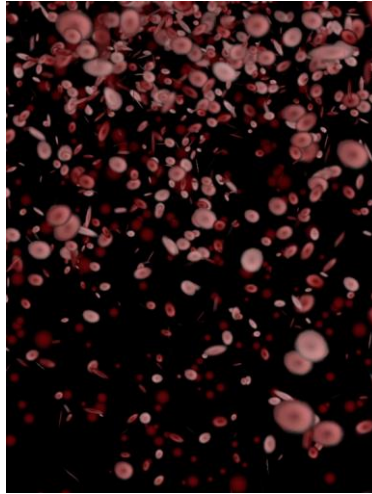


Figure 3 (The Facade: Screenshot of the projected blood rain)

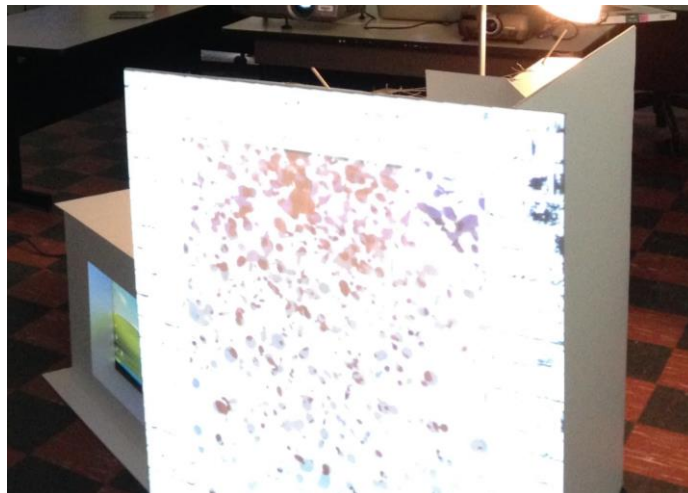


Figure 4 (The Facade: Installation piece with the projection)

The main element is the most essential part of a home, i.e a truss. This is also a representation of homeland, a place where you grow and belong.



Figure 5 (Blood Rain: A closer view of the particles)

These projects helped me develop the concept for my thesis. Despite my attempts to discover myself by moving to a new country, I found myself unable to shake my past completely. My physical location in the world changed but I was living within the same confining rules I had tried to escape. The concept evolved my thesis to a personal experience: the inability to move freely as a result of your birthplace, a home that becomes a prison.

PROCESS

The main challenge in *Truss Damage* was to create objects within in a space that convey meaning through movement and use. For this I developed different ‘stages’ for the viewer to be able to make connections between each segment of the display.

The arrangement includes prints, video, and installation pieces. The reason for choosing the aforementioned sub-branches of Digital Art is that I want my audience to experience the artwork to form a narrative. Each segment has similar objects driven from the symbols mentioned above and with them I am attempting to symbolize the negative aspects of a dysfunctional home.

Exploring these topics in my past work made me realise that my immersion into a new culture, that is completely different, has had little impact on the restrictions that I’ve been living with. My experience of life has not changed significantly after moving to the US. It is as if the background has changed but the stories are the same. In a place that I am supposed to feel safe I feel the opposite. Thus I began developing methods to visualize and represent this feeling.

I started building prototypes for an installation piece that involved the elements of roof structures commonly used in the United States, simultaneously testing out different programming platforms for making projected particle effects that were interactive during my first semester. With extensive research and prototyping I decided to use Kinect v2.0 for interactivity within the virtual space.

Interactive Art

According to Nathaniel Stern, the author of *Interactive Art and Embodiment...* “Interactive art stages an *implicit body*, not *in* performance, but *as* performance.”⁶ Any interactive piece that requires the viewer to activate is incomplete without the viewer. As the viewers become immersed they begin to connect to the piece a more personal way. They become a part of the piece. This is important to me as my moving to a new culture and being immersed in it made me broaden my perspective. I could now see the qualities and flaws of my dysfunctional family life. Although it may be confusing, it is important that the viewer fully

⁶ Nathaniel Stern *Interactive Art and Embodiment: The implicit body as performance*, (Great Britain: Glyphi Limited 2013), Kindle Edition, Location 316

understands both the good and bad aspects of my experience because I feel that only focusing on one emotion would be dishonest. Immersion into a new environment that reveals different and sometimes conflicting feelings is essential to my narrative.

