CULMINATING EXPERIENCE

Translating Sustainable Values:

An exploration in interdisciplinary immersive art and digital media

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ABSTRACT

The composition of this project can be described as half responsive digital media composition and half social experiment. It is built for the seven-screen display of the Decision Theater and utilizes a combination of digital media and creative software tools along with sensor technology to create a media environment that responds to real time physical feedback from participants. The experience uses different desired interactions or "levels" to examine the tension between Shalom Schwartz' three sets of bipolar cultural values represented in his theory on cultural value orientation. Cultural values are significant drivers of human behavior that change throughout time, however rarely does society name and define these dominant forces outright. This project aims to expose people to consider these forces through interactive discovery and game play. The installation's primary user input is based on movement and physical interaction and includes visual rewards for desired forms of cooperative engagement. Sustainability science and research often cites education and communication initiatives as the next actionable steps towards a sustainable solution. Art and design are two fields that are uniquely suited for completing this next step, because both of them regularly examine, critique, create, and comment as a part of shaping culture and encourage reflexive thinking about our norms and values. The design process included interdisciplinary engagement, which is detailed alongside project outcomes, theoretical ties to sustainability, symbolic representations, and observations of user experiences. It may be considered a pilot test of the potential for creative and interactive digital art platforms to allow for the exploration of cultural values and connections to sustainability. This ability to reflect and consider the assumptions that may be engrained within cultural value orientation is fundamentally important to the wider recognition of the cultural shifts needed to create a sustainable future.

INTRODUCTION

Project Team Members

Dallas Nichols - Herberger Institute for Design and the Arts, Master's student
Minsoo Kang   - Herberger Institute for Design and the Arts, Master's student
Brittany Nixon - School of Sustainability, Master's student

Purpose

The purpose of this project was to engage an interdisciplinary group of students in the development of an experimental media installation that can engage a wider audience in reflexive thinking about sustainability.

Goals

1) Collaborate and communicate effectively within in an inter???
2) Observe for emergence of cooperative behavior and/or change agency.

Foundational Questions of this Exploration

- How do cultures demonstrate or reflect their values visually?
- In what ways can the underlying drivers of sustainability problems be gamified or visualized?

Key Interest for Design

- How can technology be used to drive interpersonal interaction and cooperation?
- How does experimenting with real-time audio/visual manipulation effect user engagement?
- What types of interactions seems to hold user attention most?

BACKGROUND AND CONTEXT

Context

The Decision Theater at ASU is a technology driven space oriented around the idea of streamlining data visualization for complex decision making. The room itself is a perfect circle and its' 7 displays are oriented to encompass half of the room. It is a tool that has been used to test the complex systems and futures thinking skills of city water management teams, to model implications of state budget decisions and is pending application to numerous other scenarios that can be adapted to the complex systems framework it is based on. It is one part of what is known as the Decision Network which per the description on their website, "provides the latest expertise in collaborative, computing and display technologies for data visualization, modeling, and simulation." It has a sister site located in Washington D.C. and demonstrates a clear capacity for specific application in addressing some of the unique challenges of approaching sustainability problem solving by creating opportunity for increased engagement with complex systems thinking through visual representations and gamification. Currently, however the decision theater utilizes very limited engagement interfaces with the user. The system is controlled through the input of one individual and a conventional mouse or keyboard. They are keen on exploring the potential for increased user engagement and unconventional applications of the system.

The project team came together in response to this experimental interest as part of an interdisciplinary workshop course about communicating science through digital media design. The course was tasked with the creation of a creative application using the interface of the theater to communicate about a research topic with very few constraints. The initial project interest formed around creating an immersive and responsive digital media environment to communicate about sustainability and happiness within the theater. This focus serves two primary functions, it expands upon the capacity of the existing system for a significantly broader range of user input by testing the input from a physically responsive interface, and allows an opportunity to explore creative and participative methods for communicating about sustainability. Microsoft Xbox Kinect sensors are the primary hardware element deployed in the creation of this responsive system and data streams from these sensors is processed utilizing creative software and custom programming as needed.

