

# NIRVANA PLAY

Short-term Play on Academic Campuses

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Master of Design, Interaction Design, 2011

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Advisors



A Thesis submitted to the School of Design, Carnegie Mellon University for the degree of  
*Master of Design in Interaction Design.*

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ABSTRACT

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The undergraduate student experience is a unique phase of life, encompassing independence, social group membership, self-identity formation and changing support systems. In addition to their social evolution, students strive to perform well, driven by self and familial expectations, and peer competition native to collegiate environments.

I explored these experiences at Carnegie Mellon University (CMU), particularly with respect to a student's work-life balance and how non-academic campus spaces play a role in affecting the personal and social emotional environment for students on campus. In my research, I uncovered a persistent state of anxiety resulting from a constant focus on the self, a world-view limited to the CMU work-home bubble and peer-induced stress - all of which contributed to a negatively heightened emotional environment.

Non-academic spaces provided on campus, such as recreational, exercise, eating and green savannah and garden spaces, which aimed to serve as coping mechanisms, were found to be difficult to access on a regular basis for various reasons, such as scheduling issues, membership requirements, inconvenient visibility and further, some facilities were found to be overcrowded or had broken equipment. Hence, they did not successfully allow students daily opportunities to mentally suspend themselves from their anxiety.

My project looks at transitional environments as new sites for short playful interactions. The Nirvana Play pole is a technologically enhanced environment platform that is embedded on existing infrastructure present within the landscape of a campus i.e. street light posts in outdoor pathways.

It has been designed to currently run three applications - the Shadow, the Tower and the Swarm. It aims to provide students with daily opportunities to break away and mentally suspend their anxiety. It strives to contribute to the creation of a preferred emotional environment within the CMU bubble.



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A special thank you to Vanessa Sica, Nick Durrant and Gill Wildman for all your great advice and support, to Alex Fischer and Josh Caputo for letting me borrow your mad skills.

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# INTRODUCTION

## INTRODUCTION

In an article for the New York Times in October 2010, Linda Bips (2010) alarmingly reported on the rising number of students, in the past 10 years, who begin their undergraduate university education already medicated on psychiatric drugs for stress, anxiety and depression. Tamar Lewin (2011) has additionally reported, the emotional health of college freshman in the US has decreased to an all time low in the last 25 years. Indeed, as President of the American College Counseling Association has then stated, “*More students are arriving on campus with problems, needing support...*” (Lewin, 2011).

The above paints a bleak backdrop of the mental state of undergraduate students. The facts above hint at the fractured experience that is now common to undergraduate student life. Through my thesis project then, I was particularly interested in exploring this fractured experience with respect to a students’ work-life balance, how this balance impacts their experience and affects the personal and social emotional environment within a campus, and lastly, how campuses currently utilize space, particularly non-academic spaces<sup>1</sup>, as coping mechanisms for students.

Undergraduate student life encompasses independence, social group membership, self-identity formation and changing support systems. In addition to their social evolution, students strive to perform well, driven by self and familial expectations, and peer competition native to collegiate environments. In my research, conducted with 21 undergraduate students from various disciplines at Carnegie Mellon University (CMU), I uncovered a preponderant state of anxiety resulting from a constant focus on the self, a world-view limited to the CMU work-home bubble and peer-induced stress,

all of which contributed to a negatively heightened emotional environment. Non-academic spaces provided on campus, which aimed to serve as coping mechanisms, were found to be difficult to access on a regular basis for various reasons, such as scheduling issues, membership requirements, inconvenient visibility as they were out of the way for students at times, and further, some facilities were found to be overcrowded or had broken equipment. Hence, they did not successfully allow students daily opportunities to mentally suspend themselves from their anxiety.

As an Interaction Designer, I found this presented an interesting opportunity for my field, towards the design of new, technologically enhanced spaces that could play a role as coping avenues for undergraduate students. I looked to leveraging transitional environments, such as outdoor pathways, as new sites for short playful interactions. Placing a design solution in a transitional environment, I found, would allow for students to be presented with daily opportunities to break away and mentally suspend their anxiety, while overcoming the constraints and problems currently faced with non-academic campus space usage. The Nirvana Play pole, comprised currently of three applications known as the Shadow, the Tower and the Swarm, strives to contribute to the creation of a preferred emotional environment within the CMU bubble.

RESEARCH

I structured my research into three sequential phases, each with differing intentions and goals. The first phase of research - the Exploratory phase, aimed to uncover insights into user needs and reveal an opportunity space for a design intervention. Based on the identified opportunity space, in the following Generative phase, I generated multiple design concepts in order to reach one preferred future design solution. Finally, the Refinement phase involved designing and low-fidelity prototype testing the final concept.

## EXPLORATORY PHASE

I began this phase with the following hunt statement to help guide my research:

*During the exploratory research phase, I will explore how students experience and interact with spaces on campus, specifically non-academic environments...*

The intention of this early phase then, was to understand, through user research, how students currently utilized spaces on campus, specifically non-academic spaces, and their distribution of time, emphasis on, and personal achievement goals associated with school work versus life outside of school work. Ultimately, I sought to understand and empathize with what it felt like to be an undergraduate student at Carnegie Mellon University (CMU).

### RELATED WORK

I looked to architecture and interaction design theory to learn about the distinction between space and place, layers in space and how to design technologically enhanced places; to human computer interaction (HCI) theory, for an understanding of embodied interaction, ubiquitous computing and affective experiences; and finally, to environmental psychology theories to understand how environments affect human behavior. Below, I have segmented related work

into Literature, which reflects on existing theory, and State of the Art, which highlights project examples that were reviewed. Further, Literature has been categorized into various themes that highlight primary learnings. In addition, apart from user research, I also conducted a review of related literature and projects that served as sources of inspiration and deepened my understanding of the space of inquiry my thesis work resided in.

### Literature ●●

#### *From Space to Place*

My beginning thoughts on the notion of space and place were informed by the work of the Chinese geographer Yi-Fu Tuan's writings. In *Space and Place: The Perspective of Experience*, Tuan (1977) writes that space is “much more abstract than place.” Space allows for movement, while place is formed when this movement is paused. It is those pauses in ones’ experience of space that allow for “undifferentiated space” to be transformed into a place, “as we get to know it better and endow it with value” (Tuan, 1977).

Christopher Alexander in *The Timeless Way of Building* (1979) echoes Tuans belief of places containing experiential value, for he views place not as that which is physical or structural, but rather created by the “pattern of events” experienced. Further, Paul Dourish and Steve Harrison (1996), and Bannon and Ciolfi (2005) contribute their understanding of space and place in similar veins. Dourish and Harrison (1996) view space as providing structure, “the three-dimensional environment” or location within which things occur. A place on the other hand, involves the creation of meaning through behavior patterns, particular to cultures, that are repeatedly acted out and appropriated over time. Therefore, “A space is a place invested with social meaning” (Dourish and Harrison, 1996). Further, Dourish and Harrison (1996) believe

that designers cannot design places, but rather only provide people with the tools to create a place. You cannot design it, but you can design for it to arise.

Similar to Dourish and Harrison’s notion of place as that which involves a common understanding of behavior within a space, Bannon and Ciolfi (2005) take a people-centered approach. For them, space is “a container, a physical setting,” that translates into a place because of the “many dimensions of human experience within an environment” such as “sensory perception, memories, feelings, social connections and the presence of others, cultural rules and conventions” (Bannon and Ciolfi, 2005). Thus, for them, places are truly created by people, and the way they utilize a space.

Through these readings then, I found that spaces may be seen as physical structures, within which rich human experiences unfold and continue to form traditions through patterns of human activities, events or experiences. This “accumulation of experience” (McCullough, 2004), stemming from an appropriation of space, allows for social and cultural meaning to arise. Simply put then, a space becomes a place when repeated human experience creates meaning and a common cultural understanding of place.

Designing Technologically Enhanced Spaces

As we begin to move into a world augmented by digital technology, where “computation is embedded into the fabric of the world around us” (Dourish, 2004), McCullough (2004) believes that it is this very technology that needs to be unobtrusively layered in spaces, in order to ubiquitously enhance existing human activity. Dourish (2004) takes this further in his belief that such spaces should also allow for the development and practice of new human activities. He advocates for a “simultaneous layering” of technology into spaces. This layering refers to those layers that make up a space. If we are to adopt a

human-centered approach as we design technologies into our built world, an understanding of these existing layers is crucial in order to make sure we “enrich, rather than further cheapen, our usage and appreciation of the physical world” (McCullough, 2004).

Physical	Digital	Social/Cultural
Structures such as buildings, pathways, nodes, signs etc.	“Needs to be invisible & interwoven into the physical structure”	Meeting together, eating, talking, playing, performing etc.
Affect how we understand, develop & practice human activities within a particular space.	“Should be designed based on a rich understanding of the physical and social layers of a space” (Dave, et.al., 2009)	Involves a common understanding of the human activities and practices that occur with a space, and of life and experiences within a space

Layers in Space

Thus, as McCullough (2004) has articulated, “Architecture (and Interaction Design) has acquired a new, digital layer of expression and design, extending its capabilities to facilitate and organize social interactions.” As we work within or towards an introduction of a digital layer, knowledge and an understanding of the existing layers in space is important.

Designing Affective Experiences

Lastly, I discovered the work of Kristina Höök. In Höök’s research, I discovered the notion of ‘Affective Loop Experiences.’ Affective loop experiences present a somewhat circular and reactive process where, a user interacts with an object or an artifact through “some physical interaction involving their body... gestures or manipulations (Höök, 2008).” This leads the artifact to a response which is affective - using for instance “colors, animations and haptics (Höök, 2008).” Then, this successively leads the user to respond to the artifact. Thus, this process proposes a more engaged view of the way users may interact with artifacts or objects, one which is more “emotional, physical and interactional... (Höök, 2008).”

Further, Höök has also talked about emotions or emotional responses as part of a users’ interaction with an object or artifact. Höök speculates that emotions are not just merely about states, but rather processes. “They are constructed, actively, interactively, together with others, in a dialogue with our bodies, our minds and our social context (Höök, 2008).” Her emphasis on the social context influencing the interaction and emotion is important to note.

Environmental Perception Affects Behavior Patterns

Lastly, I looked to environmental psychology in order to understand whether individuals are influenced by their environments. In reviewing the work of John Holland, Henry Murray and Rudolf Moos, I found that an individual’s needs are either satisfied or frustrated by ‘environmental press.’ Further, the way individuals perceive their surroundings impacts their behavior in those surroundings. As Insel and Moos (1974), have stated, “the ‘climate’ of environments in which people function relates to their satisfaction, mood and self-esteem and to their personal growth. Environments shape adaptive potentials as well as facilitate or inhibit initiatives and coping behavior.”

State of the Art ●●

I reviewed the following themes emanating from sample projects that served as visual and conceptual inspirations through out this project:

Playscapes

Set within large, typically outdoor, spaces, Playscapes tend to include props or toys at massive scale. The *SwingScape* (InteractiveSpaces, 2010) project for instance below is an interactive playscape that comes to life with light when a user interacts with the swings.



SwingScape (2010) by Interactive Spaces

Unconventional surfaces

The use of new surfaces that break away from conventional desktop and mobile screen-based experiences pushes the kinds of interactive experiences one can design, enabling conventionally physical objects and surfaces to acquire a digital layer of expression. For instance, *Railings* (GreyWorld, 1996)



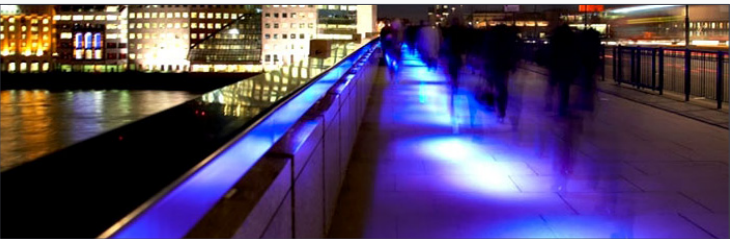
below plays the song *The Girl from Ipanema* when you run a stick along it.



