

The background is a traditional Chinese ink wash painting. It depicts a landscape with a winding river or path that flows from the upper right towards the lower left. The river is rendered with light, misty ink, contrasting with the darker, more textured ink used for the surrounding hills and mountains. The overall style is minimalist and evocative, typical of classical Chinese ink art.

Redesigning Tradition
Through Metaphor

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Abstract

My thesis explores the use of metaphors as a means to support a better understanding of tradition by employing dynamic media. Despite the positive gains from these new technologies, overly structured digital environments have become barriers separating young people from the old traditions, such as characters, festival and ceremonies. My research focuses on how to add new experience or extra dimensions to tradition with dynamic media.

Metaphor is a powerful tool for interaction design. It helps people to conceive and understand abstract concepts. By conducting a series of experiments studying both visual and behavioral metaphors to redesign tradition, my research investigates metaphors as a means for interpreting concepts of tradition in interactive design.

Introduction

My Background

WHY NEW MEDIA?

All my life, I have never stopped trying to discover my talent. In high school, I had once been eager to become an architect, because I had been always passionate about art and design. Also, I have always held the idea that architects affect people's lives mostly with their works in which people live in. However, this dream was broken when I found that I actually had a horrible sense of direction and space, which would be a barrier for a career as an architect. Afterward, I found my interest in communication design, and realized that graphic designer could be a wonderful job for me as well.

Before I came to DMI, I had seen so many differences between new media and traditional media at the time I worked as a graphic designer in Beijing. I found that communication is no longer one way. The Internet offers the public a fabulous accessible platform for communication. Besides, time is saved. When I was editing magazines, we had spent a month doing the work that it takes to put out the publication. Then, we

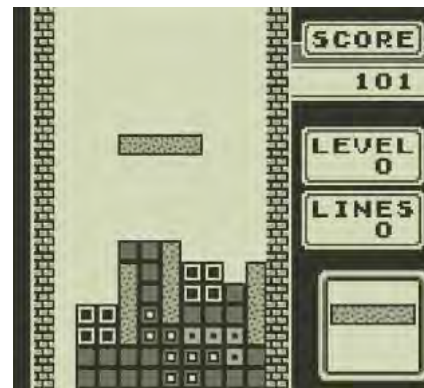
have to wait two weeks for printing and shipping before anyone could even read our work. But by using new media today, I get response just at the time I post. Life and work are sped up because of the birth of new media. These findings kept me thinking and gradually turned my interests to new media.

People's lives are constantly changed because of new media. For instance, social networking has become a new way to communicate in just a short time; electronic portable devices have taken the place of paper-made books; even our languages have expanded through new media. New media influences the entire world. Consequently, I could not stop thinking how this affected communication design. The multiple ways of applying new media piqued my curiosity. Before my application to the graduate program, I visited my professor at college who told me that, "The way of exploring communication design should never be limited just by graphic design but should be broader and more adaptable." I could not agree more. Gradually, I have shifted my role from a graphic designer to an interactive designer.

EARLY MEMORY AND DEVELOPMENT

My earliest memory of an interactive object was the first edition's black and white Game Boy that could only play the classic game "Tetris" just requiring four AA batteries. When I was about six-year's old, my mother bought it for me as a gift. Compared to my other toys like dolls and toy bricks, this toy had a diverse set of functions. The rules were very easy to learn while the game was always unpredictable because of the changes of blocks. There were interesting digital sounds at the same time I activated each changing. Besides, there was always a higher level after you completed one level that kept the players being challenged. And all of these functions were built up only inside a small and portable box.

At the beginning, I was fascinated with it and loved to share this magic toy with my cousin. But just a couple of months later, I lost my interest in the toy because I found my cousin got the latest edition with nicer images and improved functions. You would never want to play with the older one whenever you encountered an updated Game Boy. Therefore, the older one was obsolete. At the same time, I started getting a little worried about this toy, for the reason that despite I would be given the "latest" one several months later, I found it would still be replaced in a short time. In addition, the update cycles of these kinds of electronic toys had become shorter and shorter than any other toys I had ever had. Sooner or later, it started to allow two Game Boys to link together for multiplayer purposes. Then a colorized remake of the game was released on the Game Boy Color entitled Tetris DX. I felt there was never the really an end to get this the "latest" one no matter how much I had ever loved playing with it.



Tetris (Game Boy), 1989

SUMMARY OF PERSONAL GROWTH

Several years later, when there were a growing number of interactive toys in my life, I found short-cycle renewal was actually one of the features of technology. Indeed, I learned that redesign was also employed by manufacturers as means for commercial purposes. As a way of promoting consumption, the manufactures usually set up the process of supplying newer editions products by redesign or refreshing the older editions. By doing so, they could keep their products competitive in the market and attractive to existing clients. For instance, new technology and advance design have played a key role for supporting Apple to keep releasing higher-level computers with both upgraded hardware and software. No matter what other products appeared in the computer industry, it has ensured Apple's products being competitive in different stages of time.

How I experience playing with interactive objects like the Game Boy in my childhood has let me understand the rule of

renewal, especially when technology is involved. Whenever I received an interactive product, I always kept in mind to ask myself whether this object would be renewed or not in the future. When I encountered an obsolete design I still valued a lot, I had attempted to think about the ways to give it a second life through redesign. It is significant for me to save things that I care by applying new experience for "upgrading".

The environment in which I grew up also helped me become interested with redesigning traditions. Because of the high-speed development of economic, societal, and culture, people's lives in China has been changed dramatically over the past decades. As a country boasts a wealth of traditional cultures, it starts to be aware of the fact that we have lost so many traditions.

For now, dynamic media is the tool for me to redesign traditional culture that is being forgotten gradually, which I think should be reproduced to meet the needs of new media age.

DIGITAL PAINTING

My very first experiment of applying new media to tradition was the digital painting I had done during an illustration course in my sophomore year of college. I had tried digital painting using a Wacom pen tablet and finished multiple painting styles, such as oil painting, crayon painting, and watercolor etc. by using Corel Painter. For the final assignment of that class, we were required to create one painting style based on the skills we had learned. Thus, I started to think about the variety of styles that can be created in a digital way. I asked myself "Is there any possibility that I could create the traditional ink and wash in digital painting?" I thought it would be a different view to mix a very traditional style with a non-traditional painting skill. So I had tried some different brushes and found the watercolor one that looks similar to the brush used for Chinese ink and wash painting. After adjusting the preferences of brush and paper several times, I found an approach especially suited for drawing. I experienced some new facts such as the "redo" function in new media, which is impossible to realize in traditional painting. I could not tell if this was an improvement or regression for this kind of art that time. However, it did enlighten my passion to redesign tradition in a new media environment. As a result, it became my first attempt related to my thesis research.



Early experiments with digital painting, 2005

ABOUT THIS BOOK

My thesis explores how to use metaphors to support a better understanding of traditions with dynamic media. In this book, I will talk about my interests of metaphor and tradition in the following chapter and the case studies that gave me tremendous insight on the possibilities of using metaphors to interpret the language of dynamic media, to represent tradition with new experience.



Early experiments with digital painting, 2005

Tradition and Metaphor in Dynamic Media

“Any new thing that appears in the made world is based on some object already in existence ... each new technological system emerges from an antecedent system, just as each new discrete artifact emerges from antecedent artifacts.”
George Basalla, *The Evolution of Technology*, 1989

CONTEXT OF REDESIGN

The term “redesign” is not a new word. It is well understood that the development of design came along with the growth and development of culture. Design is a representation of human’s demand on culture, and redesign has a close connection with the transformation of culture. As early as 1978, the pioneer designer Alessandro Mendini first used the term “re-design” when he developed the so-called “banal design” by transforming daily existences with artistic application (painting, decoration) into new ironic objects of design. Industrial designers have much experience using the term “redesign” for upgrading existing products, such as the redesign of mobile phones, computers, and automobiles. In contrast, the term “design” is used for addressing solutions that do not yet exist. In the past decades, redesign also has referred to some other domains. The word redesign has been widely employed in several other contexts like business management, interior design and web design.

Japanese artist and designer Kenya Hara pointed out that “Redesign is making the ordinary unknown ... producing something new from scratch is creative, but making the known

unknown is also an act of creation”(Hara 22-23). It directs the designers to a new way of thinking of design. “For Hara, designing means taking the familiar and presenting it in different ways, which is different from the intuitive” (Frostig). Between the years 2000 and 2004, Hara produced the exhibition called *RE-DESIGN: Daily Products For the 21st Century*, which called great attention to the concept of redesign, with the goal of actualizing the reality of redesign, as well as recalling people’s thinking of the true essence of design. The exhibition showed redesigned everyday products such as toilet paper, matches, the roach motel, exit stamps, diapers, tea bags, and macaroni with the improvement on both functionality and aesthetics. For example, the toilet paper has been changed within a square core instead of the traditional round one, so that it clunks as it unrolls so that you don’t get too much at one time. Besides, it makes the shipping more convenient and efficient because of more square rolls can be packed into shipping boxes. Designers used to design mere stimulation, but the exhibition shows that now they part ways with that past and look at the ordinary and traditional with clear eyes, to yield new thinking on design.

WHAT IS TRADITION?

Tradition is usually thought of as the passing down of elements of a culture. The Oxford Dictionary defines tradition as “the transmission of customs or beliefs from generation to generation, or the fact of being passed on in this way.”

As the historian Peter Martin states, “culture is not a static set of rules but a live organism that has to change to avoid settling into an equilibrium that will confine individual spirits, practice traditions blindly, or overconsume its local resources”(Martin, 262). In my research, I focus on discovering the cultural traditions such as traditional art form, ceremony, ritual, and folklore that are cultural heritages and attempt to present them to contemporary culture with dynamic media.