Stakeholders

The Decision Theater
Herberger Institute of Design and the Arts Faculty - Jake Pinholster and Boyd Branch
School of Sustainability Faculty - Scott Cloutier

Support and Institutions

The Aktipis Lab at ASU - Pamela Winfrey and Athena Aktipis

PROJECT APPROACH

During the initiation phase of the project, the IDEO field guide for Human Centered design was used as a map for guiding the design process. The process begins with framing the design challenge as a question and then returning to reframe that question after analyzing the desired outcomes, potential ideas or solutions, existing capacity, and identifiable constraints. The built-in feedback loops of this process were well suited for use in this project because it helped to facilitate the interdisciplinary learning process. It was very important during the initial stages of design and throughout development that the project team members were able to exchange information and expertise in order to build a foundation for collaborative learning. A common language had to be developed so that the project team could establish the appropriate goals and make sure that the elements of design were conceptually in agreement. This is probably the most difficult aspect of working in a group with diverse backgrounds and experience. Each team member has existing ideas of the subject matter and personal development goals which may or may not conflict with the overall project goals. Addressing assumptions, sharing research from a variety of disciplinary backgrounds, and interpersonal conversation were all key actions taken to solidify team cohesion and create a sense of common understanding.

The group decided to focus on a design challenge of engaging users with an installation that encourages reflexive thinking about values and sustainability in a real-time reactive environment after engaging in group and class discussions about art, sustainability, and science communication case studies. In order to address this challenge the team would rely upon creative media software tools that team members Dallas Nichols and Minsoo Kang were familiar with and also explore experimental territory with the use of Microsoft Xbox Kinect sensors. At this point, members of the group proposed potential project concepts which were then followed by group discussion and research if needed. After that, if the idea or concept was still interesting and applicable to the design challenge, prototyping and testing took place where the group sought feedback from mentors and peers before returning to compare the interaction built with the original design challenge. This process was repeated several times throughout the project's development because the design challenge itself turned out to be very difficult to realize. The group was interested in telling a sustainability story without leaning on the typical environmental imagery but visualizing a value or social pressure that drives a behavior is much more difficult than it seems despite the universal recognition of values and value systems. The project team wanted to continue to work at this challenge though because they felt there was a danger in misrepresenting sustainability with a narrow environmentally based scope. Messages of sustainability as an environmentally based science are abundant and tend to lack representation of important social justice and equity issues. This led the team down the path of initially designing for desired forms of user interaction before placing those interactions within an overarching framework. The venue itself was the best place to begin thinking about what types of interactions could be created, for example how the media could prompt conversation, physical movement, physical interaction, etc. The project team had to have a good understanding of the capacity of the space beyond the computer systems including, measurements of the physical space itself, the dimensions of the room, permanence of fixtures, lighting, sound,

shape of the room, and other potential variables or capacity for interaction. During this phase of the design it was also important to understand the available data streams from the Kinect sensors, their reliability, potential limitations, as well as to physically map the tracking range within the theater since the users themselves would be the primary input interface in the installation.

The interactions desired by the project team centered around ideas of cooperation and collaborative discovery. The orientation of the screens facing towards the center of the room encourages the natural orientation of each individual to be outward facing from the center of the room. It became a priority to play with this relationship and consider methods to use the constraints of the display technology and visuals to drive interaction between the people in physical proximity of one another rather than directing their focus solely outwards as individuals and towards the displays. The ultimate goal is to alter the typical relationship between viewer and art form by allowing mediation of the display by the viewers themselves and adding an additional social and cooperative element where the visual reward is greater following a cooperative effort or understanding of the visual challenge presented.

The next step was feasibility tests of the initially proposed designs. The main challenge tackled in this stage was finding the best way to reliably track a participant moving in the space. Two different open source, or free online available programs, were explored in this phase, tsps.org and openPtrack, alongside using the data directly from the Kinect sensor in creative media program Max MSP. The first feasibility test included a basic interaction that tracked users physical position in the room relative to the sensor and responded by changing the color displayed on screen proportionately on the red-green scale. So as a participant moved around the room and changed their distance from the sensor the color displayed on the monitors would adjust in accordance. Auditory cues were also tested in this stage. For the first auditory test, a single tone was used when a user entered the space and an additional displeasing tone when a second user was detected. If the two users came within close proximity of one another the two tones would harmonize. The success of these feasibility tests allowed the group to begin proposing more complex or specific interactions in order to to trigger visual responses. The tracking systems proved to be time consuming to research, install, and test so this was completed alongside additional research for visual representations and unifying theoretical elements. In the future, or for a a system that is going to be handling a high volume of users, openPtrack seems to be the best option because of its' reliability in tracing the position of multiple users in large spaces. Unfortunately, the project team discovered this platform too late to become familiar enough to design the installation using it but it is a potential future area of exploration.