Kinect Integration

To be able to create an immersive 3-Dimensional environment, my research began with motion detectors, depth sensors and integrating Kinect in Processing. However Processing's ability to render 3D graphics is somewhat limited mainly due to its render quality and frame rate, therefore I shifted my research. I decided to invest my time learning a game making engine designed to handle dense meshes and high quality renders without diminishing the frame-rate.

As one of the most integral parts of my show I have created an installation piece. This has a sculptural part and has the “blood rain” falling onto me in a tight and awkward space. This tight space restricts body movement and allows little to and fro motion. It is impossible to stand up in it. The design incorporates a toppled over roof structure that does little to stop the rain particles from falling onto the internal space. The initial prototypes varied greatly in terms of design from my final form as seen in the images below. (Figures 6, 7 and 8)

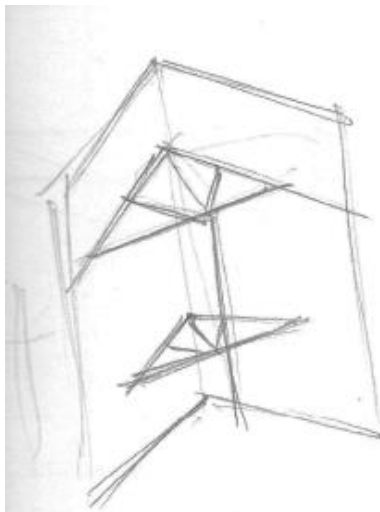


Figure 6 (Pencil Drawing Of the initial design)



Figure 7 (Initial sculptural form)



Figure 8 (Initial Truss Design, built in wood)

Since I changed my method of interaction⁷ I decided to separate the installation from the interactive environment. After struggling with the design possibilities for the installation in the real world and being limited by code, I decided to switch from working mainly on the computer to sketching out my ideas by hand" (See Figure 9). This really helped in making some major design decisions that also expressed the concept more clearly. Sketching on paper helped me break from the precise digital tools and allowed me to bring a new sense of flow into my work.

⁷ Depth sensors, webcams vs Microsoft Kinect 2.0

This helped me break from the initial structure design and develop various forms that were more organic. Working out the design on paper made it clear how to convey the meaning the structures represented. While doing so, I also made more abstract forms inspired my video piece. I started developing forms in the virtual world to work out the detail rather than the real to save on materials and time.

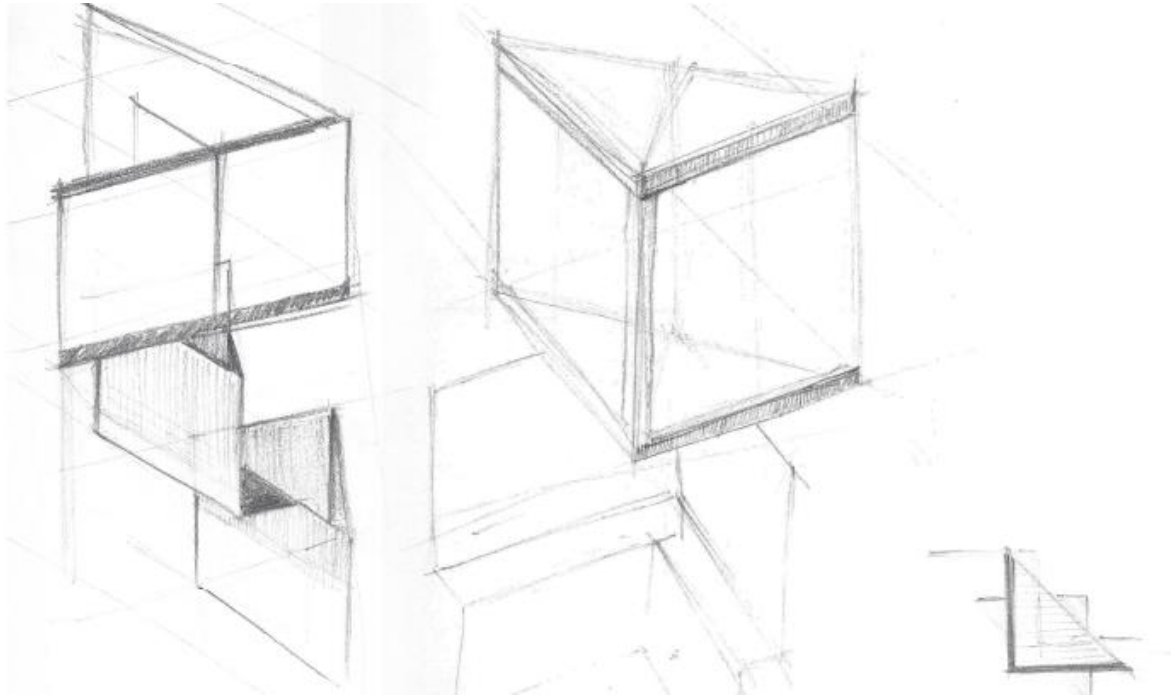


Figure 9 (Process sketches for the design development of the installation piece)