TRADITION ENCOUNTERS NEW TECHNOLOGY

Redesigning tradition can breath new life into traditions. Traditional customs have unique symbols belonging to many different cultures. Accordingly, when people apply their cultural traditions to modern design, they not only inherit their own tradition, but also identify distinctive ethnic characteristics of each culture. “The reason for design is to change. Design is choosing and planning a realization, to act in a manner that preserves, amplifies, transforms, removes, or replaces a preexisting state. It is one of culture's most powerful tools to direct or support change, especially when considering the power and extent of modern technology and networks” (Martin, 262). At the same time, globally, concerted attempts are being made to preserve traditions that are at risk of being lost. According to the research by the linguists from University of East Anglia in Norwich in 2003, in the past century, more than five hundred traditional languages have disappeared from the world, which has caught the attention of many governments. Some governments have responded by enacting laws to preserve and reintroduce some languages.

Because of the rapid expansion of new technology, cultures have been sharply affected; as a result, many traditions have been fading away slowly. Assimilating tradition into today's life is a big challenge for designers. Maia Maniglier president and creative director of exprime co. states, “Tradition is not stagnant; it's a living, evolving thing, and we should continue to revisit traditional items to ensure their message never dies

out”(Gilhooly 30-31). The best way of inheriting tradition is to develop the new from the old, and redesigning tradition has a lot of potential for future scholarship.

Some early examples of redesign appeared in the furniture design domain. For instance, the “Peacock” *chair* from 1947, created by Danish furniture designer Hans Wegner, with its fan-like back, was a redesign of the traditional UK's “Windsor” *Chair*. And Wegner's “Chinese Chair”, from 1944, draws on 17th-century Chinese seating. Whegner produced a modern design while still keeping a piece of traditional furniture.



Hans Wegner

There are many examples of tradition in graphic design as well. The branding designs for the Olympic Games, for example, were created with more unique cultural and historical features for each host country. Many of these stylized images were extracted and renewed from traditional elements. For example, the use of the boomerang, designed by FHA Image Design, in the official logo for the Sydney Olympic Games represents a

unique image of Australia. Also, the olive branch in the logo of the Athens Olympic Games was a reference to the official award of the ancient Olympic Games, symbolizing the Greek humanistic spirit. And the logo of Beijing Olympic Games features single Chinese characters in a traditional red seal. The logo was created by Guo Chunning, and achieved a modern design by using traditional Chinese elements.



Seed Of Truce, 2010

There are also a number of examples applying metaphor in interactive design. *Seed Of Truce*, an interactive installation produced by Tangible Interaction, was installed at the Vancouver Public Library during the Vancouver 2010 Winter Olympic Games. The installation renewed the traditional way of making wishes and achieving peace. Visitors were given paper and asked to write about how they can make peace in their everyday life. The paper was then folded into an origami maple seed, and an LED with a heart beat blinking pattern was then added to the folded paper before sending the "seed" up a vacuum tube into the air. Thousands of pulsing messages eventually came to rest in a high-slung net, creating a large beautiful installation that grew in size with each very personal contribution. It employed new technology to engage people's participation by redesigning the tradition of making wishes.



Message in a Bottle, 2010



LilyPad Embroidery, 2008



Drawn, 2006

Message in a Bottle, designed by students from ITP at NYU, is an interactive installation inspired by the tradition of “message in a bottle”, an old way of communication across the ocean, whereby a message is sealed in a glass bottle and released into the sea. *Message in a Bottle* starts a new tradition of discovering not only the message but also the mystery contained within the bottle. The user moves a bottle above a board to reveal five separate stories through sound, image, and animation. The installation brings romantic tradition, surprise and delight of its discovery, and a more accessible way with advancements in science and technology these days.

LilyPad Embroidery is a very impressive project developed by Professor Leah Buechley at MIT Media Lab. As a beautiful traditional handcraft and a functional interactive installation, the embroidery uses both traditional materials like floss, and tech-

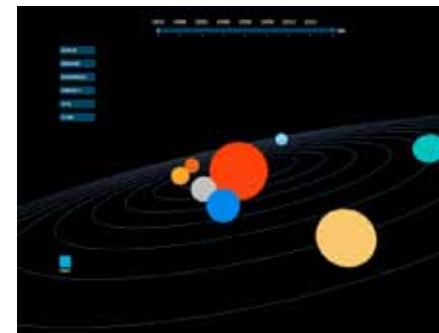
niques like electronics, conductive thread, and custom software.

The user is allowed to move their shadow or hand over the project to experience the changes of lights and sounds. The redesigned interface of embroidery successfully enriches the experience with traditional handcrafts. It also extends the tradition of handcrafts to deliver the idea of computer operation.

In some of my projects, drawing was engaged as an exploration of symbols in interactive design. I have found a fun example of interactive drawing through *Drawn* Designed by Zach Lieberman, which is an interactive drawing project that renewed traditional concepts of drawing in a playful way. It turns the static ink painting on canvas into an interactive object with the goal of creating an organic performance of hand and ink. Dynamic media gives traditional drawing a second life with a lively and energetic performance of drawing.

The Solar System is an information design project I did in *Design Studio II* class at DMI. It aims to create an interactive encyclopedia system for navigating art collections. I applied the metaphor of the Solar System for organizing information to connect users' experience of the real Solar System, therefore people can understand the abstract information more easily.

The prototype has been designed as an interactive environment that users are able to get access to specific data they want to learn more. It also allows users to explore the collected works in a 3D environment and enables to zoom in and zoom out to get close to each planet. In addition, by selecting different filters, the "orbitals" can be highlighted to guide the users to find different categories of works.



METAPHORS IN INTERACTIVE DESIGN

Defined by the book *Metaphor: A Practical Introduction* “Metaphor [is a] figure of speech that implies comparison between two unlike entities, as distinguished from simile, an explicit comparison signaled by the words ‘like’ or ‘as.’ [emphases in the original]” (Kovecses, 1).

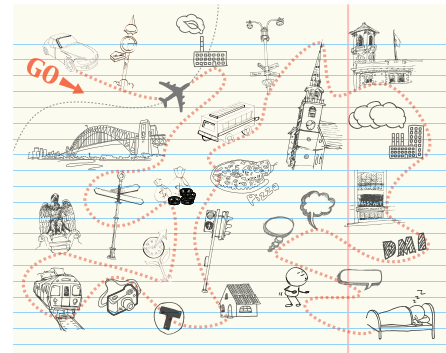
Up until the late 1970s and the 1980s, in scholarly circles, it is a widely shared view that metaphor was as a figure of speech, a poetic flourish that was merely decorative language. “The word ‘metaphor’ was defined as a novel or poetic linguistic expression where one or more words for a concept are used outside of their normal conversation meaning to express a similar concept” (Lakoff, 23).

Arlow, J. A. states that: “The word metaphor comes from the two Greek words meaning ‘to carry over,’ and refers to a set of linguistic processes whereby aspects of one object are carried over or transferred to another object so that the second object is spoken of as if it were the first” (Arlow 367).

In the late 1970s, linguists such as George Lakoff, Mark Johnson, and Michael Reddy challenged all these aspects of the traditional theory. They argued that metaphors are pervasive in everyday life, not just in language, but also in thought and action, “in the way that we conceptualize one domain in terms of the other” (Lakoff, 2). Metaphors are used for helping conceive and understand comprehension of more abstract concepts such as time, life, and love.

Map (2011) is a project created for a diary assignment exploring image and sound. I firstly chose to keep recording photos of time (clocks and watches) everyday, and also the sounds of the environment where I got the image. Then I edited and connected these diary images and sounds and developed them as a narrative of my daily trip. Every drawing is related to a pair of image and sound.

In this project, to make the information more understandable for users, I employed the map as a metaphor to help people making connection between the spot and the event. Users are able to use their experiences to interpret information they are unfamiliar with.



Metaphor becomes a powerful tool for designers in Graphic User Interface design (GUI) in the computer age. In the early stages of their development, computers were not accessible to individual consumers. In 1973, Xerox completed work on the first personal computer, the Xerox Alto system, from which most modern general-purpose GUIs are derived. Over a long period of time, the desktop metaphor popularized by Xerox, contains office references (desktop, documents, folders) mixed with building references (windows, trash cans).

Microsoft's BOB, released in March 1995, described the computer as a house, which is an early example of metaphor. Each part of the operating system had to be used with metaphor, such as clicking on a clock to open the calendar, while a pen and paper represent the letter writer, a notebook sitting on a side table held addresses.

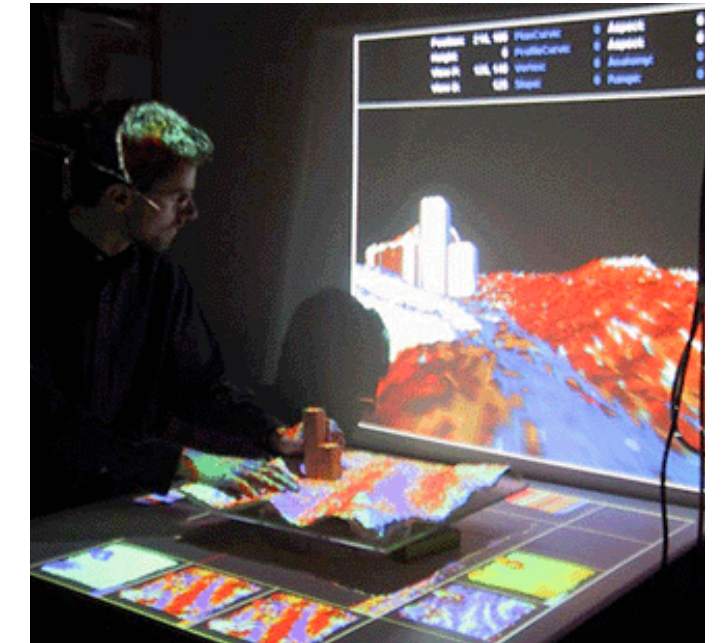
As a result, interactive designers tried to lower the difficulty of computer applications for users by creating concrete metaphors that resemble their real-world experiences. New metaphorical references and enrichments of the existing references come along with new



The Xerox Alto system, 1973



The Xerox Alto system, 1973



Illuminating Clay, 2002

functions and components. They are used for whole computer operating systems like OS X, for individual applications and tools like Photoshop, and for visualizations of information like the data of stock markets.