While installing these systems and creating prototypes the project team consulted with School of Sustainability faculty, Scott Cloutier, for his perspective on sustainability and happiness in addition to feedback on initial design decisions and completed additional research for visual representations and unifying theoretical elements. Following the meeting with Professor Cloutier, the project team also sought guidance from the Aktipis Lab at ASU, led by Dr. Athena Aktipis an assistant professor in the psychology department whose research includes theories about cooperation, conflict, and social behavior. Representatives from the lab were also invited to participate in the first user feedback testing sessions. The project team felt that the lab test users might represent a unique "cooperation expert" sample that may help the team refine the experience and assess knowledge or

understanding gaps by providing more valuable feedback than a new user might at this stage in the design process.

After determining functional limitations of the room/system and understanding the available physical user inputs, the project team took time to revisit the search for a theoretical or philosophical narrative to bind the desired interactions together and frame the installation as a whole. It was relatively easy to come up with ways for users to interact with the system as individuals and in cooperative groups but more challenging to find a powerful storyline or narrative to encourage the type of reflexive thinking included in the design challenge. It was most important that the physical movement and responsiveness of the system resonate with a deeper philosophical message rather than act as a simple interactive experience to avoid superficial novelty. At the same time it was equally important to the team to avoid a feeling of didactic instruction. This made it difficult to find a unifying visual concept that included all the complex interactions between the natural and social world for a general audience. After exposure to Shalom Schwartz's cultural value orientation theory the project team conceptualized a visual framework for an exploration of sustainability and values. The emphasis on values was important because of their strong correlation to behavior and emerged later in the design process of this project after beginning with research relating sustainability and happiness.

Zidanšek 2007 work examining sustainable development and happiness recognized the relationship between sustainability, happiness, and expression of values by linking increased alignment with post materialistic values and increased happiness inherently assuming environmental benefits are also included in this shift away from prioritization of materialism (Zidanšek, 2007). Schwartz's 2006 theory recognizes these shared expressions or cultural ideals as representative of a larger shared value within a culture. To unpack that a little bit further, happiness in this scenario is defined as relative life satisfaction, maximization of which is often guided by the dominant societal values of the time. For example, the current dominating values in the United States emphasize consumerism and materialism, which ultimately create a narrow set of pathways for achieving for achieving satisfaction and at present come at high costs to the environment. However, values and value systems are not stagnant. They shift and change throughout time and circumstance. This malleability and sense of general "invisibility" in society makes them an enticing topic to engage a general audience with, especially because a shift in alignment of cultural ideals to focus more on post-materialistic values such as relationships could bring about significant behavioral change and more positive sustainability outcomes.

The experience ultimately layered multiple interactions to create a space where users can freely come and go while interacting and discovering media responses that examine the tension between Schwartz' three sets of bipolar cultural values which will be explained in further detail in the following section (Schwartz, 2006). Challenges encountered throughout the development process were a major factor in the ultimate implementation of the installation, as the project team initially preferred a more progressive "level based" or story-like format because it seemed more conducive to learning outcomes. The biggest challenges encountered included unexpected restrictions with usage of the space. The project team had very limited time to test and develop in the venue and were given limited access to the actual computing power located at the theater. This resulted in the majority of development taking place off-site and lengthy calibration sessions when it came time to test within the venue itself.

It also hindered discovery of additional variables for manipulation and exploration like the pre-existing in-room camera system. The iterative design process allowed these challenges to be adapted to and addressed on the fly and the interactions are modular enough that a story structure can continue to be developed and eventually implemented if desired.

Schwartz' Values and Sustainability

Schwartz cultural value theory includes seven different dimensions: harmony, embeddedness, intellectual autonomy, affective autonomy, hierarchy, mastery, and egalitarianism. He orients these values visually in a circle[1] where adjacent values are compatible and those at a distance are incompatible (Schwartz, 2006). This project aims to offer an opportunity for cooperative engagement and discovery of these cultural values, especially those in opposition of one another. The project team felt comfortable in using this theory as a universal framework because of its' diverse sampling during the collection of data. The survey has had respondents from cultural groups on every inhabited continent, anonymously, in their native language (Schwartz, 2005).