*Railings (1996) by Greyworld*

*Reactive to movement*

Projects like Chris O’Shea’s *Hand From Above* (2009) and Jason Bruges’ *North-South over East-West* (2008) create interactive experiences within the existing built world that react to the presence or movement of people. The shift towards incorporating experiences into our existing physical environments, and how users can trigger these is particularly interesting.



*North-South over East-West (2008) by Jason Bruges*

*Lights*

Creative ways of using LED lights to create unique informative or playful experiences is evident in *Zygote* by Tangible Interaction and *Air Quality Baloons*. *Zygote* has been used at large public events, where audiences play with them by pushing them around, as they react and change color with every touch. Additionally, they can control and manipulate music too. *Air Quality Baloons* changes colors based on the quality of air being measured.



*Zygote by Tangible Interaction*

\*(See Appendix for more State of the Art examples)

USER RESEARCH

**Methods** ●●

Every research session involving participants began with a survey, which collected demographic data such as sex, age, year of study, expected major, housing situation (on-campus/ off-campus), type of cellphone and car if in possession, and relationship status. Such demographic data was useful when organizing findings and synthesizing research data.

*Contextual Observations*

I spent several days over a couple of weeks observing non-academic spaces within the CMU campus. Contextual observations (CO’s) is a method I had commonly practiced in several Interaction Design classes during my graduate school experience. Over time, I have found that it is a really useful and unobtrusive way to quickly gain a sense of the lived experience of a space, in terms of the activities and behaviors that unfold. Although designers may gain similar information in speaking with users, I’ve found CO’s to be particularly practical in obtaining a slightly more objective, distant and broader understanding of the context of use. CO’s allow a designer to understand how the state of a context changes over time. Such lucidity in information may not necessarily be gained from users.

Observations required physically being present for extended periods of time (30 minutes to 1 hour) at various points in time during a day (early morning, afternoon and late evening). Data was recorded using written notes and photographs. The goal was to gain a sense of the activities being conducted within the space (for example, eating, talking with friends, working etc.) and whether these changed or were dependent upon the time of day. Also, observations sought to understand whether these non-academic environments were being

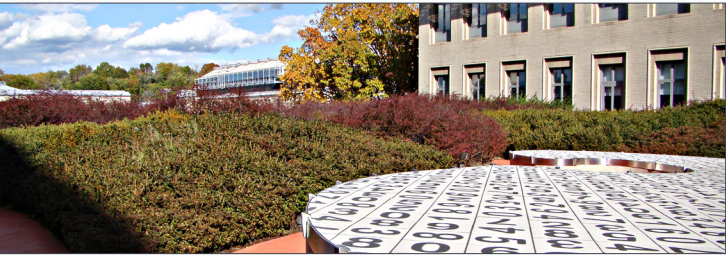
used for their intended usage, or if the intended usage had been altered by users. Paying close attention to conversations between students within these spaces was also helpful in gaining a sense of how students emotionally connected with a space.



*Scotland Yard Gaming Room, University Center, CMU*



*Merson Courtyard, CMU*



*Number Garden, a green space on the CMU campus*



### Interviews, Directed Storytelling and Reflection Exercises

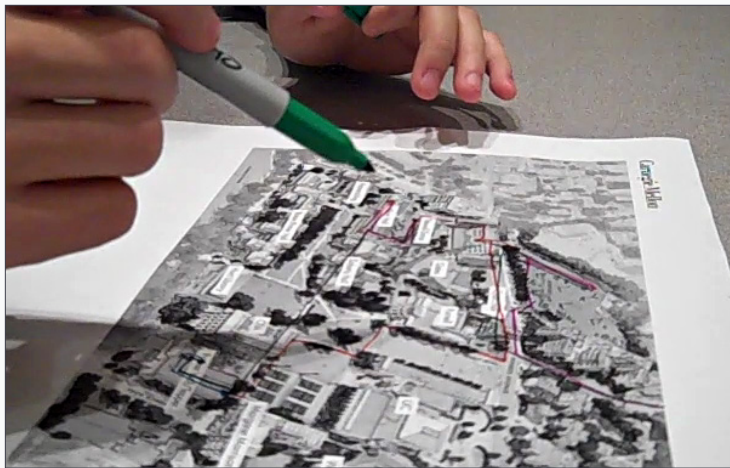
I interviewed 11 undergraduate students from various disciplines at CMU to unveil insights in to student life. Interviews are my go-to method in conducting any user research. Apart from the logistical ease of conducting them, in my experience, I've found them to be the best way to truly empathize with ones' target audience and reveal implicit user needs. As part of these interviews, I also structured in reflection exercises. Reflection exercises were activities that I constructed in order to gain really specific information I was looking for from each user I spoke with.

Interviews began with probing participants with questions regarding motivations for choosing CMU, number of courses currently enrolled in and extra-curricular activity duties. Then, following methods such as the 5 Why's (which involves successively asking the question 'Why' five times to any response from a user), and directed storytelling (an interview technique where the interviewer begins questions with phrases such as *Tell me a story about the last time you...*). Questions centered around understanding division of time with respect to work and fun, stress and anxiety triggers and the related coping methods used for managing such pressure. Questions also focused on learning where students spent time on campus, why, with whom, and the activities conducted in those spaces.

For the Reflection exercises, participants were asked to write down on a post-it note, the first place, space, environment or object on campus that came to their minds when they heard the sentence: *I go there to have fun or to just take a break*. This allowed me to see which non-academic campus spaces, if any, were genuinely associated as coping spaces or safe havens for students.

Then, participants were provided with a 11"x17" map of the CMU campus.

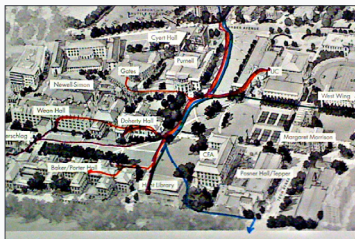
Using colored markers, they were asked to draw their daily routes and routines during a Monday to Friday school week. This allowed me to gather rich data related to those pathways and spaces on campus that were most frequented and had the highest traffic over an average school week.



Reflective Behavioral Mapping



Interview room set-up

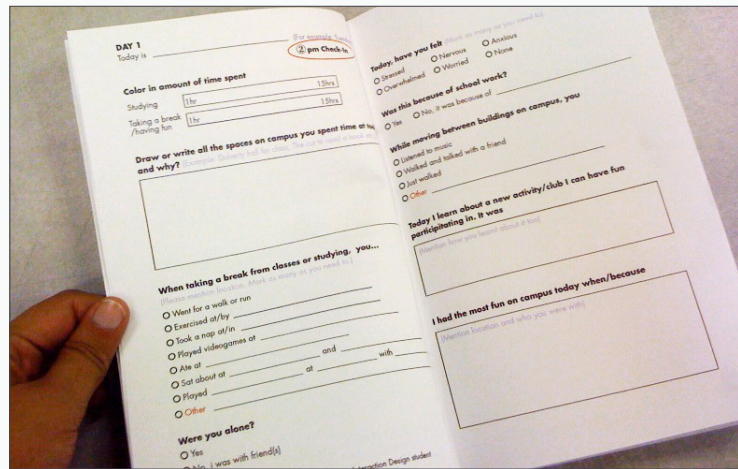


Participants' weekly routine through campus

### Journals

I recruited 4 participants from varied undergraduate programs at CMU to maintain a journal for a week. Each journal contained the same set of predefined question prompts. As an Interaction Designer, I was curious about the quality and usefulness of data generated from journals, having had no prior experience with using them. Hence, I decided to explore journaling as a method during this first phase of user research.

Participants were asked to check-in to their journal booklets twice a day at 2pm (in the middle of a school day) and 10pm (at the end of a school day). Questions remained consistent through the week and attempted to gather information regarding time spent on school work versus non-work activities, time spent at spaces and places on or off campus, activities engaged in if and when on a break, negative emotional states felt over the course of the day and reasons motivating such feelings, amount of time spent with friends or alone and distractions or out of routine occurrences during the week.



Journal booklet

Today is Monday 2/11 (For example, Tuesday)

**10 pm Check-in**

**I've spent**

On Campus 1hr 1.5hrs

At home/dorm room 1hr 1.5hrs

**Also I spent**

Studying 1hr 1.5hrs

Taking a break/having fun 1hr 1.5hrs

**So far, I've spent time at...with...we talked about...**

In addition to the morning in which I had written this early in the morning, I talked about programming being tough and mathematical biology. Then at the library to work with a friend. After we talked about the idiosyncrasies of people, then at the library to study and talk about my day with a friend.

**To take a break from school work, I...**

(Please mention location. Mark as many as you need to.)

☐ Went for a walk or run

☐ Exercised at/by

☐ Took a nap at/in

☐ Blended into the environment

**With friends**

**Today, I've been a little** (Mark as many as you need to)

☒ Stressed ☐ Nervous ☐ Anxious

☒ Overwhelmed ☐ Worried ☐ None

**This was because of**

☒ School work ☐ Because of

**While moving between buildings on campus, I tend to...**

☐ Listen to music

☐ Walk and talk with a friend

☒ Just walk

☐ Other

**Today I learnt about a new activity/club I can have fun participating in. It was...and I liked it because...**

(Mention how you learnt about it too)

N/A

**I had the most fun on campus today when/because**

I found out that I was actually pretty well prepared for my week class. I was really excited and stayed in until I bought

Completed participant journal booklet

### Collaging

The last method I utilized during my exploratory research phase was collage activity sessions conducted with 6 participants. Similar to journals, my motivations for choosing to conduct collaging research sessions stemmed from a desire to gain experience in this extremely qualitative method of research and learn how it could be useful.

Each participant was given an identical tool kit, which included a large sheet of chart paper with a bulls-eye target that served as a canvas, a packet filled with images representative of student life and focusing on four themes: identity, social groups, places and activities; 80 words that ranged from positive and negative emotions to activity verbs, nouns and adjectives, stick figures, a change button, a wish button, smiley face and star shaped stickers, assorted shapes such as squares, circles, rectangles etc, colored markers and glue sticks. The contents of the tool kit were intended to provide participants with a range



of materials that would help them to communicate their experiences most efficiently. Participants were given 25 minutes to make a collage in response to the following prompt:

Use the materials provided to express your life and experiences at CMU on the bullseye, from what is most important to you/what you love the most in the inner most circle, radiating outwards to what is of least importance to you.

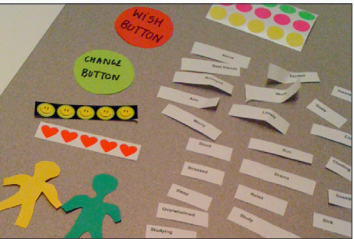


Collage kit

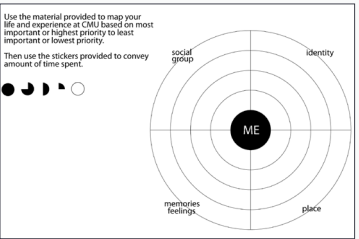
Once participants had completed their collages, they were asked to use time stickers provided to convey amount of time spent on things represented. This helped reveal a contrast between what students most valued amongst their experiences at college and the actual amount of time devoted to these experiences. At the completion of a collage, each participant was asked to spend 5 to 10 minutes talking about what they had made and explaining what it reflected. These explanations were video recorded for later review.