Changing my design methodology helped me achieve different ways of connecting everything together. By developing a virtual version of the installation helped me tie the narrative in the virtual and the real world. The built installation piece with the projection of a video on it is the real world segment. the video is projected on a form i built and it depicts a person who is trapped in a very tight space (See Figure 10). The replica of this form (See Figures 11 and 12) in the virtual world is the link between the virtual and real. By placing the avatar of the viewer in this space, the viewer finds himself trapped in the same situation.



Figure 10 (House Bound, with the projected video)



Figure 11 (Third segment of the show)

Limitations in structural design in the real world was the reason I had switched from architecture to the virtual designs. Developing a model virtually helped me save time and material that I may have wasted prototyping in the real world. Also, virtually developing multiple compositions for the fallen truss was much quicker and it helped convey the meaning of the house becoming a prison more clearly.

The previous design that was built (See Figure 7) had many pieces with no functionality and added little to the meaning to the overall piece. I started simplifying the design -- with a more minimalistic truss design, the installation started to look more like a cage (See Figure 13). It was also important to translate the meaning of each part separately and as a whole more clearly. This lead me to develop digital renders for each segment of the display.

The installation piece *Home-Prison* has the same structure that holds the viewer trapped in the interactive virtual environment. The installation piece has a video of myself projected onto the canvas showing constrained movement within a confined space amplifying the idea of restrictions inside a house that offers little to no protection. Whereas in the virtual piece *A Walk In My Shoes*, the avatar follows the movement of the viewers but at the same time the virtual figure is unable to do much within that space. This is my way of telling the viewer to imagine themselves in a similar predicament.

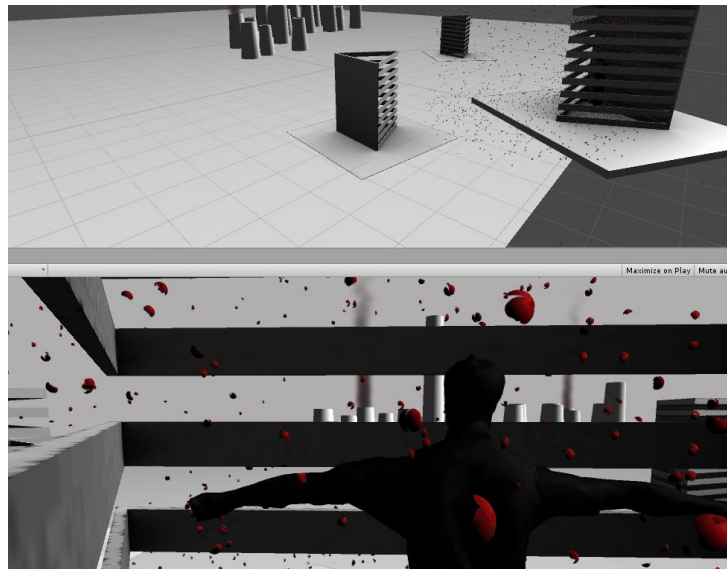


Figure 12 (Scene file in Unity)



Figure 13 (House Arrest, Installation Piece - Process)

The choice of materials also plays an important part in developing spatial narrative . The reason for using the monochromatic tone in the interactive piece is a way of bringing in an implicit layer of my past; often architectural sketches are rendered using monotone pencils. By normalizing the UVs of the models I was able to develop sketch compositions that use the rendering styles often used by architects. This helps tell the viewer about my link with architecture design (See Figure 14). These UV maps lead to my decision to use occlusion layer rendering as a material for the trusses in the virtual space (See Figures 15 and 16).