1) Autonomy vs. Embeddedness

The tension between autonomy and embeddedness is layered into the interaction by the implementation of the digital responses in parallel. The center display featured the Master vs. Harmony interaction, which was flanked on either side by the egalitarianism vs. hierarchy interaction. The outer four displays featured a frame-difference effect that was meant to both hint at the responsiveness of the room and funnel the users attention towards the center three displays. This arrangement made participants the controller of multiple aspect of the visualization and auditory feedback without identifying which aspect or what type of movement initiates the response. It also let them progress from interactions with no real control to very specific user control which is representative of bringing knowledge to action. As an autonomous individual, one could discover the controls hidden within the room through their own curiosity or affective pleasure seeking response, but they must eventually embed themselves into some type of social grouping to unlock all of the responses. In terms of sustainability it is intended to represent the tension between autonomy and embeddedness as experienced throughout everyday life. Individuals in society are often conflicted between their own autonomy and embeddedness within a social group or status.

2) Egalitarianism vs. Hierarchy

According to Schwartz theory egalitarianism and hierarchy share the same express purpose to preserve the integrity of social fabric through the promotion of responsible behavior, he claims they differ in whether the motivation for that behavior is directed from within an individual by voluntary choice, or by adherence to ascribed rules in a desire to conform (2006). Hierarchies often establish imbalances of power and uneven distribution of resources. The tension between egalitarianism and hierarchy is especially interesting to understand when

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[1] See appendix: Schwertz 7 Dimensions of Cultural Value Orientation

examining concepts or ideas used to create sustainable behavior change. Behavior change is the holy grail of many sustainability related programs which may be obtained by voluntary choice or the enactment of rule or policy changes, therefore it is important for users in this level to understand how their interactions do or do not support the hierarchies created in the visual environment and how imbalances of power can create imbalances in results/resources. Users can explore this concept in the installation through both audio and visual feedback. Volume of a Robert Kennedy speech[2] about why GDP fails as a measurement, recorded in 1968, is controlled by individual user position in the room, where the volume is increased as users decrease their distance from the sensor and represents the motivation to change behavior through hierarchy. The corresponding visual displayed pixelated footage from this speech composited with Kinect camera data from the room and as distance between two users decreased the pixels grew in size until the image became clear as they stood side by side.

3) Harmony vs. Mastery

The value of harmony is categorized by Schwartz as an expression of lack of desire to control, change, or manipulate the environment and an emphasis on appreciating and establishing a place in the natural processes of the environment as it is. On the other end of the spectrum, mastery is expressed as a desire to control or manipulate the environment to attain a desired goal or outcome. In initial design for this level users were represented as small shapes that reveal an "image beneath the image" in what can be described as a flashlight or spotlight type reveal effect. The effect was functional but when implemented on the seven large format screens of the theater the processing speed was significantly slowed due to the drastic change in resolution between the venue and the monitors that the project was being developed on. Towards the end of development Dallas Nichols, decided to try using a different system to increase processing speed. The resulting interaction became a game where a participants hand position was tracked throughout the room and matched to the position of a colored ball on the screen. There were matching colored rings on the screen that would increase the size of the ball and relocate each time a user passed their ball over it. Once a ball accumulated too much size it would eventually trigger a reset and they all would return to original size. This is symbolic of the inherent drive for competition in mastery based cultures, despite the obvious negative outcome of eventually dominating the field of play so fully that you prevent collaboration all together. The idea of lack of desire to control is explored when users choose to either collaborate with one another to discover what is causing the size change of the ball or to disengage with the game when their piece becomes to large. However, it is also noted later in the findings, there was no user that displayed this type of disengagement behavior. Harmony and mastery are readily linked to sustainability challenges and outcomes related to environmental conservation and resource use because mastery forces like competition typically drive rates of consumption that exceed rates of regeneration of resources and promote individual attainment of wealth.

Sustainability Competencies

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[2] See appendix for full text of speech excerpt

The project team drew inspiration for the interactions and responsiveness of the project design from the four sustainability competencies in the following ways:

Systems thinking and Interconnectedness

The choice to use the room and participants themselves for the input or decision making rather than using an independent interface was important for emphasizing interconnectedness. In this setting, every movement of each individual has an effect on the room and that effect is displayed across all seven monitors. Users can see the immediate effect of their actions on themselves and those around them. This is symbolic of the way we as individuals make decisions every day that create effects both seen and unseen in the environment and those around us. In Frisk and Larson's description of the four sustainability competencies it was noted that, "In order to bring about behavioral change among students and society, people must learn to analyze the consequences of their actions, both intended and unintended, while recognizing the tradeoffs now and into the future (2011)." The installation allows exploration of these ideas by giving participants the opportunity to change position at will to explore and discover the responses to their actions. The display also presents them with both a team and individual score, without context, so users must choose for themselves whether to set individual or cooperative goals.