Participant making a collage



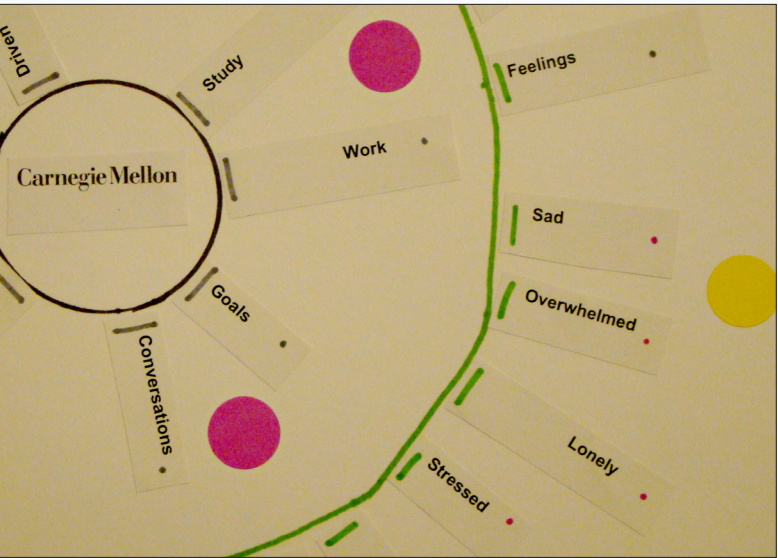
Collage kit items



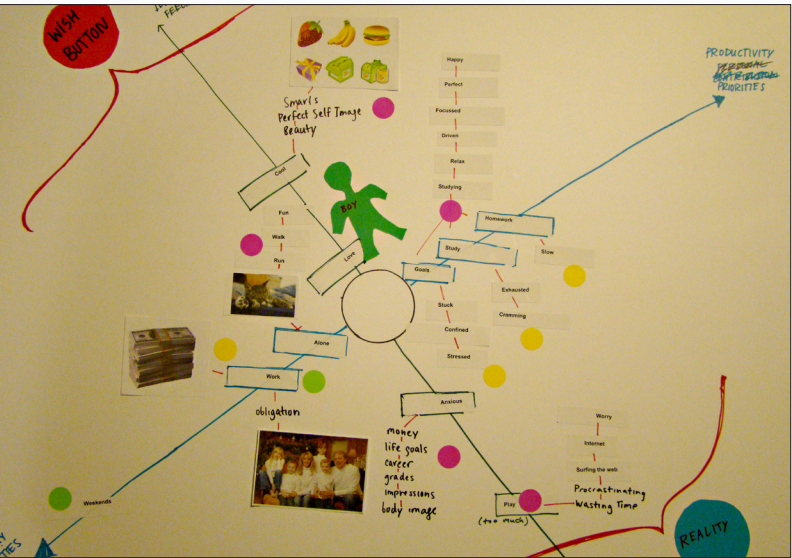
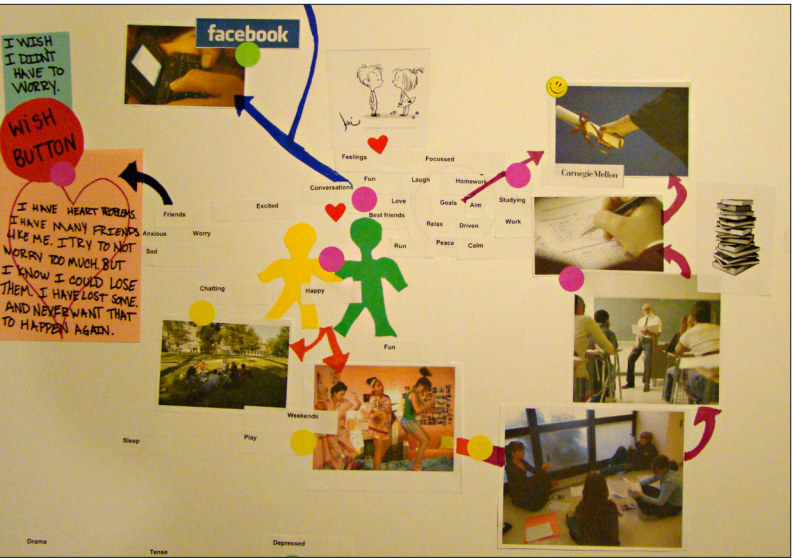
Activity prompt

Expert Interviews

Since the context of enquiry for my thesis was the CMU campus, I also engaged with relevant staff and faculty at CMU to understand how decisions about spaces and activities at CMU were made. I interviewed the Associate Vice President - Campus Design and Facility Development, the Director of Housing and Dining Services and also spoke with faculty members from the Civil and Environmental Engineering and Architecture departments.



Participant Collages





FINDINGS

- From the journals, I found that a school week involves certain period of stress related to deadlines that fall on certain common days of the week. Sunday through Thursday was found to be the highest stress period involving work overload and lack of sleep due to homework deadlines, studying for tests or prepping in advance for the onslaught of the coming week. Saturdays were consistently found to be a day of rest for students across academic years and disciplines.
- The Reflection activity revealed the walking pathway between the cut and the mall (large open savannah spaces on campus) and the outdoor walking pathway between the University Center (UC) and Margaret Morrison street (where open food trucks are parked) to be the most popular and commonly utilized transitional corridors. In addition, the Cut was also found to be a common space where students enjoyed themselves if the weather was pleasant.
- During interviews, students revealed that during their Freshman year, they overestimated the amount of work they could take on. This lead to excess extra-curricular activity membership, with many students committing to activities only because their friends were interested in them. However, students conveyed that with time, by their Sophomore and Junior years, they achieved a better balance and would engage only in activities that truly interested them.
- While conducting user interviews and from contextual observations, I found that some non-academic spaces served dual purposes of food and work (for example: the University Center *Black Chairs* lounge area and coffee shops like Tazza D'Oro cafe). Others - the recreational spaces (for example: the UC Scott difficult to accesy, were perceived to have inconvenient visibility as they were “out of the way,” overcrowded, or had broken facilities. Still further, others

required scheduling or membership (for example: the swimming pool, tennis courts etc.) Academic environments on the other hand were utilized only when they allowed for privacy and quiet, and were avoided when there was a likelihood of being disturbed by friends passing by.



Sorting research findings

- All research activities conducted during this phase revealed students who were athletes or incorporated personal daily physical exercise into their routines were better time-managers with respect to their workload, as opposed to students who didn't exercise regularly. Further, students who tended to procrastinate were also found to be bad time-managers with their workload, which often led to a complete lack of sleep for more than half the school week. Overall, students differed in their behavioral personas and hence could be classified into various archetypes which will be expanded upon in the synthesis section.

- Feelings of being trapped within the “CMU Bubble” were consistent amongst participants who participated in the collage sessions and interviews. The need to find ways to break out of the bubble, but not having the ability to do so due to time or lack of easy avenues, also surfaced several times as students explained their collages.
- During user interviews, many participants reported a lack of time to actively seek out “cool things on campus.” Also, weekend activities involved one of the following - a house party, dinner with friends, a movie night or exercise of some kind.
- While conducting interviews and the collaging sessions, I also found that students tended to feel intensely guilty if they didn't experience a sense of anxiety or stress constantly. Participants also further revealed that when stressed or anxious, it was often peers who generated such feelings.

SYNTHESIS

In order to synthesize findings from my research, I read several research tool kit manuals published by IDEO and the Stanford Design School to find interesting and appropriate methods. I was looking for methods that would provide me with different frameworks to place my research findings within, thereby allowing me to look at the data from multiple perspectives. I hoped this would help reveal truer insights.

Empathy Maps, which use a Say-Do-Think-Feel division, particularly useful in organizing findings generated from interviews, were used. Cultural Models was a method I was curious about exploring in terms of how they are used and the kinds of insights one can derive from them. I also made affinity maps - a method of synthesis I had most commonly practiced. Finally, I created an Environment-Activity-Objects-Interaction map in order to view the research findings more holistically, almost as an attempt to understand the student-campus ecology. Using these methods of synthesis I abducted key insights, which will be expanded upon further:

- Non-Academic campus spaces were inadequate and hence weren't frequently utilized.*
- The Bubble Effect was a common felt experience amongst undergraduate students.*
- Students tended to feed off of each other's stress.*
- Distinct student archetypes existed, as no two students were the same.*
- Breaks weren't commonly practiced.*
- Transitional states differ.*



Synthesizing data using Empathy maps

**Non-Academic campus spaces were inadequate, weren't frequently utilized**  
Findings from interviews and contextual observations revealed that non-academic spaces were not being utilized due to lack of time, awareness, resources being over-utilized, broken facilities and weather changes. This led students to rarely, if at all, utilize these spaces. The non-academic spaces then did not act as anxiety diversion aids.

**The Bubble Effect**

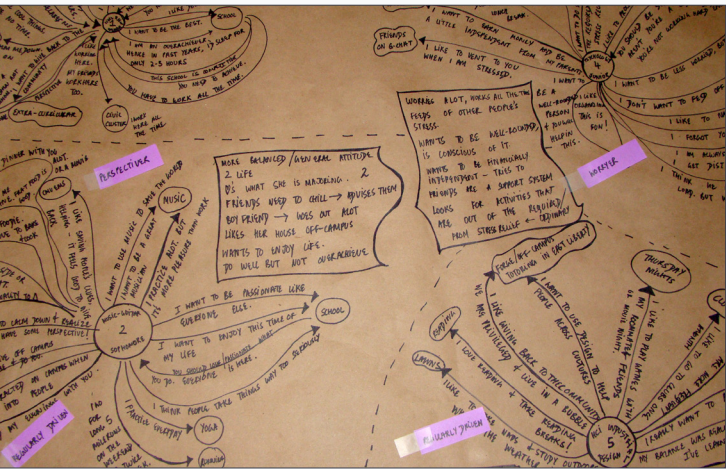
Work and home life for students are contained within an academic bubble. Additionally, students haven't had previous exposure to "the real world." They aren't equipped to put their pursuits in perspective, which leads to an unhealthy imbalance between work and life, a skewed world view and high levels of anxiety.

*"I need at least 7hrs - 8 hrs of sleep a day. That's 3 - 4 hours above the CMU median. I really need to go see a doctor about it, it's a serious problem."*  
- Sophomore, Chemical Engineering major, CMU

**They stress, I stress**

Students co-create a peer-induced stressful environment resulting in a common and constant state of anxiety.

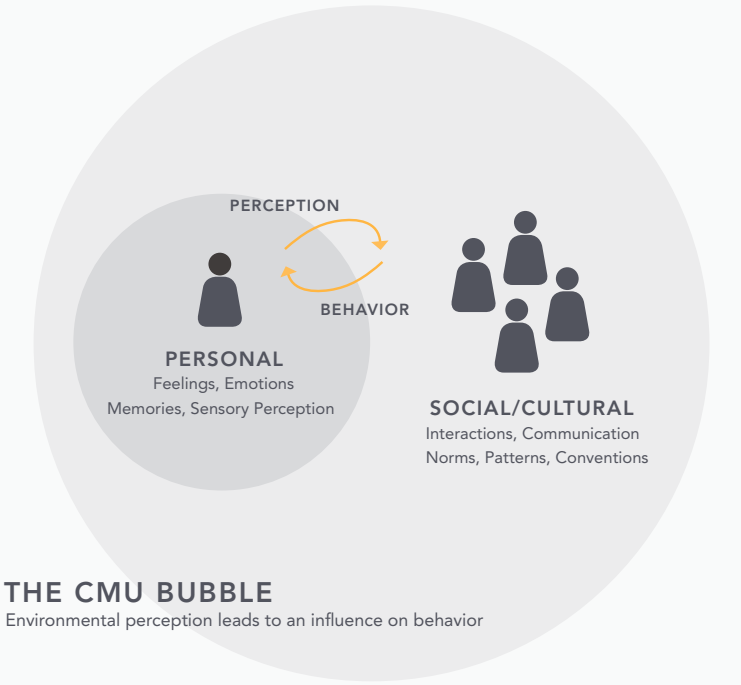
*"My last free evening? I spent it worrying about why I was free. You feel guilty here, everyone feeds off each other. You see people stressed and you need to be too, else you're not working hard enough."*  
- Junior, Psychology major, CMU



Synthesizing data, Cultural models

Learnings from my review of literature, spoken of earlier, regarding environmental perception affecting behavior, I realized were on display here. Hence, I created the following model to illustrate how students reside between two

layers in a university campus space i.e. the Personal and the Social or Cultural layers. It is between these two layers and the manner in which students perceive them that behavior is impacted, leading to the creation of a heightened emotional environment within the bubble.