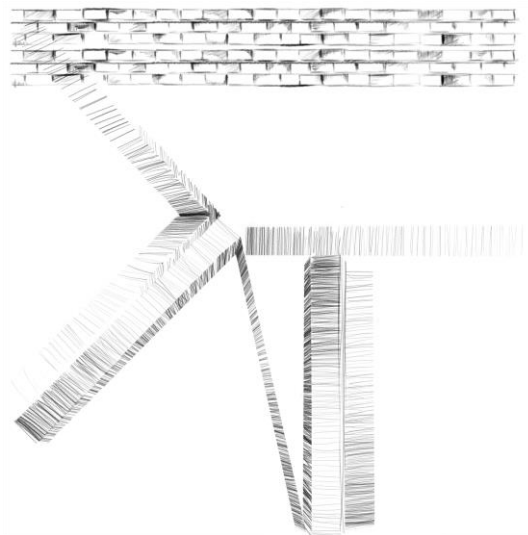


Figure 14 (UV Map Rendering Using A Pencil In Photoshop)

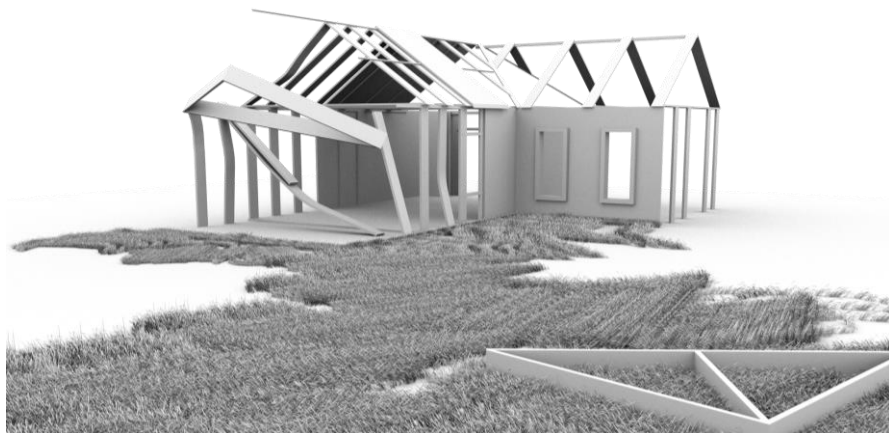


Figure 15 (Broken Home - Occlusion Layer)

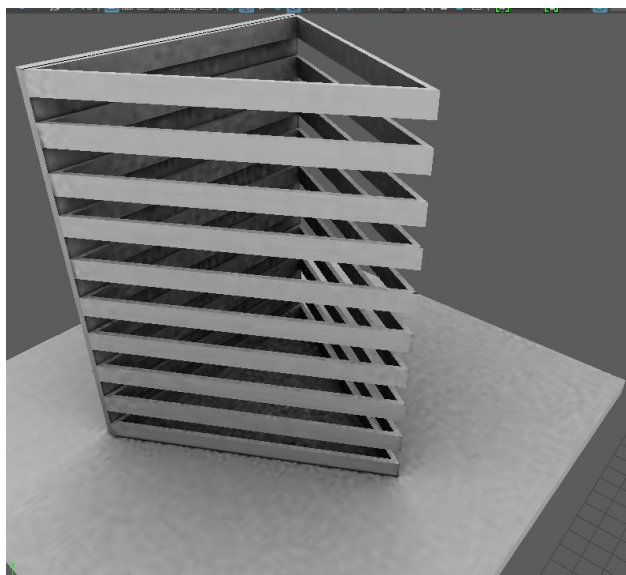


Figure 16 (Virtual Form of the Installation Piece with Ambient Occlusion)

While working on the mesh collider in unity I started to look at my model differently. I began translating the feeling of suffocation by developing textures for the avatar. Since the avatar in Unity follows the viewer's movement and the particles do not collide naturally with a solid mesh I had to divide my character's limbs and then import them in Unity as a separate object (See Figure 16).

The mesh when imported into Unity, is a solid form (See Figure 17). It is pre-rigged and the skin weights are painted in Maya. In order for the mesh to collide properly with the particles, the bones for individual limbs have to be parented to an empty child object. In the child object

another layer of geometry is added as a collider for each limb.⁸ While importing all of the limbs I was able to see the avatar and the mesh overlap each other (See Figure 18 and 19). During this time I was visualizing the suffocation I felt being unable to free myself. As I had to move the mesh over the avatar's face it almost felt like I was putting a web over his face to stop the breathing (See Figure 19). This led me to the development of digitally rendered images of the avatar in the glass world.