Futures thinking

Futures thinking can be considered an underlying motive for the project itself, but more importantly, to engage futures thinking, people must first think that a future is possible. In order for sustainable behavior changes to occur, especially in the western world, there needs to be a cultural value paradigm shift to support it. The audio playback engages futures thinking by encouraging users to envision the U.S. with a set of values that includes measurements beyond gross domestic product.

Stakeholder engagement/ Group collaboration

The installation is designed as a cooperative experience but the level of cooperation is dependent upon the user group. During initial test the properties of a level seemed to be discovered and explored by individual participants first before evolving into a group experience as they learn. The motivation to make this installation a cooperative experience was encouraged by a study cited by Frisk & Larson, that was completed by Segalas et al. This particular study found that more community-focused, group-oriented activities resulted in higher cognitive learning and more dynamic interactions than individual approaches. Segalas et al. (2010). This is especially important when it comes to sustainability problem solving as wicked problems often require sophisticated levels of collaboration. Engaging people in a group setting and collaborative decision making by utilizing the room as the interface also has larger potential functional usages in the Decision Theater venue as well. In this project, there were already

stakeholders from psychology, sustainability, and art, but there is also potential to increase the involvement in the design of interactive media about sustainability to other specialty areas too.

<u>Action orientation and change agent skills</u>

From the beginning the team was interested in finding ways to use this technology driven theater to drive interpersonal interactions and group collaboration in the physical space. Action is incorporated in a very literal sense in this piece because users have to move or create the action in order to play or reveal anything about the properties of the installation. There is also opportunity in this installation/experiment for the emergence of a change agent. As participants discover the rules or responses of the room they make seek to create those scenarios or to disrupt them. This is an interesting social behavior to witness and consider its' implications for global sustainability overall as per Frisk and Larson, "Sustainability cannot be achieved by simply relying on state intervention, legislation, or new technologies; it requires that people actively participate in decision making, problem solving, and sustainable change (2011)." The sharing of the responsive space by participants will ideally encourage communicative and/or cooperative behavior.

FINDINGS

There were only four novel users in attendance for the final implementation test but the project group was still able to glean useful feedback from these interactions. Participant attention was immediately drawn to the ball and ring/ mastery vs. harmony game and remained there for the majority of their engaged time because they were able to immediately recognize the responsiveness of the ball to their hand. The most interesting interactions with this portion of the game were when one of the project group members were able to "play along" and act as a guide or curator of the experience, this seemed to enhance the connections made between the subject matter and the installation. This was especially true with the audio and pixelated visual interaction. It was noted in instructor feedback however, that the layered interaction lacked some of the compelling narrative and validation of the initial story based design. Engaging users in an open interaction also allows for them to leave the experience at will without any real data pertaining to the user's learning or progression whereas a level based format may allow for more inference or understanding of learning outcomes. The user sample obtained, although small, represented a diverse age range, which made it promising to see active physical engagement across a wide range of users, but more concrete visual ties to sustainability are needed in order to make the interaction more effective. A short introductory animation was used to prime users for the engagement, but a future adjustment would include extending visual ties to sustainability into the shapes and targets used in the ball and ring game and building a mechanism for transitions in order to use more of a story based format.

User feedback during testing

See table in appendix

**Examples of user interaction**

Pictured above: Users interact with level 1, master vs. harmony prototype. Change in depth of right hand from sensor position rotates shape to reveal hidden shapes masked below image. Up to 5 users in this prototype (testing maximum user capability and shape masking effect)

Pictured below: Example images from open source software tracking platforms. (tsps.cc and openptrack.org) These explorations would not be possible without free access to these platforms. Ultimately, neither were utilized in the final installation but they were invaluable for use during rapid testing and prototyping.
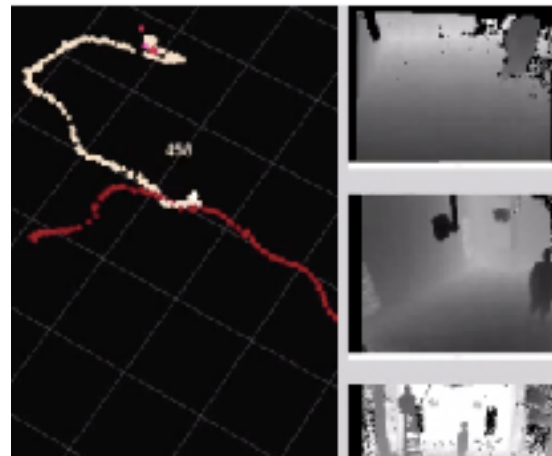
CONCLUSIONS AND FUTURE DIRECTION