**THE CMU BUBBLE**  
Environmental perception leads to an influence on behavior

**Student Archetypes**

Student personas couldn't be generalized as many differing types were revealed in my research findings. Thus, I developed 5 student archetypes which helped me understand how students differ in their needs, and which types are in most need of a design intervention.

- Overachievers**  
Athletics, school work and multiple extra-curricular activities are life. Nothing else.
- Driven**  
Regular exercise, school work, extra-curricular activities are important. But has a social life.
- Perspective Holders**  
College is a time to work hard, but have fun and party too!
- Procrastinators**  
Anxiety translates into wasting time online etc. Bad time-manager but makes up by not sleeping.
- Worryalots**  
Constantly anxious and stressed about school work. Not an efficient worker.

**A break? What's that?**  
The non-academic spaces on campus don't help students to mentally disconnect from their context and often function more as reminders of their anxiety. As options for taking regular breaks aren't adequate, students give this lower priority.  
*"I was working all the time, sleeping for 2- 3 hours a day and my appetite just faded away. Because of my anxiety, my body just shut down. I was really sick all the time and eventually had to take a year off from school."*  
- Senior, Civil and Environmental Engineering major, CMU



At the end of this phase of research, I concluded that student life is indeed contained within the CMU bubble, as work and home are contained within the same space. However, if current non-academic spaces weren't helping students mentally break out of this bubble, not allowing for an occasional suspension of their self-absorbed perspectives of life, this demonstrated a negative effect on the emotional climate within the bubble. What students really needed then were daily opportunities to mentally suspend themselves from their physical context. Hence, I concluded that transitional environments such as outdoor pathways or indoor corridors could be leveraged as new sites for playful diversions, in order to provide students with daily opportunities to break away and mentally suspend their anxiety, contributing to a preferred emotional environment within the CMU bubble.

With this conclusion however, I questioned how a design solution in a transitional environment would manage to engage users to interact in a state of transition. Hence, I categorized 3 types of transitional states in order to address this.

Types of Transitional States

- ⚡ Purposeful with lack of time: For instance, moving through campus to get to another class on time. Chances of engagement here would be highly unlikely.
- ⚡ Purposeful with flexible time: This could include having a class you need to attend, but having sufficient time to get to it, such as 30 mins. The chances of engagement when in this type of transitional state would be more likely.
- ⚡ No purpose with flexible time: An example of this type of transition could be just casually walking through campus or going to get a snack, after class hours etc. The likelihood of engagement would be highest in this instance.

GENERATIVE PHASE

As I moved from my exploratory research phase into a state of idea generation, it was clear that my design solution would reside in an outdoor transitional environment at CMU. An outdoor environment was chosen over an indoor, because of greater student reach. Prior to actually commencing ideation, I developed a set of design guidelines, similar in intention to the hunt state-ment in the exploratory research phase, to help guide my process. Following this, several methods were employed in order to brainstorm ideas, including Bodystorming, Affinity Maps and Speed-dating storyboards discussed later.

The true aim of this phase was to generate as many ideas as I could in order to ensure a robust exploration of what the solution space could look like.

DESIGN GUIDELINES

A transitional environmental solution meant the interaction needed to be brief, not requiring students to devote excessive periods of time to engage and be positively affected. To help guide my ideation process, I developed a set of guidelines which were used initially to constrain design solutions. The design guidelines were divided into characteristics the design concept should necessarily have (most if not all) and the resulting outcome or effect upon use.

Characteristics ●●

Attract from afar

As the solution would reside outdoors, in a public space, it would have to compete with various stimuli for attention.. Hence, its form would have to gain a users' attention from a distance to motivate curiosity, interest and interaction.

Transitory or Migratory

Since users would be in a state of transition, I believed a design solution that could move along with users and allow for interaction would be interesting.

Form can be manipulated

To successfully help students mentally suspend themselves from their context, providing a solution that they could shift their mental focus to something other than themselves, something that they could manipulate, I thought would be interesting.

Allow for Social Interaction

Playing in isolation wouldn't be too attractive, hence the system would have to be capable of multi-user scenarios.

Short-term Interaction Duration

This was dictated by the site of the solution, that is, an outdoor transitional environment.

Entry and exit points controlled by users, and not faulted for

I wanted engagement to be dictated by users in terms of when they would enter or exit a game. Also, users wouldn't be negatively affected if they left an interaction early (for example: no loss of points).

Situated in a physical context, but mentally immersive and transcendent

The experience would reside between interacting physically with the design solution and the affect it had mentally on a user in its ability to distract a user from his/her previous mental state of mind.

Outcomes ●●

I divided outcomes into short-term outcomes, which were more immediate outcomes during and just after interacting with the solution, and long-term outcomes, which were created over-time through multiple engagements:

Short-term/Immediate

Mentally suspend or dettach from existing mental frame and reattach with immersive interaction in order to create a new mental frame. It should also allow for reflection and the ability to view dual perspective, prior and renewed.

Long-term

It should result in a sense of student ownership, create repeated usage, and users must begin to value short-term play encounters.

METHODS

Body storming

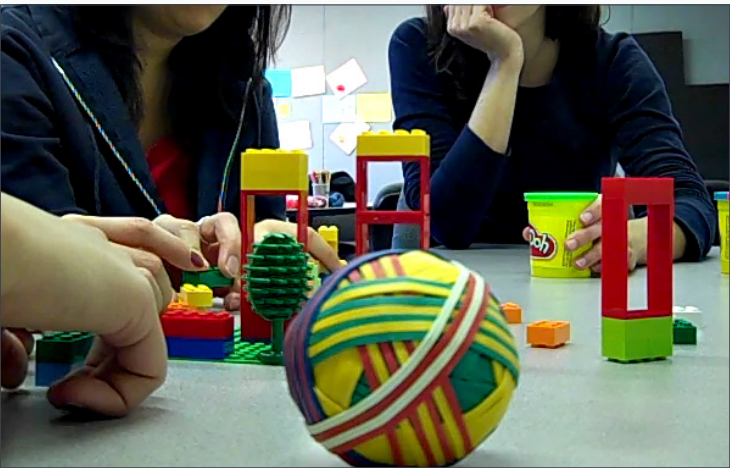
I first began by brainstorming ideas for a final solution based on the guidelines previously mentioned. However, I found brainstorming in isolation to not be the most effective manner of ideating. Hence, I employed body storming as a method to help me generate greater and better ideas.

Using 2 to 4 person groups, I conducted 4 body storming sessions with fellow design classmates to help generate ideas and/or inspiration. Every session began with each participant being given a particular persona to embody, for example: You're Stella, a Sophomore and a Psychology major. As a warm-up exercise, participants were asked to generate a backstory for their character.

Each group was given four scenarios to enact, which placed them in various

different transitional environments on campus such as *Walking between the UC and the food trucks*, *Walking between Baker hall and the UC*, *You're walking on the cut* etc. Additionally, scenarios revolved around experiences typical to student life, for example:

*One of you didn't make the major you were hoping for, and you're upset. As a group, y'all are discussing the situation. As you walk, you notice something in the grass.*



Generating ideas, Bodystorming session with fellow designers

Participants were also provided with several props, ranging from objects to help embody their characters such as backpacks, baseball caps, t.shirts etc. to props that would assist idea generation such as lego, playdoh, colorful sheets of paper, toys etc. I found it useful to provide a mix of obvious and ambiguous props in order to allow for participants to impose meaning on certain props if they wished to do so.

Participants were then briefed using the following instructions:

- 1 Remember, you are imagining the future.
- 2 Props placed in the environment maybe used to assist you in imagining the future. Use as many or as few props as you need to to construct the narrative.
- 3 Everything that you imagine should allow you to temporarily suspend your context, be a positive playful experience and involve social interaction.
- 4 You are never wrong.
- 5 You will be filmed.
- 6 Please carry your cellphones.



Props being used during session

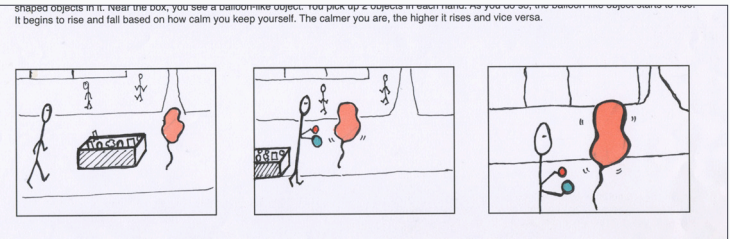
### Affinity Maps

I reviewed video recordings of the body storming sessions conducted and generated over 50 ideas on post-it notes. These were clustered using an affinity map into various categories such as competitive gaming, aggression release, manipulable reactions, building or creation abilities, migratory, discovery over time and place, future views and reactive to your body. These spanned multiple platforms and forms such as physical, digital, virtual, mobile, web, ubiquitous, building facades, new objects etc.

### Speed-Dating Storyboards

Although the methods mentioned above helped me generate a breadth of ideas in terms of quantity, I obviously wouldn't be developing 50 concepts, or even the approximately 13 concepts that remained after affinity mapping and conducting my own elimination process based on personal interest and contextualizing in previous research. Further, the ideas generated read very much as seed ideas, with not much substance within them. A method I found useful to not only flesh out what the solutions would 'do', but also weed out those that weren't desirable, was speed-dating storyboards.

I created 15 storyboards around concepts and concept variations generated. Each storyboard had 3 frames. Similar to the scenarios presented to participants during the bodystorming sessions, these storyboards focused on current state scenarios that placed the design concept in transitional environments on campus, with a character experiencing typical student stress triggered by issues spoken of during user interviews. Storyboarding really helped make the future states I was envisioning more concrete. I reviewed these storyboards with classmates, thesis advisors and other faculty advisors.



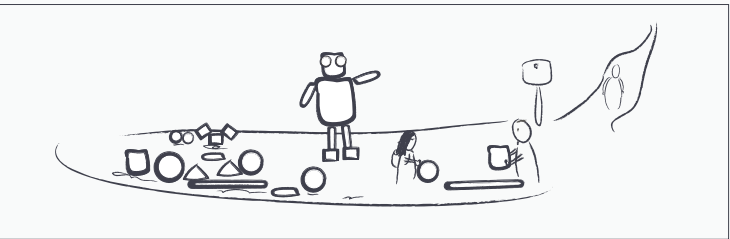
Storyboarding concepts to speed-date

### IDEAS GENERATED

As mentioned earlier, although I had generated several ideas, I began to narrow down and flesh out viable concepts. This time of idea generation was particularly difficult for me, because of its seemingly focused yet exploratory nature. As I sought to envision an innovative preferred state, I underwent a parallel iterative design process (Dow et.al., 2010). For me, this involved a constant expansion and contraction of multiple ideas and variations of ideas. Such a process allowed me as a designer to constantly remould and shape multiple ideas, like pieces of clay, in order to reach my final design. Looking back, I now see a clear trajectory of thought being followed with every iteration, that led me to my final concept.

### Early Concepts ●●

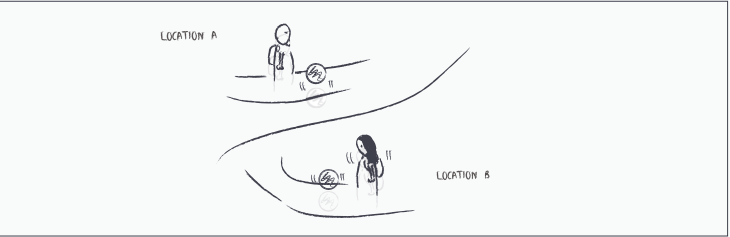
The following early concepts were presented during our mid-point thesis poster session in the Fall of 2010.