Metaphors are also helpful for conveying information in information visualization system. Illuminating Clay (2002) is a three-dimensional tangible interface for real-time computational analysis of free form spatial landscape models, developed by the MIT Media Lab. It uses the metaphor of landscape mod-

el that allows users to experience abstract data. The landscape models are constructed with ductile clay, and a laser scanner is used for capturing three-dimensional geometry in real-time. The information of changing geometry, such as shadow casting, land erosion, visibility and traveling time are calculated and projected back onto the clay model. By doing so, the projected graphics give the users immediate insight into how these information systems change and the user can "feel" the change in a metaphorical landscape environment.

Another physical project engaging metaphor is *SMSling-shot*, created by VR/Urban in 2009. The project combines a traditional weapon and digital technology together, splattering information onto public screens, such as building facades and other surfaces. It spreads information using a metaphor of a slingshot environment. The prototype is a wooden slingshot with a display screen, keypad, and laser, powered by battery. The user can “type” a message and “shoot” the message with a “color bag” on the wall to release tension, and even the splash-moment and the dripping looks natural and real. The metaphor of the slingshot works effectively for spreading the idea of reclaiming space as well as bringing the players a joyful experience.

Today interactive designers use developed conventions to interrupt the language of dynamic media, like visual and behavioral metaphors, as a basis for thinking about the possibilities of navigation and interactivity. My research uses dynamic media merging metaphors as a tool to redesign traditional customs, which are fading out of today's life, for instance, traditional ceremonies, rituals, folktales and so on.



SMSlingshot, 2009



SMSlingshot, 2009

USING TRADITION APPROPRIATELY

Redesigning traditions would give distinguishing features to modern design by identifying it with the authentic traits. On the other side, a successful redesign should not just apply tradition mechanically, but should employ traditional elements to rendering of techniques. As Peter Martin talked about the change of culture and design, “Good design will reinforce sustainable change within its cultural context” (Martin, 262). Thus, designers should also be aware of imitating tradition blindly and avoid to simply piece new and old things together. For instance, as the symbol of Chinese culture, the brush and ink are sometimes overused in movies, poster design, and logo design to represent traditions without a good connection between the spirits of ink and modern design. In these cases, traditional

elements had been overused for being emphasized only in various formats but not enough in content. Although the brush and ink are great traditional elements from Chinese culture, they will work effectively only which employed to express the objective accurately and fit for the particular purpose. Globally, the fashion of Pop art from 1960's is widely used in today's design for the tendency towards restoring classic design. But some of the designs are applied mechanically with fragments of Pop Art, such as the colorful appearance of automobiles, the contracted modeling of small product designs, or the layout of the advertising designs. Although, in terms of technology, new methods are used to represent the tradition of Pop art, designers should also understand the contextual environments and the point of views of the time of Pop art.

OVERUSE OF METAPHOR IN DESIGN

Metaphor is a powerful tool for interaction design, and it helps to introduce new concepts quickly, but it also constrains thought that should be used with care. As documented by Blackwell (490-530), the “Golden Age” of metaphors in design begins in 1985, during that time, the using of desktop metaphor is highly successful, but some extreme criticism and failure came after the success. Alan Cooper has a negative opinion of using metaphor in interaction design, the major problem he states is that “metaphors are hard to find and they constrict our thinking” (Cooper, 6). Metaphors are sometimes overused as a design tool if used improperly by designers. While they might help beginners learn an unfamiliar system, they soon become obstacles to the advanced users for further approaching. “Metaphors are like that: use them if you find them, but don't bend your interface to fit some arbitrary metaphoric standard” (Cooper, 7). Also, as noted in the book *Interface Culture: How New Technology Transforms the Way We Create and Communicate*, “the spatial metaphor begins to break down” (Johnson, 72), because they attempt to construct

interfaces that assumed the metaphors can do things that the physical object can.

No one could deny that metaphor has sometimes been overused in interactive design. An excellent example of a product that followed its metaphor too far is MagicCap, the communications interface developed by General Magic. It incorporated a “room metaphor” for its interface, where every aspect of the operating system heavily relied on metaphors. To access various functionality, the users needs to navigate from room to room. But, realistically, he spatial implementation of an “office” metaphor restricts all navigation further. The users have to metaphorically walk down a street out of buildings representing services and enter another building to begin another service. Thus, the users have to go back and forth multiple times between places to find the specific service. In real life, this kind of experience is actually very normal to people, however, in virtual world, why cannot we abandon it and provide the users a linear path? The MagicCap may give a good extension of desktop metaphor with the idea of offices and buildings, but it failed to use metaphors in its details that hindered users for further approaching and clear comprehension.

Case Studies

Learning Chinese Calligraphy

CASE STUDY I

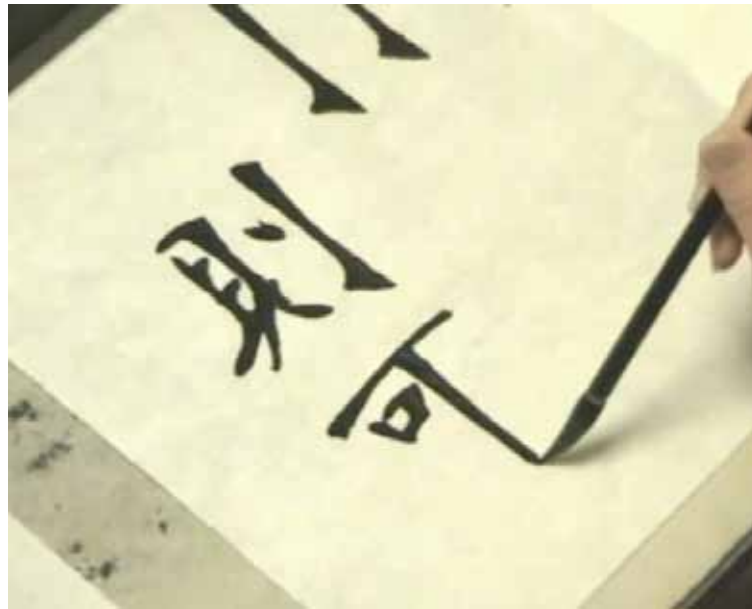
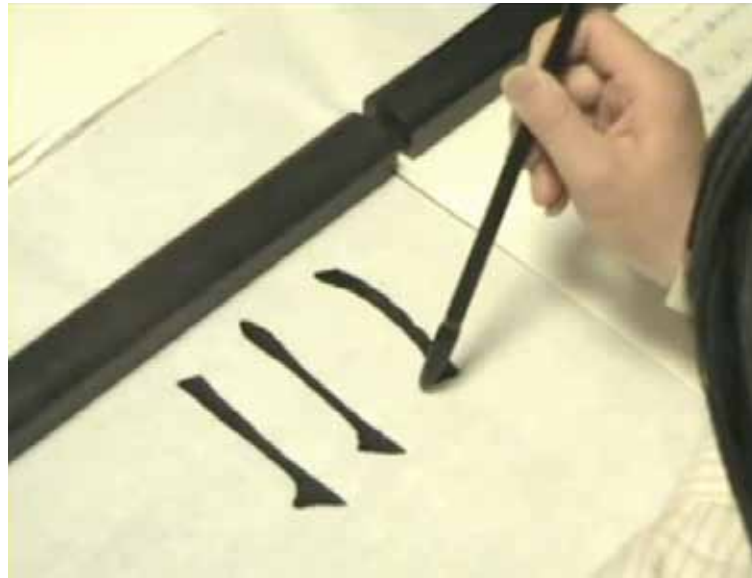


OVERVIEW

In the first semester at DMI, I had taken the class called Elements of Media, where I first attempted designing a Wii game. The game allowed people to learn writing Chinese Calligraphy by playing with a Wii remote. Elements of Media, taught by Professor Brian Lucid, helped students learn the ActionScript 3 programming language in the Flash prototyping environments. During the class, Brian showed various basic examples of interactive projects realized by ActionScript 3. Yet, I was fascinated with an example using a Wii remote to manipulate the computer mouse while using ActionScript 3. Because I personally like playing Wii, I became passionate about designing a project that utilized the Wii technology.

INSPIRATION

Over the next couple of weeks, I had a great time brainstorming different ideas and had done research with some popular Wii games. I found that most Wii players use more energy than they do playing sedentary computer games. It indicated that this energy increase might be beneficial to weight management. Therefore, I got an idea that would probably push people to do some exercise while they were playing with my project. But I could not find inspiration until one day I saw the DMI student Yaoming Hao was teaching Andrew Ellis how to write Chinese calligraphy on a black board in the DMI studio. It just reminded me of an interesting experience I had while in China. I had been practicing Chinese calligraphy with a large brush writing on the ground. It is kind of a traditional way to do both physical exercise and handwriting training at the same time. It was the moment when I first got the idea that I probably could apply dynamic media to some traditional activities to modernize the antiquated cultural practices. Hopefully, it can make people more willing to learn about traditional culture.



Traditional way of writing Chinese calligraphy

Products like Wii, Kinect for Xbox 360, and PS3 have guided us into a new era of multimedia, and have advanced what we can do with our creativity. These new types of media have brought new and playful experience for people. At the same time, overly structured digital environments such as computers, video game devices, and even smart phones are often barriers that separate young people from old traditions, such as handwritten Chinese calligraphy.

Traditional Chinese calligraphy is not only a visual art form, but is also based on principles of motion and live performance, an important part of Chinese culture. To develop their skills of Chinese calligraphy, calligraphy lovers spend years practicing writing stroke by stroke. "Studying calligraphy is much like learning to play the piano ... The discipline of calligraphy does not end with adulthood, as the study of piano often does"

(Kraus, 8). In the hand of a master, the characters become a careful manipulation of the shape and ink for the variations in tonality.

As a young pupil, I learned to write calligraphy by using an exercise book containing models. For copying each of the characters, the teacher usually kept me practicing the strokes and filling in the outline of the model. The traditional learning method bores kids, especially when they have to repeat the process a number of times. But later, I felt it was great experience because I got a chance to learn about my own culture that stems from an ancient era. Even though I don't have a lot of time to write anymore, I have gained great experience being exposed to the old tradition, which I think should be passed down for every generation.