The exploration of sustainable solutions requires the unbridled ideation of alternative futures that question the values that have created the current reality. Emphasis on a reflexive understanding both as individuals and societies within our larger global context has become increasingly important. Artists and designers are uniquely capable in helping to bridge this reflexive knowledge gap between sustainability knowledge and behavior through

their ability to provoke or create interactions. One of the most influential passages for supporting this idea is by Hans Dieleman in his article titled ,"Sustainability, Art, and Reflexivity" where he says,

> "We should realize that sustainability is not only about the economic world system, wasteful technologies or unsustainable practices as such. It is at the same time about the symbolic meaning we give to unsustainable systems, technologies, products and practices on the one hand, and possible sustainable alternatives on the other hand."

Artists and designers regularly converse in the language of symbolic meaning or aesthetic reflexivity which per Dieleman is categorized by the use of symbols, signs, and allegories, in place of scientific analysis and theory (2008). However, there is a growing niche somewhere in the middle, deemed art science communication, that explores both spectrums of inquiry using a combination of creative process and scientific process with various levels of data interpretation and/or collection involved throughout the process or within the final outcome. These creative explorations contain the capacity to become a way to engage or create an impact with a wider audience or inspire new threads of scientific inquiry. This type of inquiry is especially important for sustainability because it seeks to illuminate philosophical connections to the representation of science beyond a representation of data.

The challenges of this intersection lie in its' evaluation. Projects in this realm can differ greatly in terms of how much artistic license is granted and the abstract versus actual representation of data makes them difficult to assess by either individual community. Impact can also be equally difficult to quantify with many of these installations. This difficulty to assess by any individual field and variety of potential processes included lends support to the importance of increased interdisciplinary engagement which is also emphasized as a key feature in creating sustainable solutions.
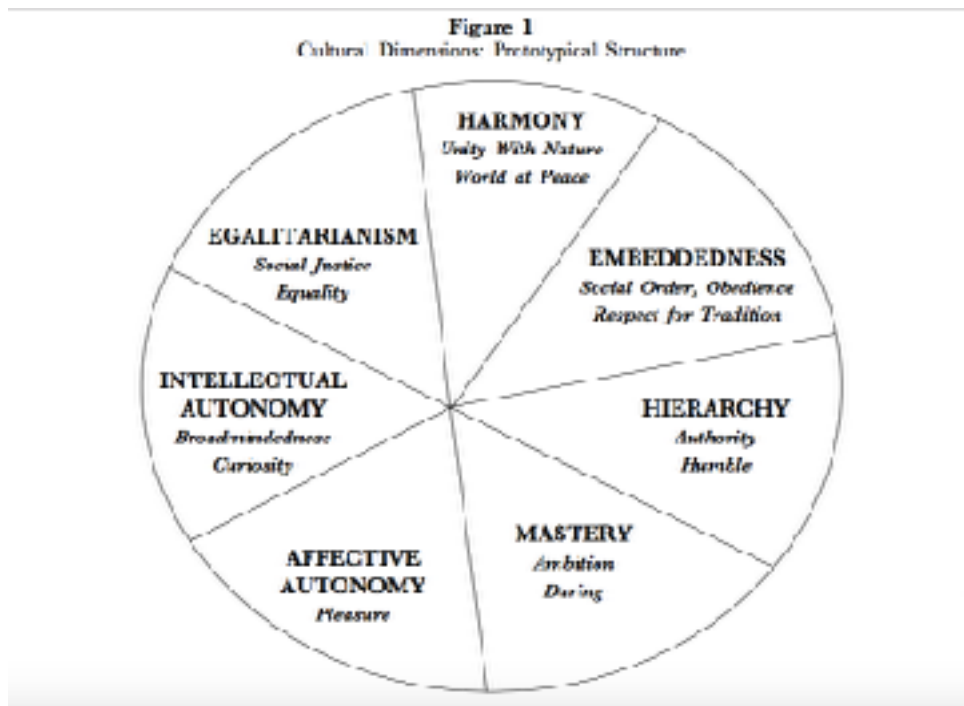
The use of motion tracking for real time engagement with art is still relatively new, with the increased capabilities and affordability of sensor technology, like the Kinect, and the increasing availability of open source tools for the processing of this data, this is just the beginning of potential creative applications for this system or similar configurations. The development approach of this project was timely and effective, although limited by a school semester schedule and lack of budget. A more robust processing system could have been built which would have enabled the usage of more advanced open source tracking systems and the potential for more sophisticated graphics. Usage of these more advanced systems would allow for greater scalability and adaptability of the installation for a wider variety of spaces, hence the categorization of this project as a pilot/prototype deployment.