Sculptoid concept sketch

### The Sculptoid

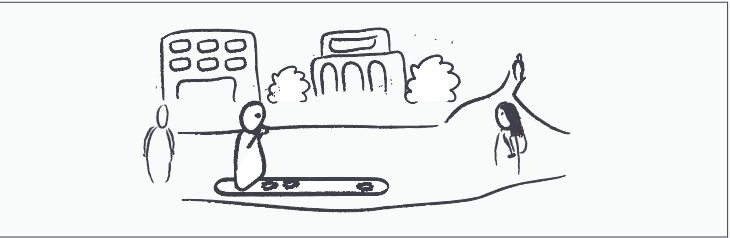
Diverts students towards creative exploration, through interactions with light-weight shapes placed in an open space on campus. Built sculptures can be deconstructed easily to allow for on-going engagement.



Ballistic concept sketch

Ballistic

Several smart balls placed within pathways on campus allow students to embody the role of Immitator (Mimics the balls movements as accurately as possible) or the Instructor (The ball apes user’s movements and networks with the other smart ball to program its movement) as they engage with the object. The interaction allows for simultaneous play with students located elsewhere on campus.



Stampede concept sketch

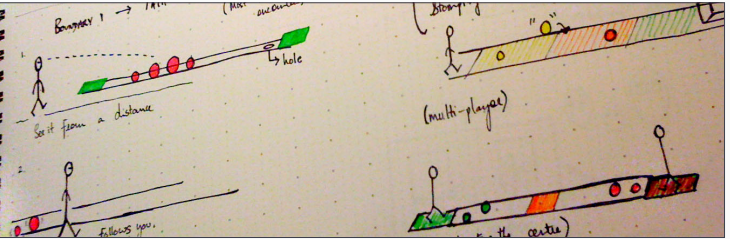
Stampede

Leverages floors as gaming interfaces. Students access a variety of quick games that require them to play with their feet. For example, above, a student is trying to kill bugs by stamping on the maximum amount within a time limit.

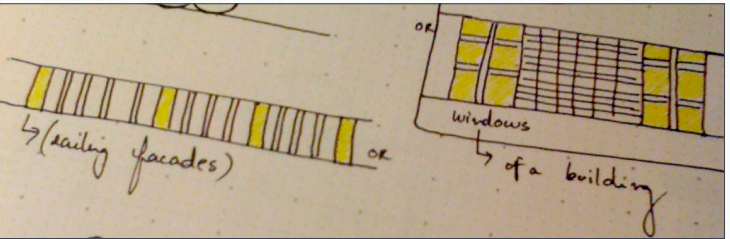
Target

Screen-based interactions, placed in corridors, allow students to play short games with students from different departments, at varied locations on campus. Players can enter, exit or continue unfinished games at any given point of time.

The audience in attendance responded most positively to the Sculptoid and Ballistic concepts. While reviewing these concepts and the feedback I had received, I found the Stampede and Target concepts weren’t innovative solutions to the problem, and hence decided not to pursue them. Consequently, at the start of the Spring semester, I began to iterate on variations of the other two concepts, in the hopes of generating more refined versions.



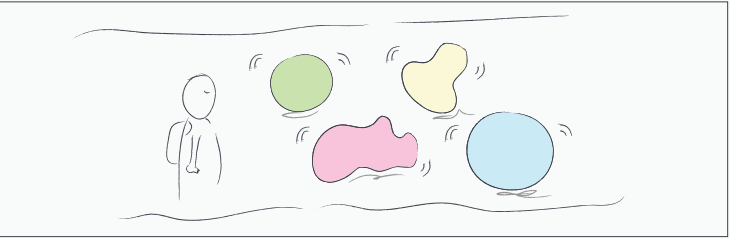
Concept Iterations



Exploring surfaces

Narrowing Concepts ●●

As mentioned earlier, I used storyboards as a way to communicate the varied iterations of my concepts to fellow classmates, thesis advisors and other faculty advisors. But most importantly, they allowed me to step back from my own ideation process and view the concepts from a distance. I narrowed the multiple variations of the two original concepts to four new concepts:



The Orbs concept sketch

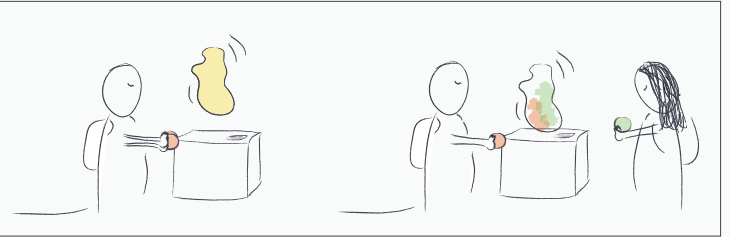
The Orbs

Four large ambiguously shaped objects, measuring 2 to 4 feet in height, placed on the Cut on campus, light up with different colors as students walk by them. Close proximity to these objects transition them into an aping interaction as they follow your movement at a slow, lumbering pace. Touch changes the color of each object; bringing two together creates a color fluctuation between them; light feedback changes when the objects move between textures i.e. from cemented pathways to grass; bringing all four together would illicit a glow in the same color.

Meditative Objects

A balloon-like object floats over a pedestal. Two small circular objects reside on this pedestal. As a user picks up the circular objects in their hand, they can control the rise and fall of the floating object. The circular objects begin to register a users’ biological rhythm in terms of heart rate, breathing etc. The

calmer a user remains, the higher the balloon-like object rises and begins to glow. The more hyper a user becomes, the greater the balloon-like object falls and the glow fades.



Meditative Objects concept sketch

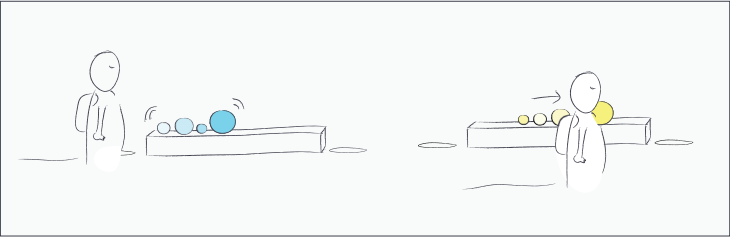
Imprint Cube

A large digital cube lights up with colorful user generated drawings and music as a new users’ presence is sensed in close proximity. As the user walks closer to it, they receive a download notification on their cell-phone, for an application that will allow them to program the cube, so to speak, with light, images and music. Using the application, users can change the form of light, its movement, color and the song it will begin to play as the next person walks by.

Chicks

Four smart balls of varied shapes live on a platform. In their inactive state, the smart balls change color. When a user approaches, they register a users’ presence and begin to vibrate. As the user walks by, they follow a users’ movement and begin to ape any body movements such as jumping up and down or moving back and forth with the user. If a user steps up to the standing pads positioned on either side, this activates a secondary gaming component where users utilize sound generated using their body to move each interactive ball within their court.





Chicks concept sketch

THE AHA MOMENT

In retrospect, all the concepts I had narrowed to had elements of my final concept. As I pushed around the four ideas above, trying to figure out which would be the most desirable, viable and feasible solution, I had begun to gravitate more towards the Orbs and the Chicks concepts. Apart from my own personal interest and enthusiasm in designing those concepts, feedback on the remaining two from design classmates and faculty advisors ranged from odd and ineffective - in the case of the Meditative Objects, as many felt they would *cause* rather than distract from anxiety, to boring and overdone - in the case of the Imprint Cube.

As I began to settle on the Orbs and Chicks, practical constraints involved in developing either of them became a concern and were used as crucial parameters for deciding which was the most effective solution. This included answering questions such as:

- 1 Will it survive in fluctuating weather conditions?
- 2 Will the university have to maintain it on a regular basis? If so, what would maintenance costs be?
- 3 How will it be protected from theft or vandalism?

- 4 How will it account for social interaction?
- 5 How will it change over time with multiple usage?
- 6 Can existing infrastructure on campus such as building facades be leveraged at all?
- 7 Is it better for it to live indoors or outdoors?

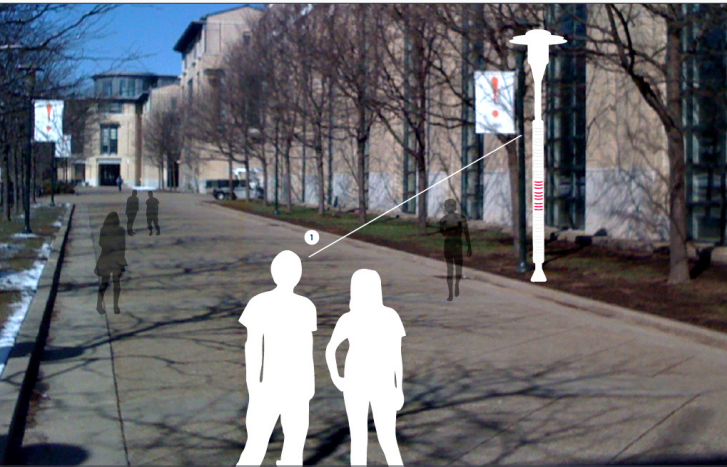
This led me to explore whether I could use infrastructure on campus such as building facades, windows and railings. During this time, I spent a significant amount of time walking around campus, observing structures I could potentially use. It was during one of these observation sessions that I discovered lamp posts on campus, which resided within all outdoor pathways and could be easily leveraged as a destination for an embedded object. Additionally, lamp-posts positively accounted for all the practical constraints listed above.

THE FINAL CONCEPT

As I had found the existing infrastructure on campus that could be leveraged, I went back to my old concepts to review which interactions and behaviors I wanted my final concept to contain. This led me to develop my final concept: the Nirvana Play interactive play pole, embedded on the external facade of a lamp-post. It would use LED lights, kinect cameras and sensors to react differently to movement from users passing by. I developed three applications for it: The Shadow, follows a users’ movement when walking past it. The Tower, starts to register sound generated from a user’s body and reflect this on the pole as a rise and fall. It also includes a competitive scoring component. The Swarm, reacts to high traffic times with a song and light show. A more detailed description of the final concept can be found in the section ‘Final Design.’

REFINEMENT PHASE

After much ideation, I arrived at my final concept and could begin to really refine what it would do and how it would work. Part of this involved developing personas and scenarios of use. Scenarios helped me to recreate the state of the world and impose constraints in order to design concept functionality and details such as, how would it account for multiple users? Early scenarios moved from being paper based, to actually shooting rough photography and overlaying illustrations of the concept onto the photographs. This helped in communicating glimpses of the final concept experience.



Nirvana Play concept experience sketching

Additionally, I began to look at what real-world technologies could actually be utilized and how, in conjunction with detailing out task flows for each application. It was during this period that I built a prototype, in order to gain feedback from my users on the felt experience of the solution.

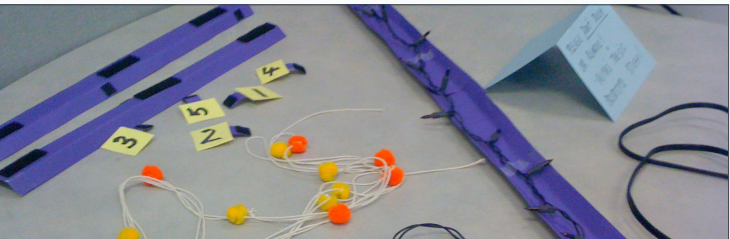
METHODS

Experience Prototyping and Wizard of Oz

In order to simulate a real-world use case scenario and get feedback on whether the concept worked for my target audience, I used the method of experience prototyping. This involved actually building a low-fidelity prototype of the concept, which I then made work, by employing the technique of Wizard of Oz².

BUILDING THE PROTOTYPE

I used a Lazy Susan for the base of the prototype, in order to render the effect of movement. The actual lamp-post was mocked up using two poster tubes measuring 3 feet and 2 feet, totalling the simulated post at 5 feet tall. This was stuck onto the Lazy Susan using masking tape and packing tape. Then using strips of Velcro and cardboard sheets, I created a mock casing for the lights to be housed within. The cardboard sheets were thus easily attachable and detachable. This allowed me to create 2 different strips. On one strip I stuck short strings of Christmas lights. The second strip was left bare as I used string and pom-pom balls to create the experience of lights rising and falling.