Traditional exercise book

CONCEPT

My main concern was how to represent this traditional art via new media. Through learning calligraphy with dynamic media, users can be taught Chinese characters and given a sense of personal participation in a living culture of antiquity. At first, I had considered many aspects including brush strokes, gesture, tonality, and so on. But after discussing the idea with Brian and watching a couple of programming examples, he suggested that I simplify the concept so that it is an easily realized and completed project. So I just filtered out the various concepts and started by building from a simple project. To create a friendly interactivity and an engaging environment, I would bring a lively experience of writing by using metaphors of writing calligraphy in real life, such as using a brush and a interface of traditional exercise book.



Hero by Zhang Yimou (2002)

CHALLENGES

My first attempt at the project was frustrated because of my technical lack of programming. Initially, the project was built with an ordinary Wii game that allowed the users to write by the movement of Wii remote. Furthermore, the interface was also designed as paper and ink-based writing environment, with the exception of the digital way to remove and change characters easily. People were supposed to experience writing Chinese characters by filling in the outline of the calligraphy models given on the screen. It was not exactly what I wanted, but worthwhile to see how it works in a basic shape.

After my first user test with my classmates, I had received some delightful advice for improving the interactive experience. It seems that they were really impressed with the

performance of writing calligraphy in a famous Chinese film - *Hero* directed by Zhang Yimou in 2002. There was a fabulous performance in that film in which a martial artist was using a large brush as his weapon while he was writing the Chinese calligraphy on a huge piece of paper on the ground. It is hard to imagine putting such movements onto a simple interactive project. Beyond the ordinary writing platform, I think it would be more approachable for an interactive project to enlarge the dimension and transfer to a broader space. Therefore, in the next week, more interesting writing tools, a large hand-made brush bundled with a Wii remote, and a projector was involved in the game. To play with the project, the user can "write" with a "brush" on the interface of "paper" in a digital environment. The metaphors give a playful way of learning calligraphy, making it easier for users to learn and more willing to experience it.

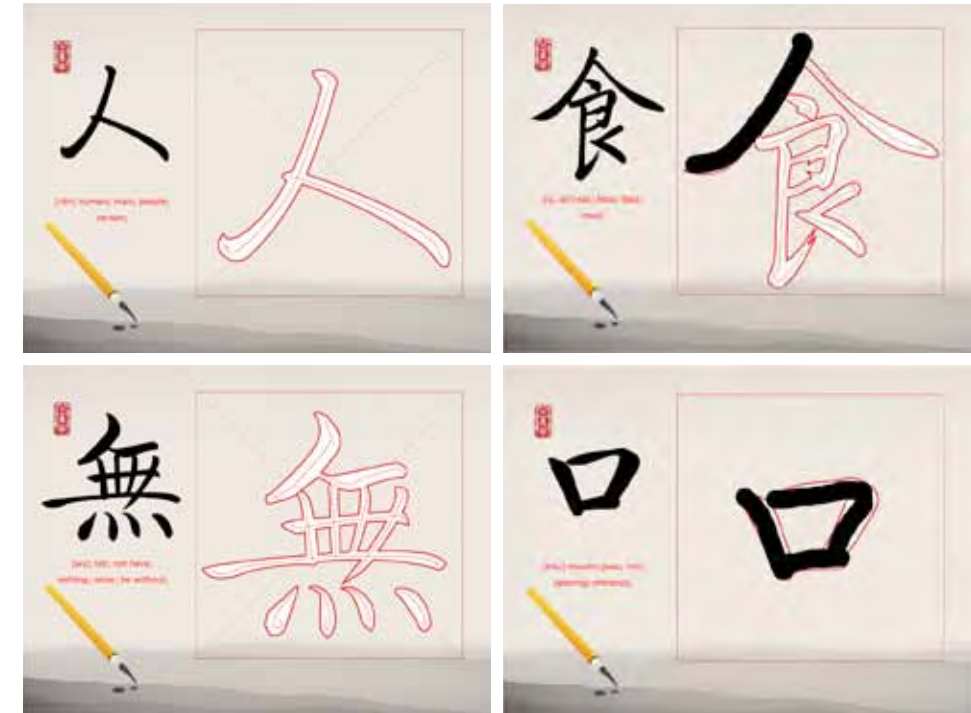


The writing tool: a brush bundled with a Wii remote.



Interface of *Learning Chinese Calligraphy*

Interface of *Learning Chinese Calligraphy*



CONCLUSION

The process was fun and full of difficulties. Dynamic media is not able to reproduce every aspect of writing calligraphy like the smell of ink, the sense of pressing brush on paper, the feeling of using water. But the experiment explored a kind of possibility for redesigning tradition. Due to the incomplete process of *Learning Chinese Calligraphy*, the game system of the project still needs to be improved in many aspects. First of all, from the point of education, it could be divided into several levels for the users getting a better learning process. Secondly,

I found the interface could be made more easily manipulated with an improved interactivity, for example having a better user interface flow. Thirdly, I learned that it is important to simplify the rules in a physical interactive project to make it accessible for users. Last but not least, the difficult fact of redesigning something people already know is selecting what to keep and interpreting it to others. Because of the limitation of time and technical problem, it is not completed. However, applying dynamic media to tradition happened later in light of my thesis research.

Make A Wish

CASE STUDY 2





The ceremony of launching sky lanterns.

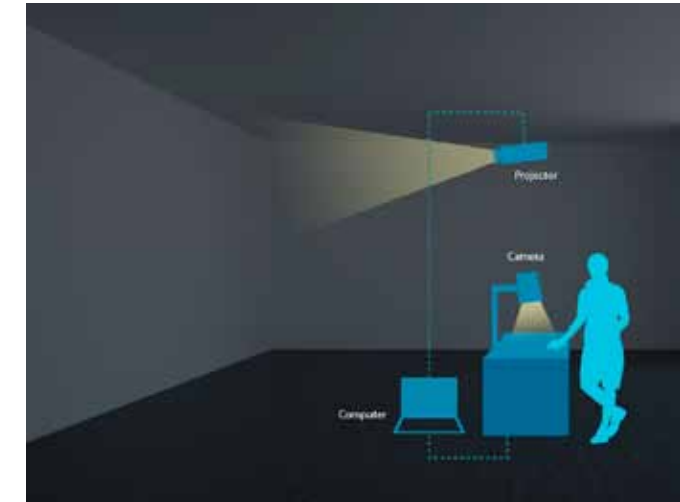
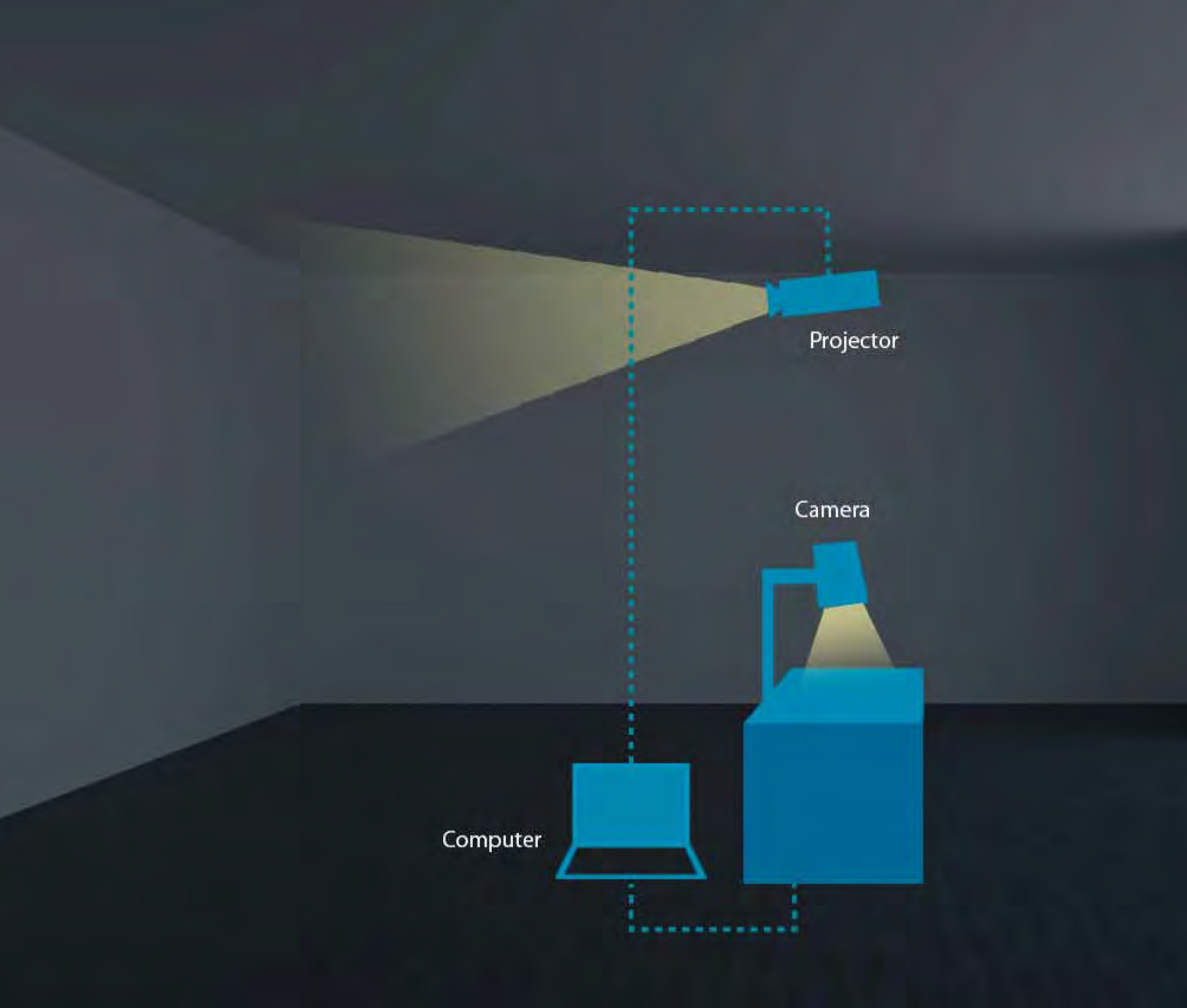
OVERVIEW

Make A Wish is one of the projects I did for thesis research with Brian Lucid, which investigates the use of lanterns in the ceremony of making wishes. I always wish I could create a project using the metaphor of light, because light not only creates beautiful atmosphere but also carries the message of hope and warmth. The memory of lanterns used in festivals from the age when I was very small always warmed me up. During every important traditional festival like Chinese New Year or Mid-autumn Festival, my parents hung the traditional lanterns near the windows at our balcony. This always gave me a sign of festival and time to celebrate. Besides, whenever I came back or left home in darkness, seeing the light illuminated by the lantern from windows brought me the hope and warmth immediately.