APPENDIX

Schwartz 7 Dimensions of Cultural Value Orientations

Figure 1
Cultural Dimensions: Pretotypical Structure

HARMONY
Unity With Nature
World at Peace

EGALITARIANISM
Social Justice
Equality

EMBEDDEDNESS
Social Order, Obedience
Respect for Tradition

INTELLECTUAL AUTONOMY
Broadmindedness
Curiosity

HIERARCHY
Authority
Humble

AFFECTIVE AUTONOMY
Pleasure

MASTERY
Ambition
Daring

Notes from Stakeholder Interview

Pamela Winfrey - Aktipis Lab
- From a user's perspective what is encouraging them to cooperate? What is the reward for cooperation?
- Think about using a prompt to initiate the interaction or using prompts to move between scenes (levels)
- Prompts of some type can help create the initiative to make a decision
- Can you access the lighting or sound in the room with the displays as well?
- Think about using other variable as layers within the experience and creating layers of meaning
- What about haptic feedback
- What do you want them to know about themselves or each other when they leave the experience?

User	Feedback	Actions taken	Results/Support
Boyd Branch (m1)	- Interesting choice of interactive variables to manipulate - Are you going to provide instruction? - Check out resource: Theater Games for Non-actors for potential inspiration	- make list of all possible physical gestures/user inputs	- continued research and gathering visual inspiration
Boyd Branch (m2)	- How do you plan on engaging stakeholders for feedback	- contacted Aktipis lab and created list of potential users to recruit for feedback	- the lab hosted a seminar on cooperation and conflict and lead The Human Generosity Project - interview scheduled
Boyd Branch (m3)	- Refine functionality of multi-user play - Think about transitions between levels - When and how are they making connections/ refer to reading from class about group-team flow experiences and cooperative gaming	- limit users to stable maximum (3) - create storyline for level/ experience cohesion	- this also came up in our meeting with Aktipis lab when discussing when/ how to use prompts to encourage the user to choose to do or not to do something
Jake Pinholster (m2)	- Good interactions but missing a through line to tie it all together - find ways to revisit or reinforce the theoretical through the visual	- Continued theory and visual research	- attend workshops and discussions - brainstorm/test various thematic ties
Marcus (level 1)	- audios cues for shape drops - attach shape to a point that is not as easy to rotate - the one tetris piece made you want more tetris shapes or to fit them together	- audio will be added in later versions - test shape attachment to head/COM/other - Hide combined shapes (+ cooperative scoring)	- level 2 supports audio functionality, so it is a feasible variable to test - attempt to build scoring multipliers based on cooperative engagement so the user may independently choose to maximize individual or group score

User	Feedback	Actions taken	Results/Support
Lauren (level 1)	- shapes are always there, pick up and move - 3D shapes - select a difference body part might change the interference	- not a feasible change with current design/ sensors - experiment with shaping and/or drop in or fit in type effect - test shape attachment to head/COM/other	- the shapes appear when they sense a person walk into the space and become actively attached to selected focal point (this functionality would be too time intensive to fit project timeline)
Elora (level 1)	- difficult to tell when the shape is lined up - needs more visual role	- experiment with shaping and and/or drop in or fit type effect	- Unity (software program) should make this possible
Ian (level 1)	- break up the interference issue by assigning spaces to move - wants shapes to be collaborative puzzle - revealing piece by piece of underlying image, reward for collaboration - what are the divergent paths between the individual (mastery) and the group (harmony)	- will need to explore ability to confine to single display space - hide combined shapes (+ cooperative scoring) - experiment with reveal of entire image based on a cooperative format - scoring pathways	- not enough sensor hardware available for this functionality - attempt to build scoring multipliers based on cooperative engagement so the user may independently choose to maximize individual or group score

DALLAS NICHOLS   MINSOO KANG   BRITTANY NIXON

PRESENT AN INTERACTIVE STORY

PIXEL

OPEN FOR INTERACTION
MAY 5 2:30-4:00

THE DECISION THEATER
AT ASU
699 S. MILL AVE

A STORY ABOUT
CONNECTING CULTURAL
VALUES AND
SUSTAINABILITY

Robert F. Kennedy How GDP failed

University of Kansas, March 18, 1968

Even if we act to erase material poverty, there is another
greater task, it is to confront the poverty of satisfaction -
purpose and dignity - that afflicts us all.