Building the low-fi prototype





Nirvana Play low-fi prototype and prototyping session



Nirvana Play: Temporary Play on Academic Campuses by Aliya Maria Baptista, Carnegie Mellon University 2011

### CONDUCTING PROTOTYPING SESSIONS

I conducted three individual experience prototyping sessions with a Freshman and 2 Juniors. Participants were told they would have to role play themselves, but within particular scenarios that were provided. At the end of each scenario, participants were asked to reflect on their experience. Some of the questions asked were:

- 1 Did you just notice what happened? Could you describe it?
- 2 What was the first thing you noticed?
- 3 When do you think you noticed the pole? Do you think it was too far for you to notice?
- 4 Why do you think the pole reacted in that manner?
- 5 Do you think it was anything you did that made it react to you? What was it?
- 6 As you walked away, could you reflect on how you felt?

### FINDINGS

The experience prototyping sessions were useful in validating existing interactions of the final solution, but moreover in pointing out areas that needed to be revised and reworked due to a lack of intuitive interaction.

Some of the key findings that came out of the sessions as a whole were:

- The Swarm pole was found to have the most positive reaction, breaking students successfully out of their existing mind frame and routine. Students reported interest in bringing their friends back to the pole to see whether it would react in the same way.
- The Shadow pole was reported to be interesting, however participants found they wouldn't engage in it for extended periods of time other than passing by, stopping to see reactions change and moving on. This validated the brief

Nirvana Play: Temporary Play on Academic Campuses by Aliya Maria Baptista, Carnegie Mellon University 2011

interaction that the Shadow pole was intended to embody.

- The Tower pole seemed to confuse participants the most. Participants reported not understanding what it was reacting to when a scoring mechanism wasn't utilized. However, when a scoring mechanism was tested in another scenario, participants understood the reactions easily. Additionally, participants believed that the reactions were triggered more by the pace of their movement rather than sound being generated. However the fidelity of the prototype was considered as responsible for this point of confusion.
- Lastly, participants reported that the concept of interactive play poles embedded upon lamp-posts, and using LED lights would fit naturally into campus due to similar existing installations such as the Hunt library lighting at night and the Randy Pausch bridge lighting.

Overall, the experience prototyping sessions confirmed that my final concept would fit into the existing artistic landscape of campus. Due to the unintuitive nature of the Tower pole rendering a scoring mechanism only based on closest proximity, a scoring mechanism has been left constant in the final design and not dependent on proximity.

FINAL DESIGN



FINAL DESIGN: NIRVANA PLAY

The Nirvana Play pole is a technologically enhanced environment platform that is embedded on existing infrastructure present within the landscape of a campus i.e. street light posts. I designed 3 applications (explained in detail later) that can run on this platform, however Nirvana Play is intended to run multiple applications and hence holds the opportunity and potential for future creative development.

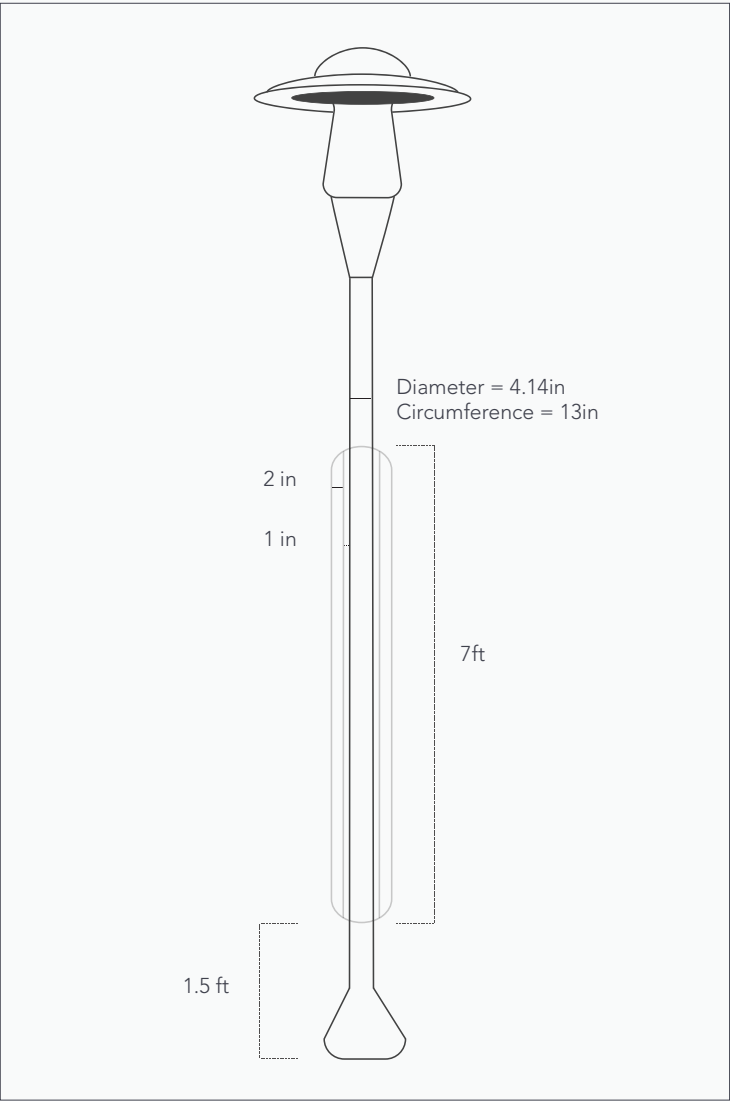
Although Nirvana Play currently exists as a vision concept, details regarding how it could be implemented in actuality as a physical product are presented below.

THE PHYSICAL FORM

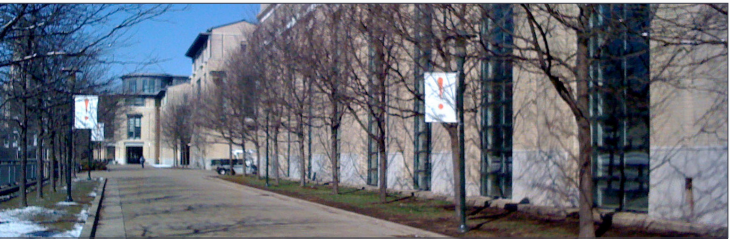
The form would involve a shell casing that clamps around the body of the light post. Potential materials for the outer shell structure could include perforated aluminum or plastic. Encased within the shell would reside a series of LED lights, a Kinect camera and sound sensors, which enable interactions. The shell structure serves as a shade during daylight hours, allowing for the LED lights to be visibly represented.

LOCATIONS

The Nirvana Play poles can technically reside within any outdoor pathway on the CMU campus (or any campus) that contains a lamp-post. However, for my thesis, I chose 3 specific popular corridors that have dense traffic, needed to support the interactions within the applications.



Estimated concept specifications



Location 1: Pathway between Merson Courtyard and Margaret Morrison



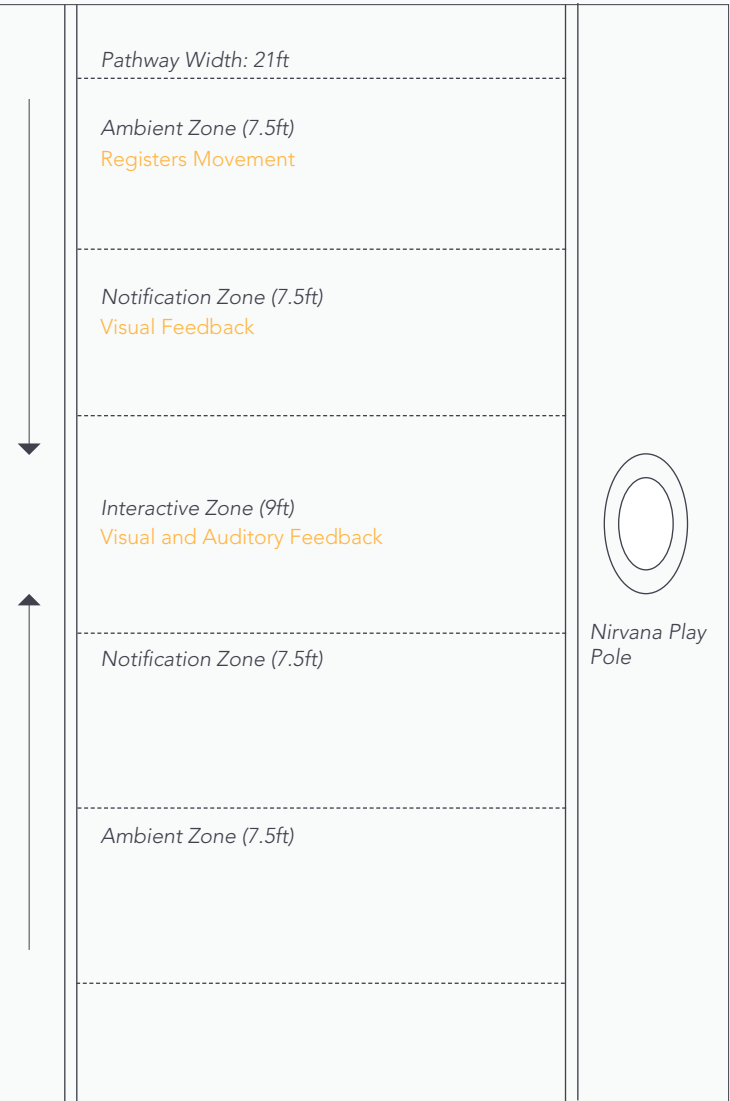
Location 2: Pathway connecting the Cut and Merson Courtyard



Location 3: Pathway between Margaret Morrison and Resnik Cafe.

SPATIAL RULES

The Nirvana Play applications react depending on where a user is spatially located within the proximity range. The proximity range consists of three zones (Prante, et.al., 2003), the Ambient (farthest distance), the Notification (nearer) and the Interactive (closest) zones, that trigger different reactions within the live application, depending on where a user is located.



Top view of proximity range. The 3 zones above have been adopted from (Prante, et.al., 2003)

APPLICATIONS

The Shadow ●●

Movement is registered within the ambient zone. Then, based on closest proximity, it follows a users’ movement as he or she walks past it, through the notification and interactive zones.

Rules

- Vertical bars of light rotate horizontally in relation to a users’ position when present within the notification and interactive zones.
- Application pauses for 30 secs after completing one encounter with a user and beginning the next encounter. An encounter refers to the time the application starts tracking a user upon entering the proximity range and stops tracking a user, upon exit.
- Application calculates distance and reacts to the user in closest proximity.
- If a users’ path alters to a direction outside the proximity range, the application restarts and looks for a new user within the proximity range.
- Sound and light feedback activate within the Interactive Zone, while only light feedback is active within the notification zone. The application registers the user to be tracked within the ambient zone.
- Active hours: 12pm - 2.30pm / 4.30pm - 2am, seven days a week. The hours noted allow the application to run during times when outdoor pathways are populated and also during hours that will highlight the aesthetic appeal of the application, allowing greater attraction.

The Swarm ●●

The Swarm is triggered for a minute and a half, twice a week, by peak traffic times. Dancing patterns of light sync to the beat of music, which is played from a predefined list.