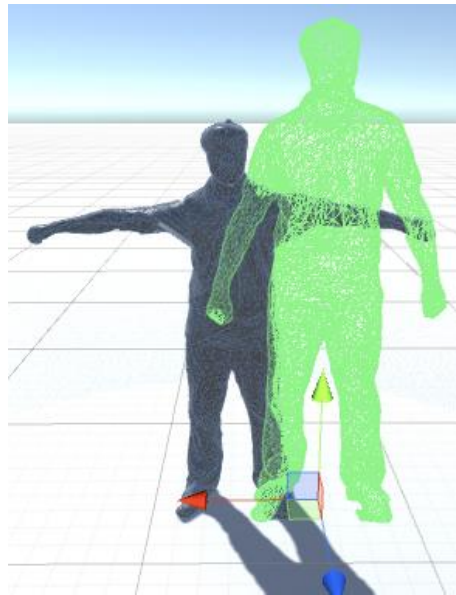


Figure 17 (Rigid Mesh Collider Not Lining Up)

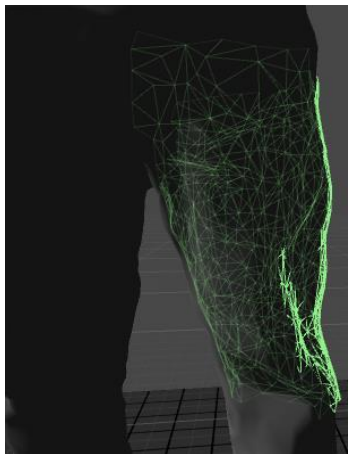


Figure 18 (The Mesh Collider And The Character Mesh)

⁸ This will further be elaborated in the methodology section.

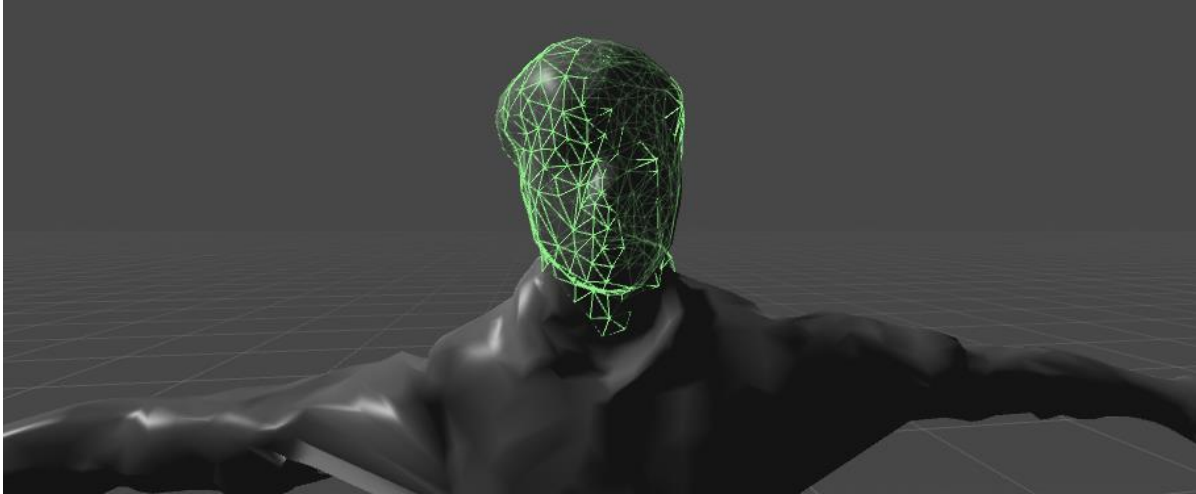


Figure 19 (Mesh Collider As A Separate Component Overlaid On Top Of Avatar's Face)

Lastly, to show the viewer the dangers of resisting progress and change towards a better world I created a video piece that was different than the projected video piece. The video has floating glass triangles, a minimalistic and abstract form of a truss which I developed through my sketches. These triangles made of glass have sharp corners and yet look breakable. This piece symbolizes the lurking threats of a broken house that is fragile yet dangerous. The lighting on purpose is extremely dim as the problems within my family have cause many of my relatives to have depression and anxiety.

After viewing the prints, experiencing the installation piece and interactive piece, the viewer is guided through a path of different feelings that I felt being bound by my family's cultural values. The first two parts, the video and the installation piece, show my past. The interactive piece is understanding a situation once immersed in a different world and helping the viewer relate to my experiences.

Research and Methodology

Kinect Interaction

My initial exploration regarding virtual space and narrative began when I played *Beginners Guide*, a game created by Davey Wreden. It is a game that does not have traditional gameplay mechanics nor any goals and objectives. The game is about going through an experience with the person who the game is about, in a way this makes the user empathize with the protagonist of the game. The spaces designed play an important part in helping the viewer

understand the character's mental state, whether it takes the form of impossible puzzles, or doors that only open from the opposite side which make the player feel trapped.