Too much and for too long, we seemed to have surrendered
personal excellence and community values in the mere
accumulation of material things. Our Gross National Product,
now, is over $800 billion dollars a year, but that Gross
National Product - if we judge the United States of America by
that - that Gross National Product counts air pollution and
cigarette advertising, and ambulances to clear our highways of
carnage.

It counts special locks for our doors and the jails for the
people who break them. It counts the destruction of the
redwood and the loss of our natural wonder in chaotic sprawl.

It counts napalm and counts nuclear warheads and armored cars
for the police to fight the riots in our cities. It counts
Whitman's rifle and Speck's knife, and the television programs
which glorify violence in order to sell toys to our children.

Yet the gross national product does not allow for the health
of our children, the quality of their education or the joy of
their play. It does not include the beauty of our poetry or
the strength of our marriages, the intelligence of our public
debate or the integrity of our public officials.

It measures neither our wit nor our courage, neither our
wisdom nor our learning, neither our compassion nor our
devotion to our country, it measures everything in short,
except that which makes life worthwhile.

And it can tell us everything about America except why we are
proud that we are Americans.

If this is true here at home, so it is true elsewhere in
world.
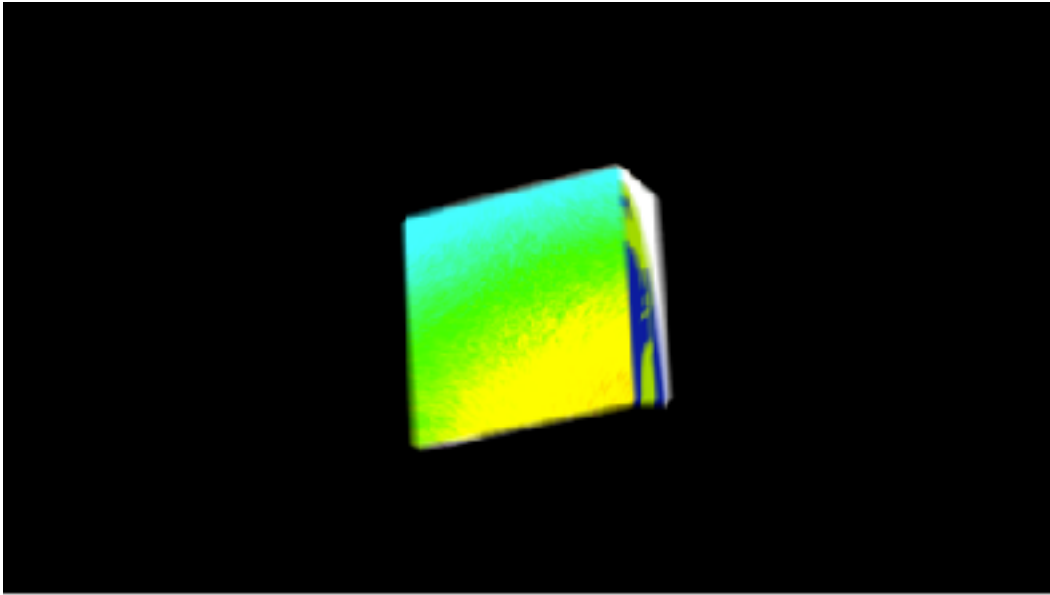
Introductory animation

Sample of installation interaction

ACKNOWLEDGEMENTS

Project team members (Minsoo Kang and Dallas Nichols) - For trusting me and each other to be patient during the process and allowing our concept to freely evolve as we tested numerous ideas and system boundaries.

The Aktipis Lab - For creating space for engaging discussion and asking important questions during our design meeting, in addition to both the willingness to user test and offer critical feedback.

Boyd Branch - For priceless opportunities in creative development and career development as well as critical feedback and project guidance.

Jake Pinholster - For always asking the most excellent questions and intuitive instruction as well as critical feedback and project guidance.

Kijana Gaines - For patience and overall endurance as emotional crutch.

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