Rules

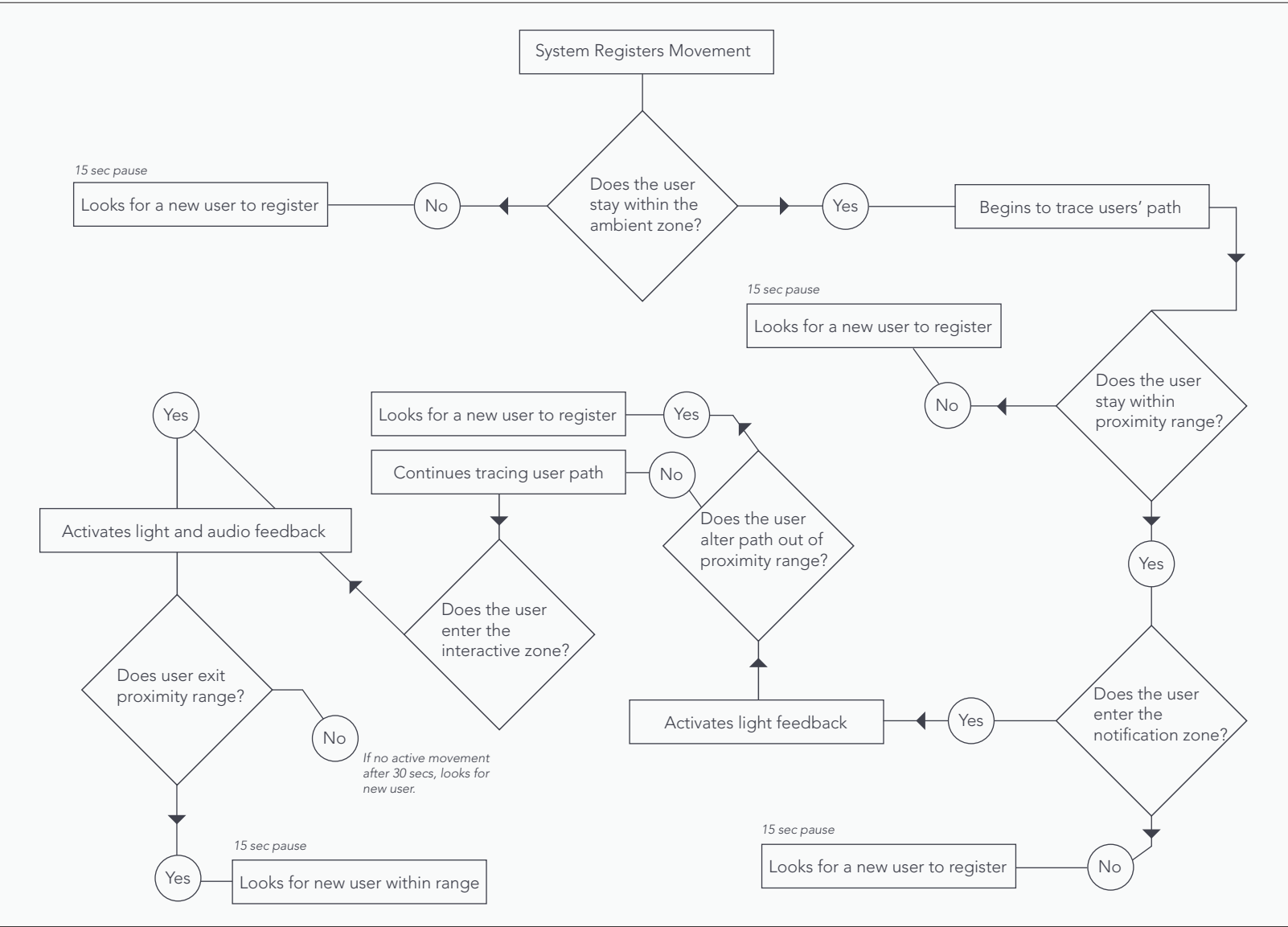
- Application tracks density of population within the proximity range as a whole. Setting a lower limit, for example >50 people, it randomly chooses to react at peak traffic times on 2 days between Monday and Thursday. (Research revealed between Monday and Thursday to be the most stressful days for students).
- Lights sync in coordination with beat of music being played.
- Music clip plays for 1min, 30 secs.
- Music list is predefined within the application, and contains current music.
- Active hours defined by point 1.

The Tower ●●

Auditory levels generated within a defined range are registered. This is reflected as a rise and fall as users move through the notification and interactive zones. At the most basic level of interaction, it picks up on sound generated from a user, in closest proximity, walking by. Users can also use their bodies to generate sound that will score higher on the Tower.

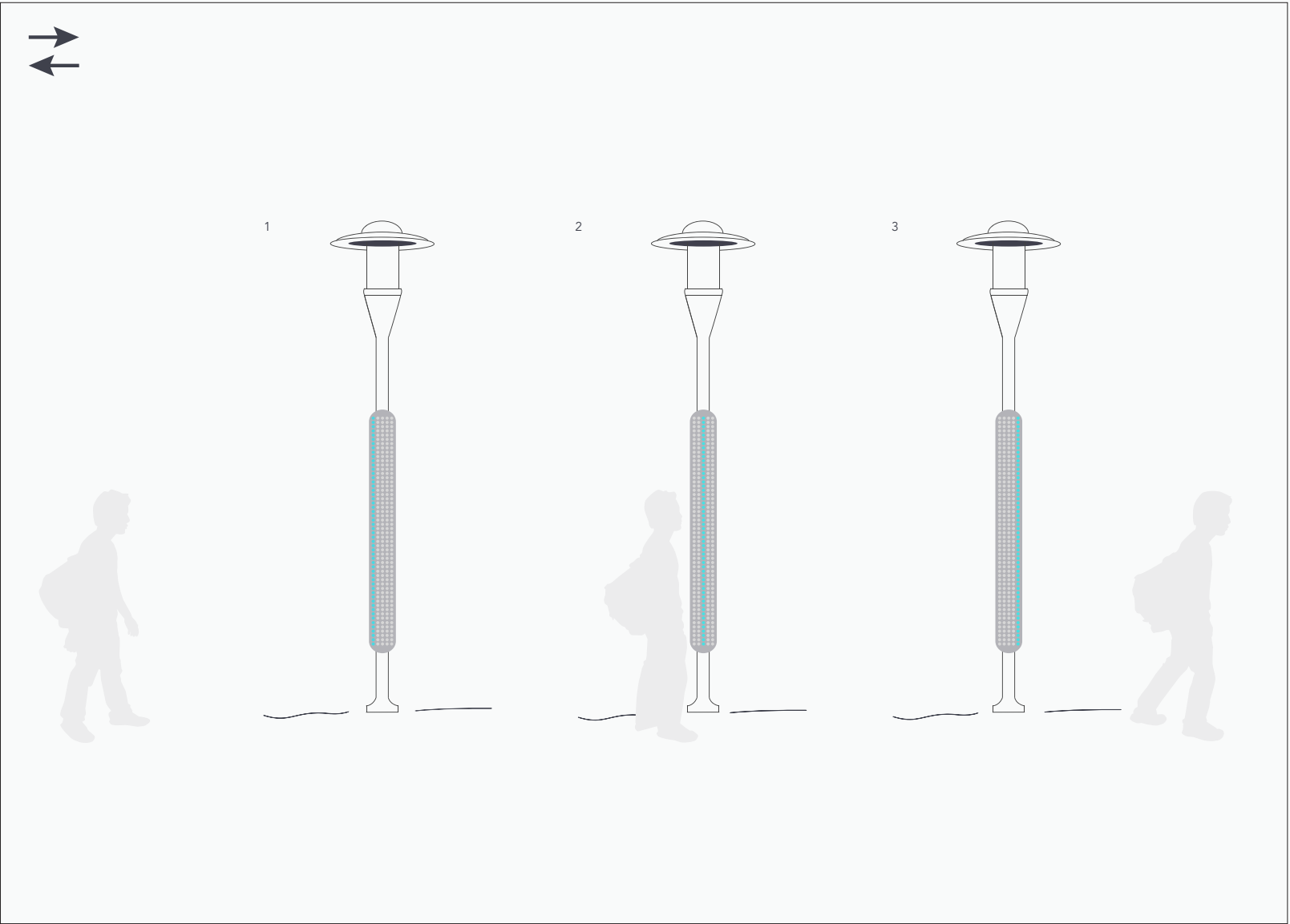
Rules

- Light rises and falls vertically in reaction to a users’ movement within the notification and interactive zones.

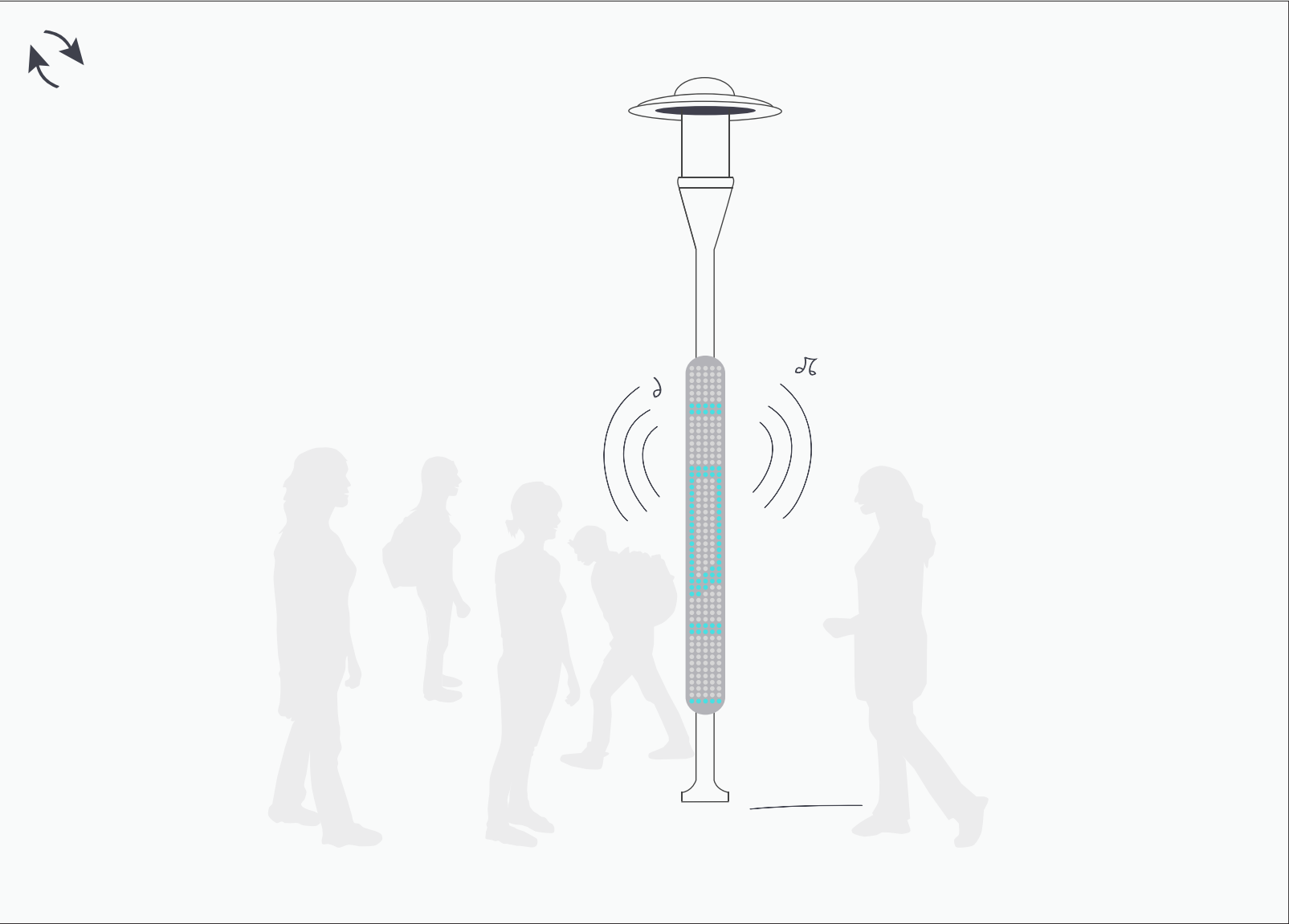


System flows were created for each application in order to devise the rules for application activation. Above is a partial sample of the Shadow system flow.