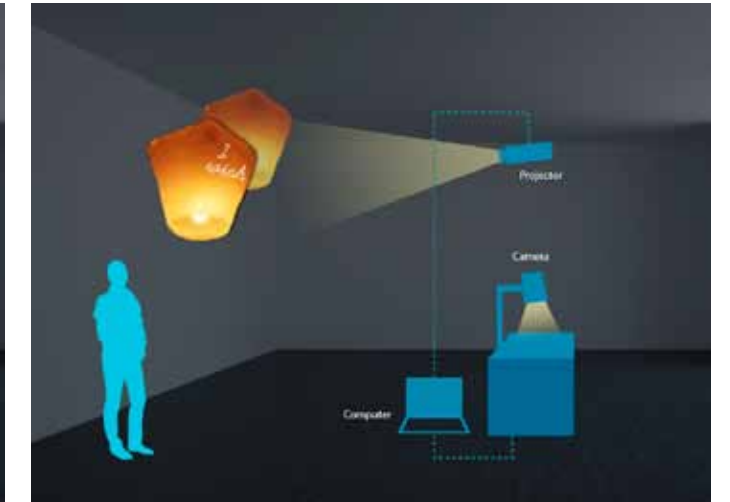
I had constantly held the idea of making an interactive project using lanterns in traditional ceremonies, and the picture of the sky lanterns being released to the sky for praying had popped up so many times. In the new environment of dynamic

media, I wanted to redesign the activity of making wishes with sky lanterns by adding an extra dimension to the traditional way.

In some cultures, especially those of eastern Asia, the sky lanterns are employed for making wishes. People usually write down their wishes on the sky lanterns, light up and release them to the sky as a ceremony of making wishes. I have learned that sky lanterns actually has a long history that can be tracked back to the 3rd century, when they were invented by the military strategist Kongming as a type of signaling balloon. However later on, people began employing sky lanterns for non-military applications and mostly used them for making wishes as the peaceful and beautiful atmosphere built by sky lanterns. However, due to the flammable contents, there is a risk of causing fire when the lanterns land on the ground, and they may also cause a hazard to an aircraft. Thus, regarding these safety issues, governments in some places have banned launching sky lanterns currently. Nevertheless, to develop it in a digital way might bring people the similar experience but in a safe and ecologically friendly solution to those issues.



The concept of setting up



CONCEPT

Make A Wish is a physical installation that translates people's wishes from their handwritings onto floating lanterns. The goal of the project is to extend and build the ceremony of making wishes with sky lanterns by redesigning with interactive media. It is designed to let people, who may not know about this traditional ceremony, learn about it through a digital platform. People are able to interact with the traditional lanterns with

a digital experience. My concept was to create a system that people can input wishes by writing or drawing on paper, which would be transmitted by the system and display on the surface of lanterns floating in the air. The materials adopted in this project are an IR(infra-red) camera, a couple of IR LEDs and balloons, a webcam, and a projector. In an ideal situation, the balloons will be released outdoor and being detected by the camera to display the wishes on them.



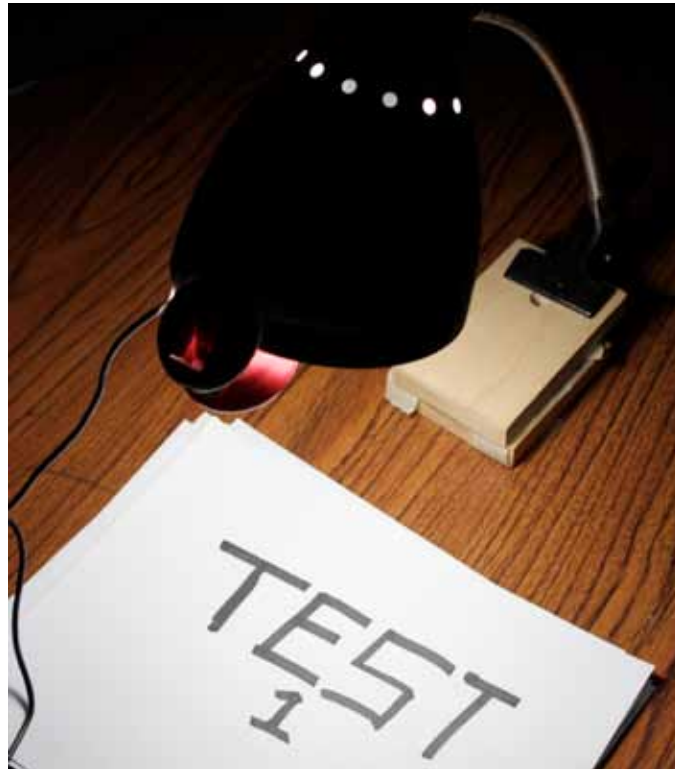
PROCESS AND CHALLENGES

Make A Wish reached a more complicate level than any project I had ever done before. There were too many components, and the rules are more complicated. At the beginning, there were so many problems I could not figure out, such as the way to set up the lanterns floating indoor, choices of technology I could use to track the position of lanterns, and types of platforms I should use for inputting information. Due to the support of my advisor and classmates, I was able to progress the idea and learn what technologies to use. For the motion track technology, the computer scientist Johnny Lee's research about projector-based location discovery and tracking inspired me by taking advantage of IR camera and IR LED. So I bundled single Infrared LED light at the bottom of each lantern. In this way, the lanterns could be tracked with their location by an IR camera and the location data can be fed back to the computer for use in a projected application. It significantly simplifies the interactive projection as eliminates the needs for an external tracking technology.

Processing is really a powerful tool to work together with other application like TUIO (A protocol can be used with tracker application that allows the abstraction for interac-

tive surfaces in programming environment) and Community Core Vision (an open source solution for computer vision and machine sensing used for supporting multi-touch lighting techniques), which allowed me to realize tracking and projecting in high-speed. Afterward, a lot of tests had been done to assure multiple tracking objects being projected accurately on surface at the same time.

Regarding the metaphor of sky lantern, I tried various ways to raise it in interior space like the real ones (using the flame heat inside the balloon to raise it up), such as using an electronic fan on ground or heating the inside lantern with a heater. After that, I set up a balloon inside each real sky lantern, so that it would rise and float stable enough for being detected by camera. I got a couple of balloons filled with helium to make them stand in the air. At the same I also constructed a real sky lantern with tissue paper and steel wires. It works as planed, looked like the real ones lifted by fire, however, I felt like it looked like a ghost while it was floating there, so I decided to give up the outside look of a real sky lantern and just use white balloons, which work as the same way. Since it is more important to focus on the experience of the ceremony rather than the format of lantern itself, choosing the white balloons made sense. They are both nice looking and functional when projected on surface.