Ready Player One by Ernest Cline is a book that I read over the winter break and it is about people living their entire lives in a virtual universe called OASIS. If sometime in the near future the virtual lives of people become more appealing than the real one, what role does architecture play then? Will the viewers get nostalgia from virtual spaces like they do in real spaces? Can we feel architecture and spaces in the virtual world like we do in the real world? To experiment with this idea the two major parts of my show are the installation and the interactive pieces.

Since interactivity was important, it was crucial to get the technical part working before delving into visual aesthetics. Researching multiple platforms lead me to conclude that the gaming engine Unity had the most possibilities for developing a better representation of the real vs virtual world. In Unity you cannot create game objects, textures and animations, all of this is completely done in Maya and Photoshop, baked⁹ with the model and then imported. On the other hand, to create a character that mimics the movement of the viewer there is no need to create animations approximating real movement. When you import a 3d scanned model into Unity it uses a skeleton system and automatically configures joint position on a user's body. The model and its skeleton along with the skin weights still have to be created in Maya and imported it into Unity. The program then needs to be told to configure the model as a humanoid. Once the model is set up the next step is to drop the model into the scene and attach a scripting component¹⁰ to it. I learned how to do this by researching how the Unity game engine works through tutorials.

After the character is following the movement of the person standing in front of Kinect 2.0, the next challenge is to create particles that would collide with all the objects within the scene. Unity has its own particle system and functions like rotation and collision can be added from its editor. To create the form of the particles in Unity, a single form of geometry can be added as a mesh to a single particle system. So in order to have a variation in particles multiple particle systems need to be created. A texture map is then attached to the particles. This is

⁹ Bake in Maya terms means merging the textures, animations lights etc onto the model or a single file instead of having a network of different files connecting. This makes the file take up lesser space.

¹⁰ A scripting component in Unity allows you to attach code to your game object.

created this in Photoshop. The overall process makes use of Maya, Unity, its script editor, and Photoshop.

My research regarding Maya included tools like baking textures such as ambient occlusion mask, rendering wireframes, instancing geometry, painting skin weights, and mel scripting within Maya for random scale and rotation of particles.

The sound for the “Emotional Damage”¹¹ was done in Mixpad and Sony Forge. It is made from the sounds of bells, glass colliding and the sound made by running your finger along a partially filled crystal glass. The video is an abstract form of my experiences in my home. The floating triangles are an abstract form of the trusses that are a major symbol for my show.

Installation Piece

After spending weeks of time working towards a design on paper I decided to use pine wood to make my final design. Pine wood is a soft wood that can easily be scratched and is a method of representing the surface level strength of a world -- a fake mask that culture shows the world as its own. I first built the 90 degree trusses using wood glue. They were just L shaped parts. Then I attached them to the vertical pieces using glue and screws for a stronger bind. The base piece was built once all the others were connected. The frame with the canvas was the last part to be built.

Inspirational Artists

One of the inspiration artists for the design of the trusses for the installation is Donald Judd. His work is associated with minimalism. Not only is the form of his work relevant, but he also uses the placement of objects within a space to create meaning specific meanings. (See Figure 20)

Donald Judd was an American artist, whose rejection of both traditional painting and sculpture led him to a conception of art built upon the idea of the object as it exists in the environment.¹²

¹¹ In reference to *The Glass World Animation*

¹² “The art story: Modern art insight, Donald Judd”, accessed May 26th, 2016, <http://www.theartstory.org/artist-judd-donald.htm>

Unlike traditional sculpture, which was placed upon a plinth, thus setting it apart as a work of art, Judd's works stand directly on the floor and as a result, force the viewer to confront them according to their own, material existence.¹³

Architecture and public spaces often seems to be an integral part of art works that use projection mapping. Rafeal Lozanno Hemmer's 'Displaced Emperors' or 'Body Movies' are some of the prime examples that use projection mapping onto building exteriors. His projects use interactive projections to transform public spaces into creative and meaningful representations of body and self.

Architecture is often seen as the art of a thinking mind that arranges, organizes and establishes relationships between the parts and the whole. It is also seen as the art of designing spaces, which we experience through movement and use.¹⁴

The installation work by Annica Cuppetelli is an example of how the real and virtual spaces can be combined together to form spaces (See Figure 21).