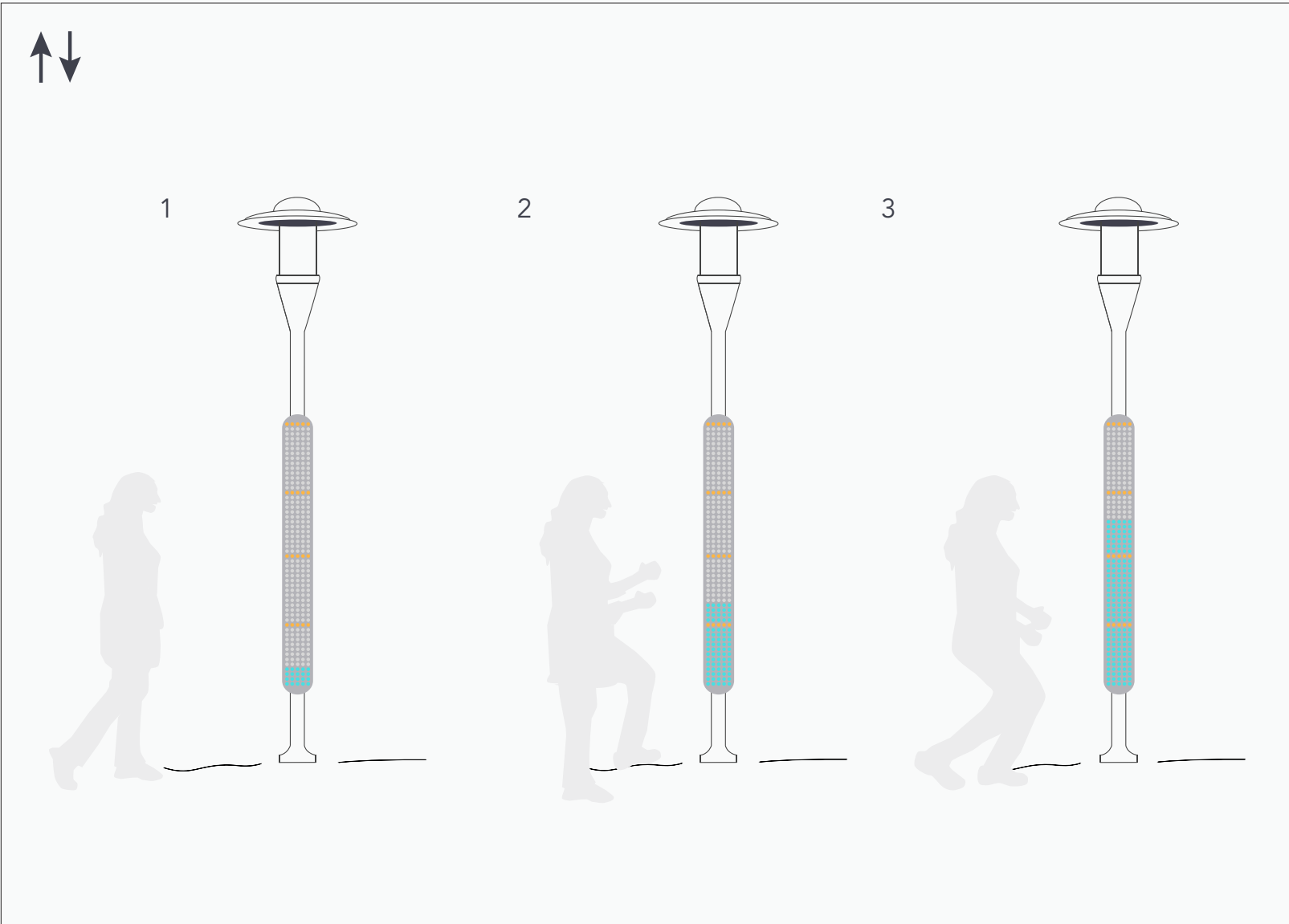
- Sound generated must fall within a defined range. The application should distinguish between sound generated by people versus machines.
- Application reacts to every whole encounter registered. A whole encounter here involves sound registered, within the sound range, i.e. from start to stop.
- If more than one user is present and participating within the interactive zone, the application distinguishes users based on position and provides light feed-back in differing colors.
- If both users produce movement and sound at the same time, application responds to user who is closest in proximity.
- If a registered user alters their path towards a direction outside of the proximity range, the applications restarts and looks for a new user within the proximity range to register.
- Score displays for 3 secs after every encounter.
- Active hours: 12pm - 2.30pm / 4.30pm - 2am, seven days a week. The hours noted allow the application to run during times when outdoor pathways are populated and also during hours that will highlight the aesthetic appeal of the application, allowing greater attraction.



The Shadow



The Swarm



The Tower

REFLECTION & CONCLUSION

REFLECTION AND CONCLUSION

Retrospective reflection on my thesis work brings to mind ideas for how certain phases of research could have been implemented more efficiently, and also views on how I have personally grown as an Interaction Designer.

Using the Right methods

Although the design process followed was extremely rigorous and well structured, the personal pursuit of knowledge and experience with respect to research methods led to a certain level of excessive usage of methods, for example in the exploratory synthesis phase. I have learned now that it isn't the volume of research one conducts, but rather the ability to choose the right methods to utilize.

Don't let the timeline get to you

Although key to having a successful thesis is a structured and overambitious schedule, the quality of work shouldn't suffer. For instance, during the body storming sessions conducted in the Generative phase of research, an exploration of improv techniques to help participants warm-up wasn't conducted due to a perceived lack of time. Makeshift warm-up exercises were used instead. However, the results of the activity would have significantly benefited had time been spent on inquiring into and using a standard improv warm-up exercise.

Not being in your comfort zone: challenging yet rewarding

A constant challenge faced was that this thesis resided in an area that required skills or knowledge in the fields of architecture, industrial design and tangible interaction design. To address a personal lack of skills or knowledge in such areas, advice from key faculty members who could offer opinions and advice on the subject matter I was dealing with was extremely important through out

and helped further my thesis work in new directions that it may not have necessarily evolved into had I been guided solely by myself and my thesis advisors. It allowed me to increase my depth of knowledge in areas that I haven't been previously acquainted with as well.

Further, although the final concept was realized to an extent through a low-fidelity prototype, looking back, I do believe the project would have benefited more significantly had a technologically capable higher-fidelity prototype that didn't rely on Wizard-of-Oz been built.

Wearing every hat

Perhaps the most challenging aspect of working on a thesis project for a year was: doing it alone. Familiarity with group work tends to allow for one to be a master or skilled practitioner in a certain area. However, during this past year, I had to assume the role of a one-man army, a Swiss pocket knife if you will. Seeking out classmates for advice during such moments became vital.

Looking to the Future

I believe the design I have created successfully leverages the transitional environment of outdoor pathways on campus, as new sites for short playful interactions. The Nirvana Play pole, embedded on lamp posts within outdoor pathways on a campus, has been designed to currently run three applications - the Shadow, the Tower and the Swarm. It aims to provide students with daily opportunities to break away and mentally suspend their anxiety. It strives to contribute to the creation of a preferred emotional environment within the CMU bubble.

The future of this concept holds possibilities for the development of multiple applications. Costs to implement this project would be relatively inexpensive

in comparison to existing structures present within CMU's artistic landscape (Hunt Library lighting / Pausch Bridge) and would add significant value to the experience of life on campus for undergraduate students.



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<sup>1</sup>Non-Academic Spaces: These include recreational spaces such as the *Scotland Yard gaming room*, green savannah and garden spaces like the *Number Garden*, *Peace Garden* and the *Cut*, eating locations such as the *University Center Black Chairs*, *Taza D’oro* and *Resnik* coffee shops and sports-oriented spaces like the football field, tennis courts, swimming pool and gym areas.

<sup>2</sup>Wizard of Oz: A technique where, when conducting a research activity, one physically controls the designed prototype, simulating a real-world experience in a mock manner as users’ engage and interact with the prototype being tested. During such an exercise, users’ are typically aware that a person is controlling the prototype and a certain level of role-playing or make-belief is required.

# APPENDIX

APPENDIX

- [1] *Words provided for collage activity*  
Games, Surfing the web, Internet, Feelings, Anxious, Tiring, Studying, Homework, Worried, Stressed, Overwhelmed, Sick, Love, Fun, Happy, Angry, Annoyed, Laugh, Sad, Depressed, Lonely, Pissed, Perfect, Calm, Cool, Insane, Crazy, Focussed, Aim, Goal, Driven, Cramming, Work, Exhausted, Tense, Burned Out, Excited, Peace, Slow Relaxed, Worry, Sleep, Eat, Study, Run, Walk, Play, Lonely, Alone, Friends, Sorority, Fraternity, Best friends, Classmates, School, Buggy, Drama, Fun, Relax, Play, Talk, Gossip, Conversations, Chatting, Confined, Stuck, Daily, Weekly, Weekends.
- [2] *Sample Interview Questions*  
So, tell me about yourself. What are you currently studying? What is your major? Why did you decide to attend CMU for your undergrad?  
How many classes are you taking? Are you part of any extra curricular activities or clubs? Why are you apart of those?  
How does participating in those activities make you feel?  
Tell me about this past week at school....  
Tell me about how you spent your last free evening? ..... How did you spend your evening yesterday after classes were over? (a school day).....is that how you spend all evenings?  
Which was your most hectic day in the past week? In terms of a percentage, how much time do you think you were studying (homework, cramming etc.) on that day?  
Do you feel students at CMU study too hard? Do you think you study too hard?  
On that most hectic day, tell me about what you were feeling like? Emotionally, what did you feel? Why is that? What triggered it? What did you do to combat those feelings? Why did you do that?

Why did you go to that place? How did that make you feel?

Describe the last time you consciously took a break? What and Why did you do? How did it make you feel? OR Imagine you're at school, it's a Wed. You have a test to study for and a ton of homework. You're really stressed out and anxious. You can't focus. What do you find yourself doing to calm yourself down focus? What is the last thing you did to make yourself balance work and having fun?

Do you think students at CMU are overworked?

Could you describe student life at CMU in or with 3 words? Why?

Do you have any favorite spots on campus that you like hanging out at? What do you do there? Why do you go there as opposed to going elsewhere? What qualities about that space do you like? Tell me about the last time you were there, what did you do?

Are there any spots on campus that you don't like?

When was the last time you saw students at CMU having fun? What were they doing? Why? Have you ever done that? Why? Why not?

Describe the most memorable thing you have done in the last month on a weekend? Tell me about the last time you went off campus on a weekend?

Where did you go? Why? What did you do there? With whom? Why?

When was the last time you had lunch outside?

Tell me about the last time you played a game? Where? With whom?

Tell me about the last time you played a sport on campus?

Tell me about the last time you went to the UC gaming room?

Tell me about the last time you went to the gym?

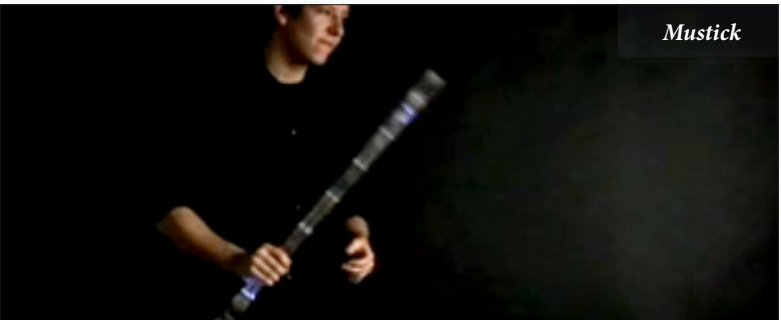
Tell me about the last time you sat on the cut or went to the peace garden?

Tell me about the last time you went for a walk around campus?

Tell me about the last time you went to the Gates?

I noticed you have a boyfriend/girlfriend. Tell me about the last time you hung out. (Why?)

- [3] *Other State of the Art projects* (refer to References for relevant web links)



Nirvana Play: Short-term Play on Academic Campuses

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A Thesis submitted to the School of Design, Carnegie Mellon University for the degree of *Master of Design in Interaction Design*.

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