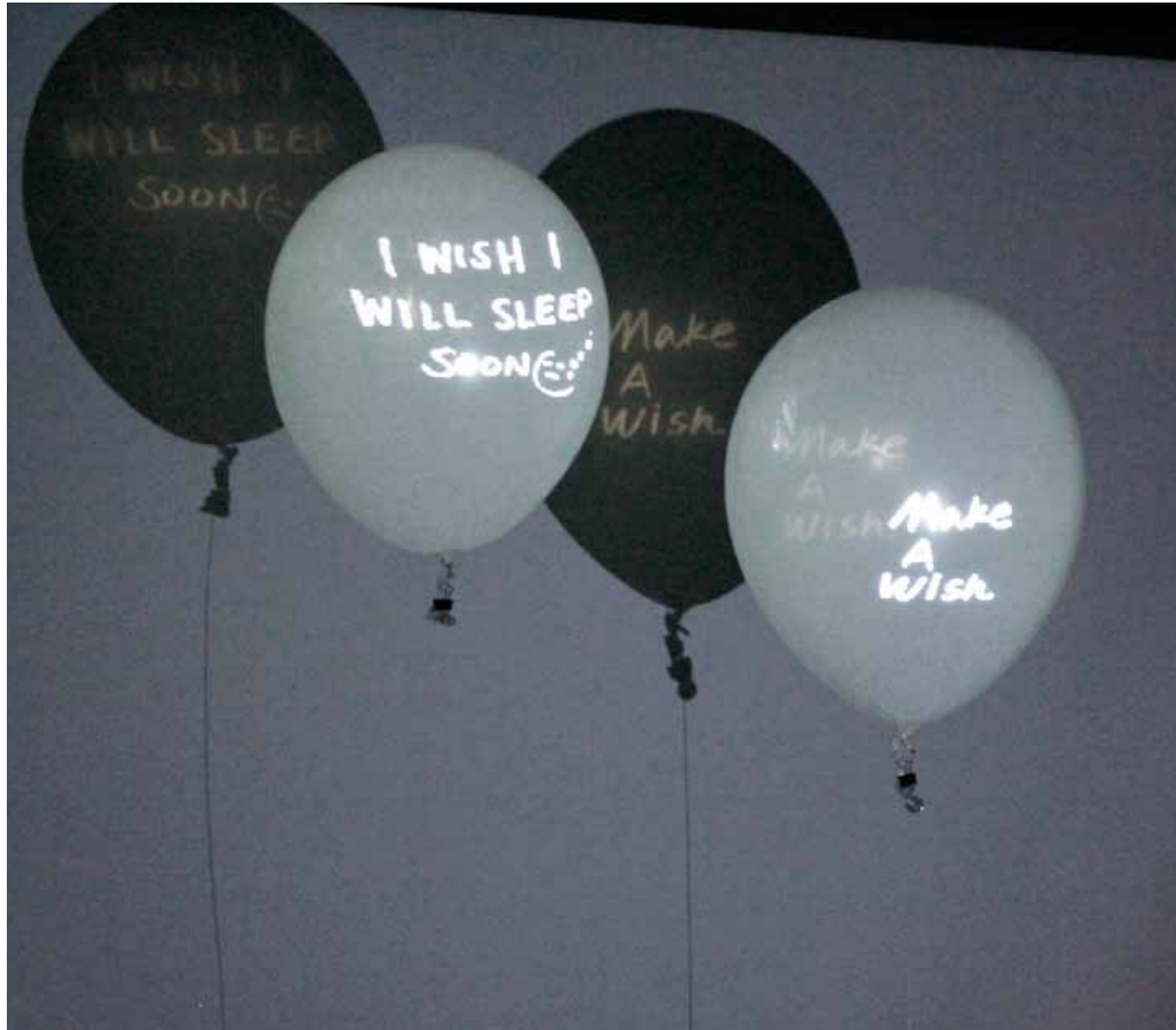


For the input part, I simply employed a webcam attached to a lamp for capturing images of people's writing. The users should first input their wishes into the computer by pressing a button for capturing and then launches a "lantern" in the space. The wishes would display on the "lantern" and follow its movement automatically. Eventually, I invited my classmate Daniel to test the prototype for multiple users in real time. The prototype did not work as stable as it was before when I

tested it, so I had to ask him to use it with caution, so that we can make sure the lights can be easily detected. Otherwise, there were some nice outcomes displaying on the balloons that bring a digital experience to the user with the traditional ceremony. All the process worked as a virtual launching ceremony for making wishes, but the addition of dynamic media attached a totally different experience to the traditional one.



User test at DMI studio



Wishes displaying on the balloons





Wishes displaying on the balloons



CONCLUSION

In fact, before *Make A Wish*, I didn't have much experience with physical installations compared to the experience of two-dimensional world, which is actually my comfort zone. I used to feel like it was so complicated to control every component and coordinate them all working smoothly in an installation. Thus, I failed several times with many of the details in *Make A Wish*, but I also learned more than I expected. I faced numerous problem including selecting materials, programming, installing, and especially that balloons are fragile to work with. And unfortunately some of the balloons popped or lost air. Some of the IR lights did not work out when they were attached to the lanterns. I tried to solve all of the problems in the process of building up and learned about installing a physical project. I also got some feedback that can help me improve this project.

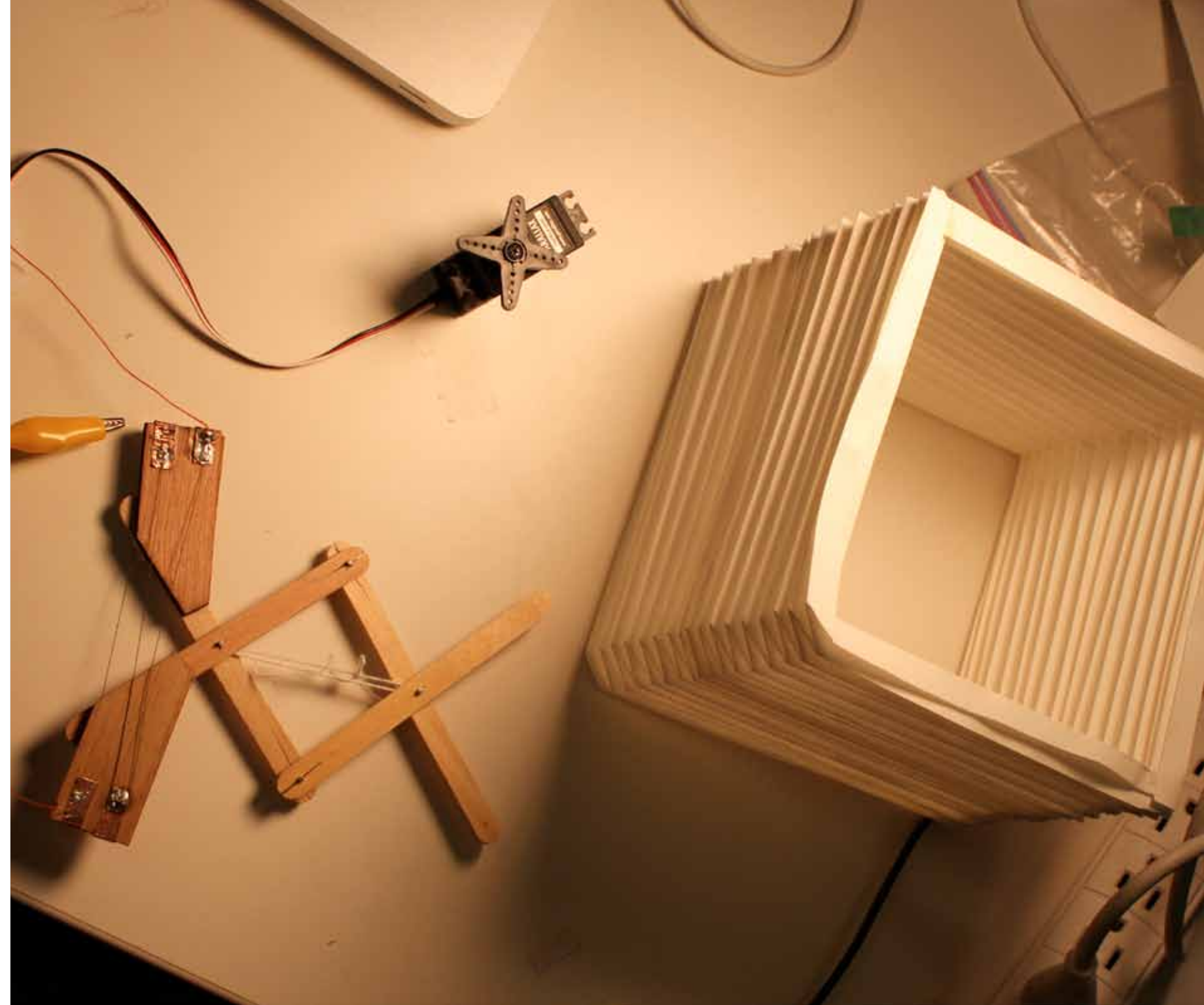
Technically, there are some changes I can make for further

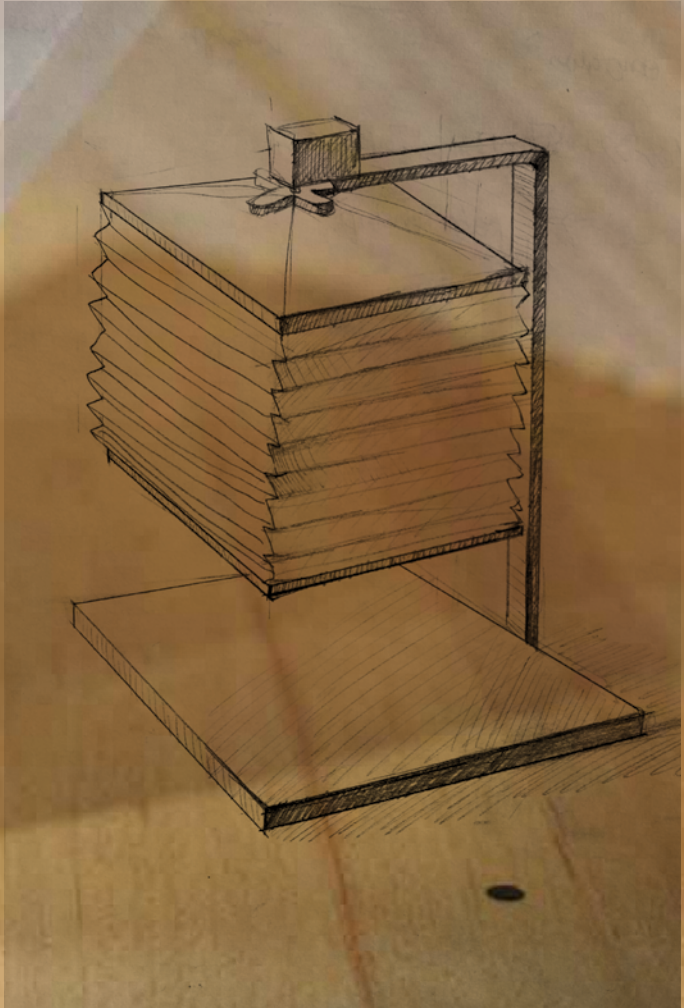
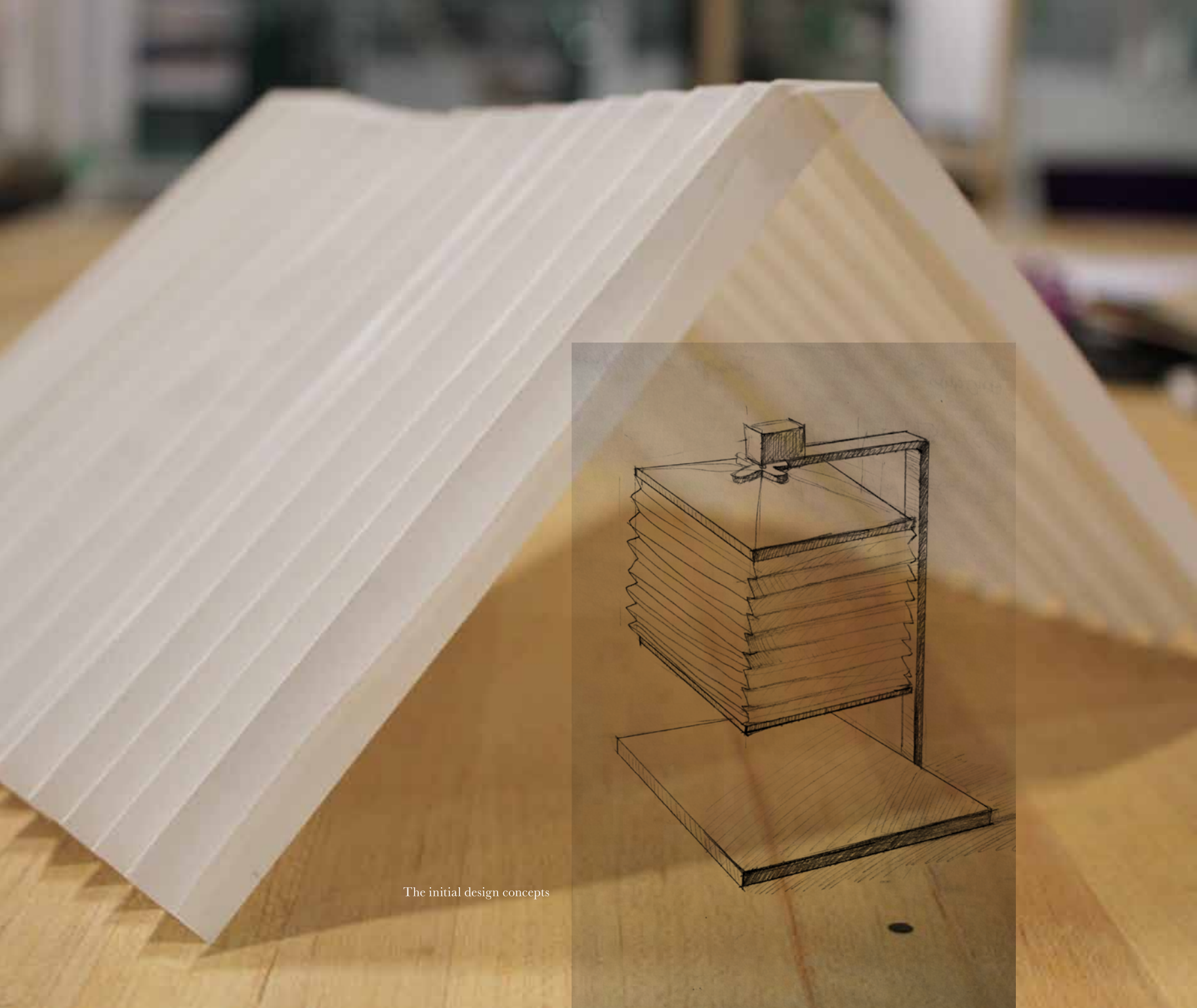
research, such as changing the webcam with a higher resolution one, using more powerful IR LEDs for a more stable condition of detecting and projecting, making the IR LEDs more approachable, and developing a friendly interface for users to input information.