Annica Cuppetelli and Cristobal Mendoza's 'Nervous Structure 3' projected sculpture melds the viewer into the art. Enter the room to see a series of parallel lines. Approach the work and the lines react to your presence by vibrating and creating complex moire patterns.¹⁵

The simple elegance of this piece in a way reminded me of the way architects render their drawings. When not interacting with the viewer, this piece is reminiscent of Donald Judd's sculptural pieces.

¹³ "The art story: Modern art insight, Donald Judd", accessed May 26th, 2016, <http://www.theartstory.org/artist-judd-donald.htm>

¹⁴ "Google Books" synopsis of *Architecture and Narrative: The formation of space and cultural meaning* by Sophia Psarra, (New York: Routledge 2009), accessed May 26th, 2016, https://books.google.com/books/about/Architecture_and_Narrative.html?id=U7QWDgmNY5UC

¹⁵ "ComputerWorld", *Art goes interactive*, accessed May 26th, 2016, <http://www.computerworld.com/article/2473016/computer-hardware/90160-tk.html#slide13>

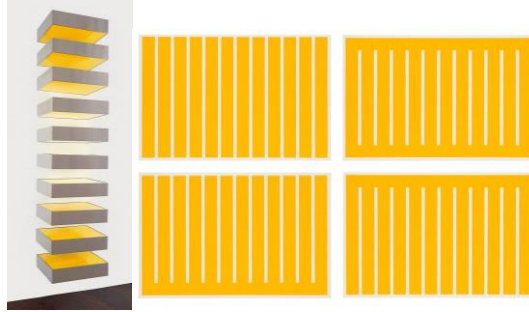


Figure 20 (Left Stack sculpture by Donald Judd Right Untitled 231-234 by Donald Judd)¹⁶



Figure 21 (Nervous Structure [field] by Annica Cuppetelli and Cristobal Mendoza)

¹⁶ Left Image Source: <http://www.mnuchingallery.com/exhibitions/donald-judd>
 Right Image Source: <http://www.ifpda.org/content/node/1175>

Kinect powered Pom-Pom mirror is an iteration of Daniel Rozin's wooden mirror. The pom pom mirror however uses kinect's camera as a method of detecting the viewer instead of a web-camera.¹⁷ (See Figure 22)



Figure 22 (Pom-Pom mirror by Daniel Rozin)

To record the video for the projection, I built another frame the exact size of the one that holds the canvas. The footage was recorded using a DSLR camera in the photo studio in the art building.

Feminist works by performance artists like Martha Rosler's 'Semiotics of the Kitchen', or Yoko Ono's 'Cut Piece', pertaining to the image of women bring forth issues seen within a society. Their work is an inspiration for my performance piece as I am trying to represent social issues within the culture of Pakistan and Muslim households. These issues however may or may not just be targeted towards women -- they affect the entire family system.

¹⁷ Andrew Tarantola, *Motion-sensing 'PomPom Mirror' recreates your likeness in fur*, "Engadget", accessed May 26th, 2016, <http://www.engadget.com/2015/05/26/motion-sensing-pompom-mirror-recreates-your-likeness-in-fur/>

GALLERY DISPLAY

Layout For the Display

How the display was going to be set up was proposed at the start of the academic year (Figure 23). All parts of the thesis show were displayed in the sections as shown from Figure 24 to Figure 29.