For a physical installation, it would be helpful if I could have more people play with it for user tests and get more feedback. Besides, I also need to think about how to attract people. But the experience with physical interactive installation in large space is so valuable for me. It led me to consider the use of distance and space and how to coordinate them, for example, being aware of measuring the detectable area of the camera and IR LED in three dimensions. However, it was most successful in creating new experience for the cultural traditions as a ceremony and it has brought me a further thinking of the use of metaphors for the traditional ceremony as I continue to explore in coming projects.

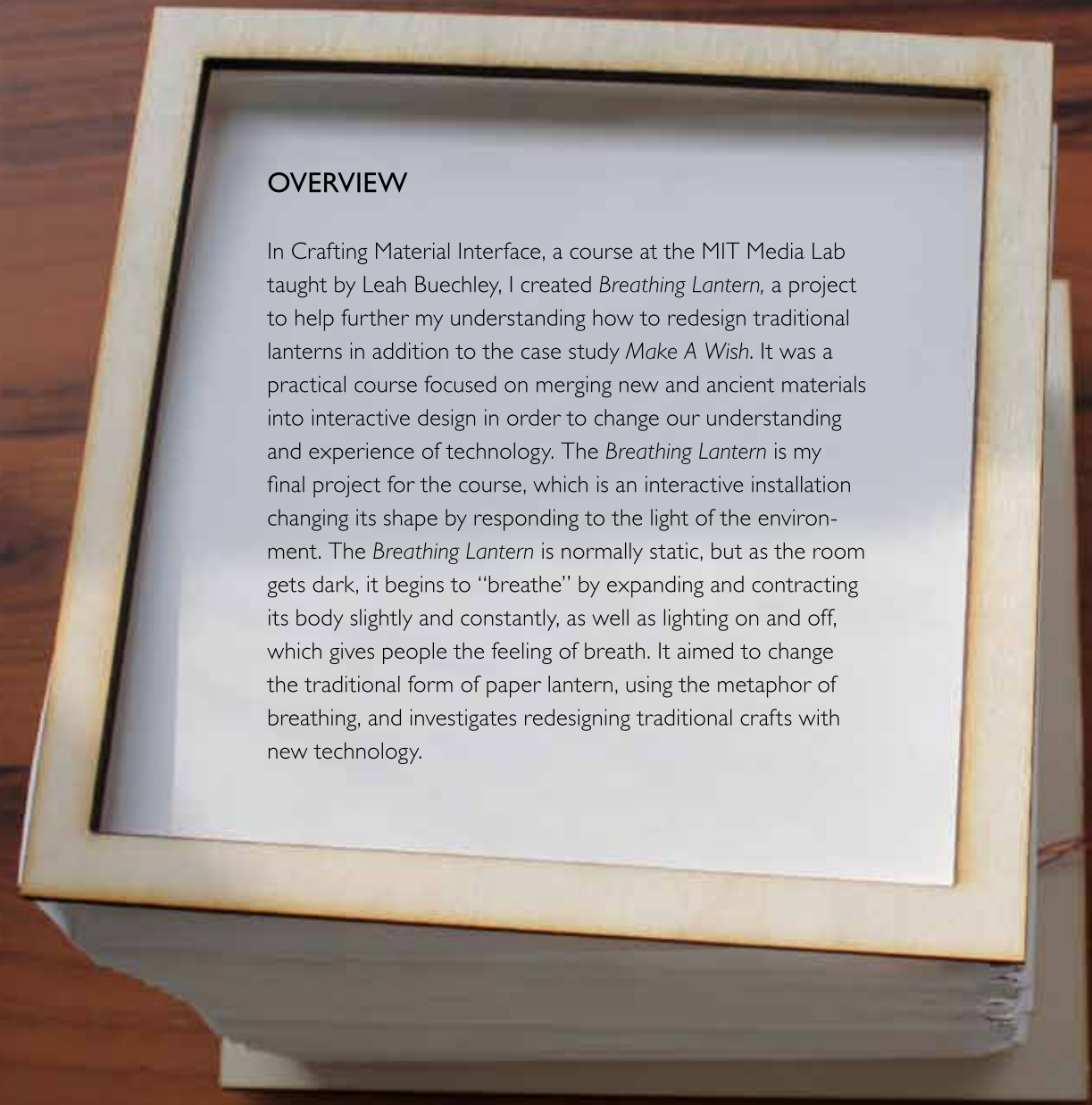
Breathing Lantern

CASE STUDY 3





The initial design concepts

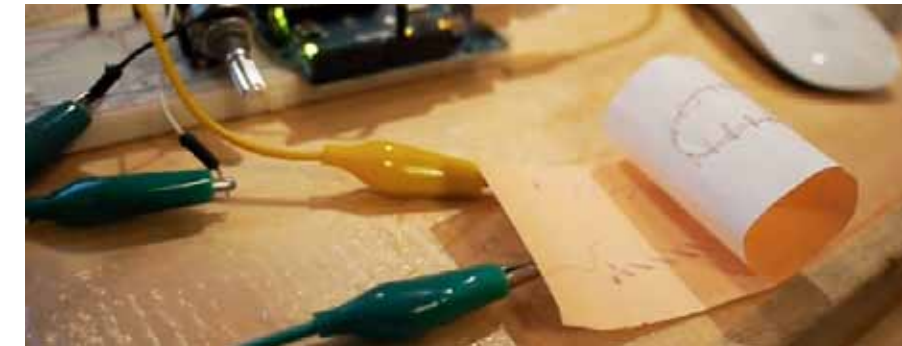
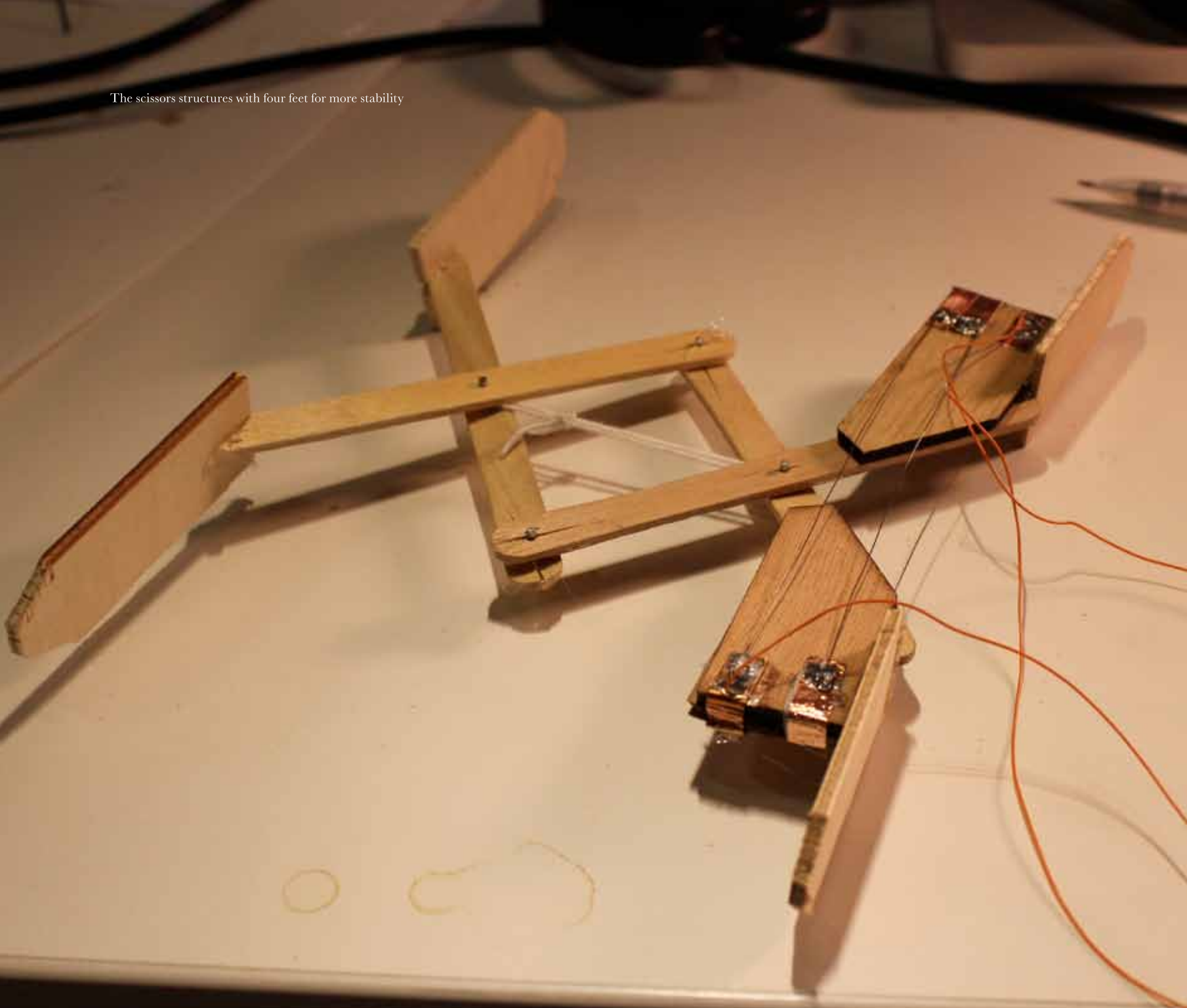