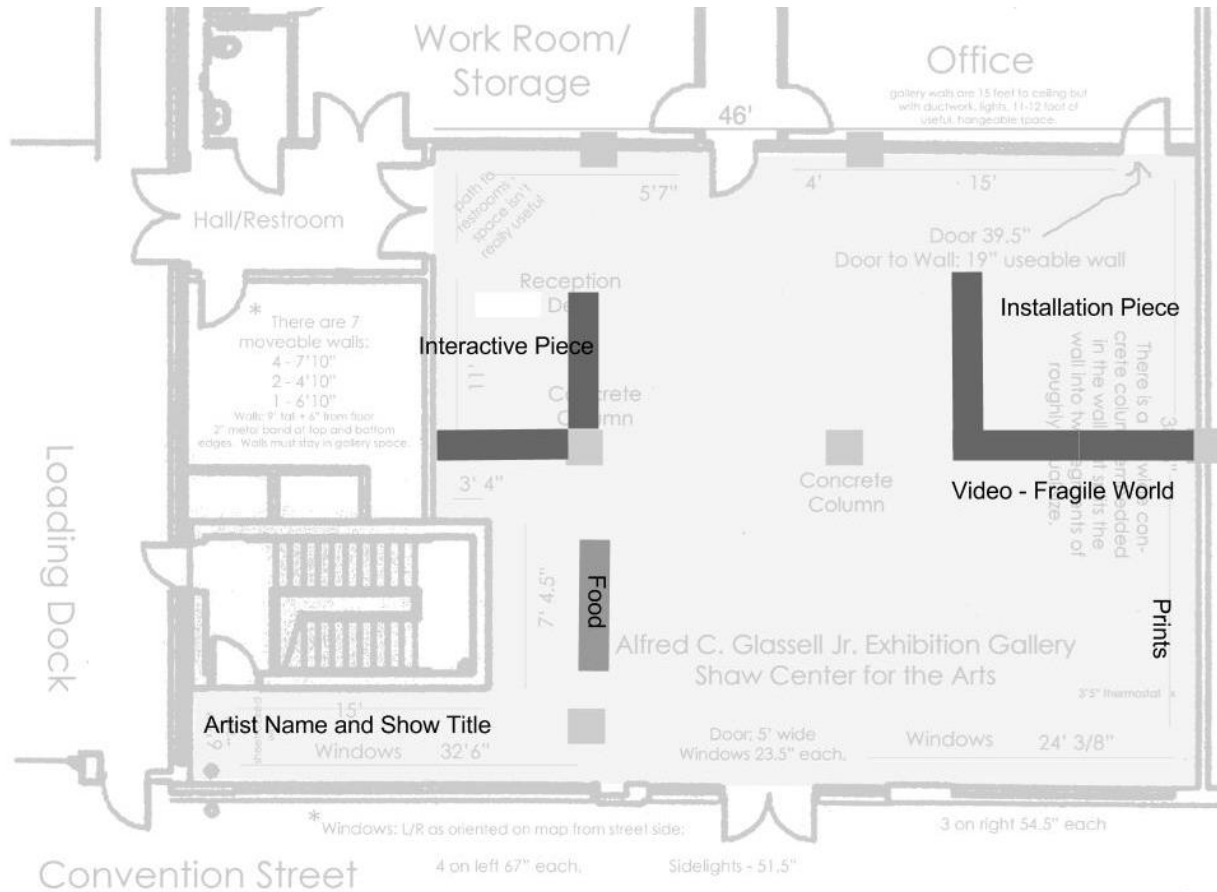


Figure 23 (Plan of the gallery)



Figure 24 (First segment of the show)



Figure 25 (Second segment of the show. The built piece “House Bound”)



Figure 26 (House Bound, with the projected video)



Figure 27 (Third segment of the show)



Figure 28 (The virtual experience: "A Walk In My Shoes")



Figure 29 (The outsider's Perspective of "A Walk In My Shoes")

RESULTS AND CONCLUSIONS

The conceptual development for display has helped me realize that each culture has things that are questionable. For progress one should be willing to change and explore new ideologies. One should have the ability to question social practices that seem to withhold progress and equality. Freedom of speech is the fundamental part of being free. Being able to voice my opinion regarding certain topics has helped me evolve as a person. As freedom of speech is a deprivation in my culture being able to do so has liberated me. Developing this thesis has further solidified this sense of freedom for me. Recognizing your fears and flaws is the first step towards improvement. The development of *Truss Damage* has helped me face mine and move on. It has been a therapeutic experience.

Future Development

The experiences in virtual space may generate a different sense of multisensory experiences and nostalgia. For future development, I want to explore how these experiences vary from the real. I want to further explore and develop spatial features that are reminiscent of the real world within virtual spaces using different types of immersive technologies. Experiment with how these spaces form connections and associations. My aim is to explore the tangible and intangible parts of architecture that help form narratives within spaces in the real world and translate that into virtual experiences.

In the real world buildings can have a strong sense of time through which is reflected by the marks made by the lives that have lived in and around them. I want to develop architecture in the virtual world that may possess such qualities. To be able to see how the lives of those utilizing such spaces may influence its form. These may be greatly different in form than those in the real world but I want to develop methods in which one can see the marks made by experiences of a building. This may or may not have an element of degradation. Besides visual development I want to explore other aspects that are involved in experiencing spaces for example sound and light.

Conceptually I want to incorporate the stories and experiences of different people from the same culture to form the visual narrative. I want to include the positivity negativity and hope into my work as the ending as this is the impact this project had on me.

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VITA

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