OVERVIEW

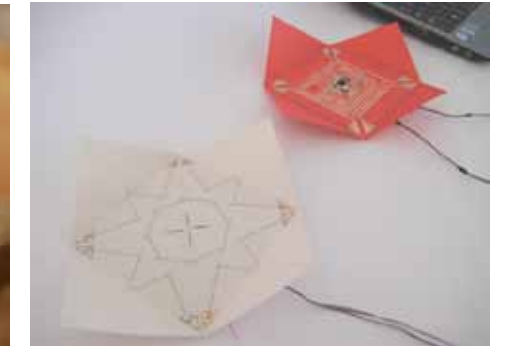
In Crafting Material Interface, a course at the MIT Media Lab taught by Leah Buechley, I created *Breathing Lantern*, a project to help further my understanding how to redesign traditional lanterns in addition to the case study *Make A Wish*. It was a practical course focused on merging new and ancient materials into interactive design in order to change our understanding and experience of technology. The *Breathing Lantern* is my final project for the course, which is an interactive installation changing its shape by responding to the light of the environment. The *Breathing Lantern* is normally static, but as the room gets dark, it begins to “breathe” by expanding and contracting its body slightly and constantly, as well as lighting on and off, which gives people the feeling of breath. It aimed to change the traditional form of paper lantern, using the metaphor of breathing, and investigates redesigning traditional crafts with new technology.



The scissors structures with four feet for more stability



Nitinol wire



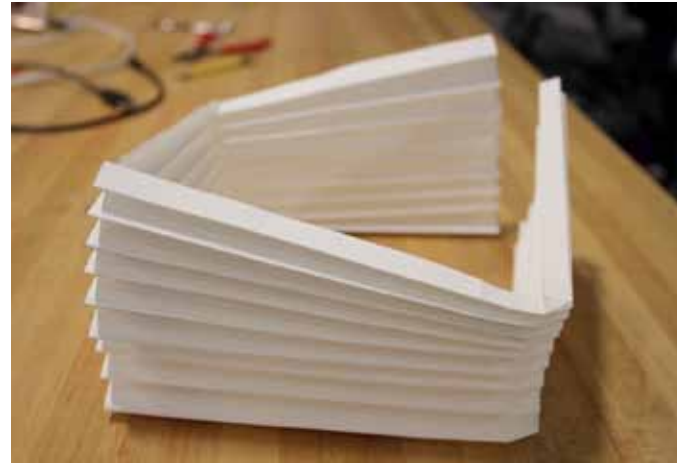
Self-folding Origami Paper by Jie Qi

CONCEPT

The *Breathing Lantern* project draws on earlier experiments that bring together high and low technologies. It aimed to change the traditional concept and format of the lantern. The idea was generated when I was experiencing the Nitinol wire in a couple of hands-on projects during the course's workshop. Nitinol Wire is a kind of shape memory alloy. According to Material Science, this alloy generally comes in the form of thin wires that can be baked in a certain shape at a certain temperature that it will then "remember," and return to when current is applied. It works great when we employed Nitinol as an actuator in some origami projects, a good example being the project called *Self-folding Origami Paper* by Jie Qi from the High Low Tech group of Media Lab. Actuated by shape memory alloy, it is a pair of origami papers, which senses how the other one is being folded and follows the folding automatically. It works as the first-step toward origami robotics and works great with traditional material like paper.

I was inspired by the idea of applying Nitinol with traditional paper lantern and wanted to bring the interactive experience to the traditional lantern. The main electronic components I used for constructing the *Breathing Lantern* are Nitinol Wires that I discovered from the *Self-folding Origami Paper*, LilyPad Arduino, and LilyPad light sensor.

The folded paper structure that is flexible to be expended and contracted.



PROCESS

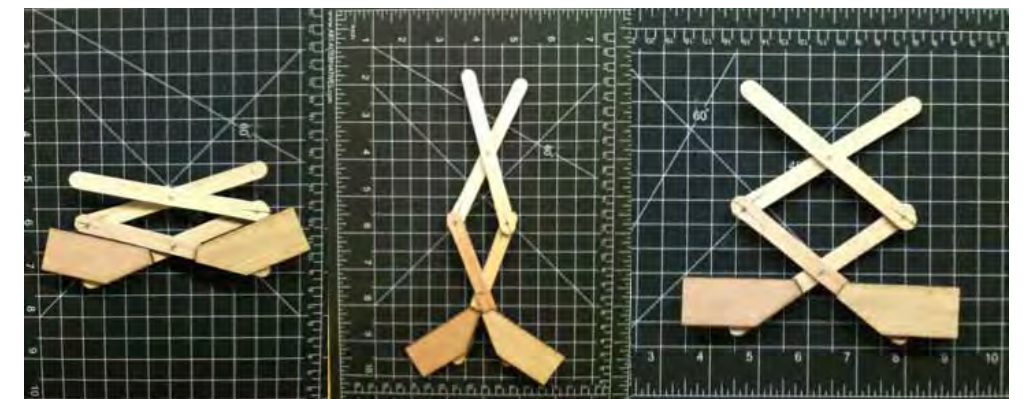
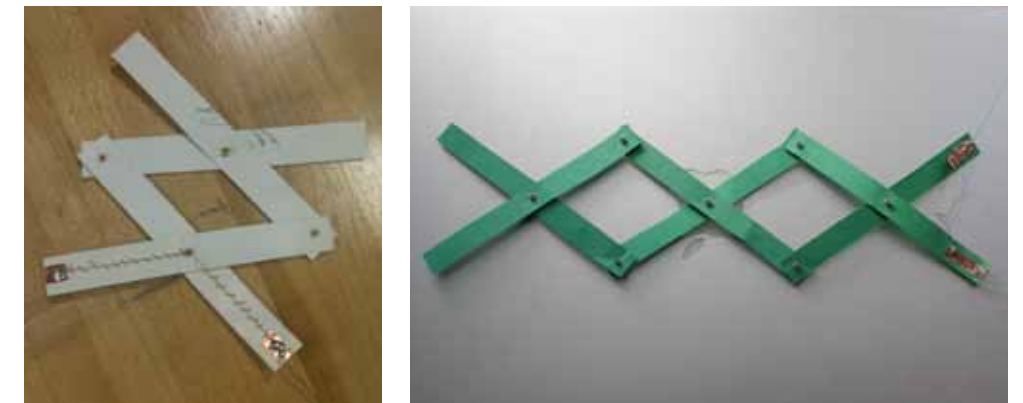
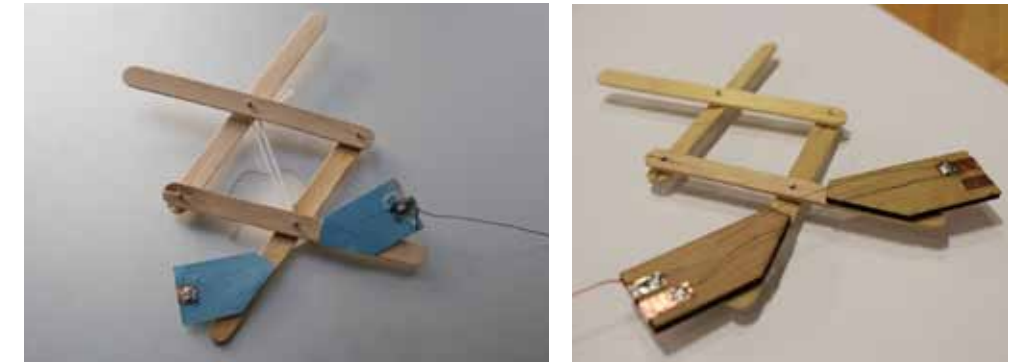
To begin with, I spent a long time experimenting with various frames to stabilize the lantern. I found the scissors structure fits well for my concept of lantern because this kind of structure makes dramatic change in length just by slightly contracting the width of the end. So I just needed to connect the end of the two sticks with a short piece of Nitinol for getting enough movement. After several experiments with paper, I built this construction with wood sticks and small pieces of wood board that works great to support weight and resist pressure. While I got the items as I expected, I added four feet to the construction for more stability.

For the surface of the lantern, I needed both flexible and stable material to realize the movement of the lantern. Thus, I employed several pieces of folded paper to build it up. It had taken me several days for testing various kinds of paper and folding methods according to their properties of standing and

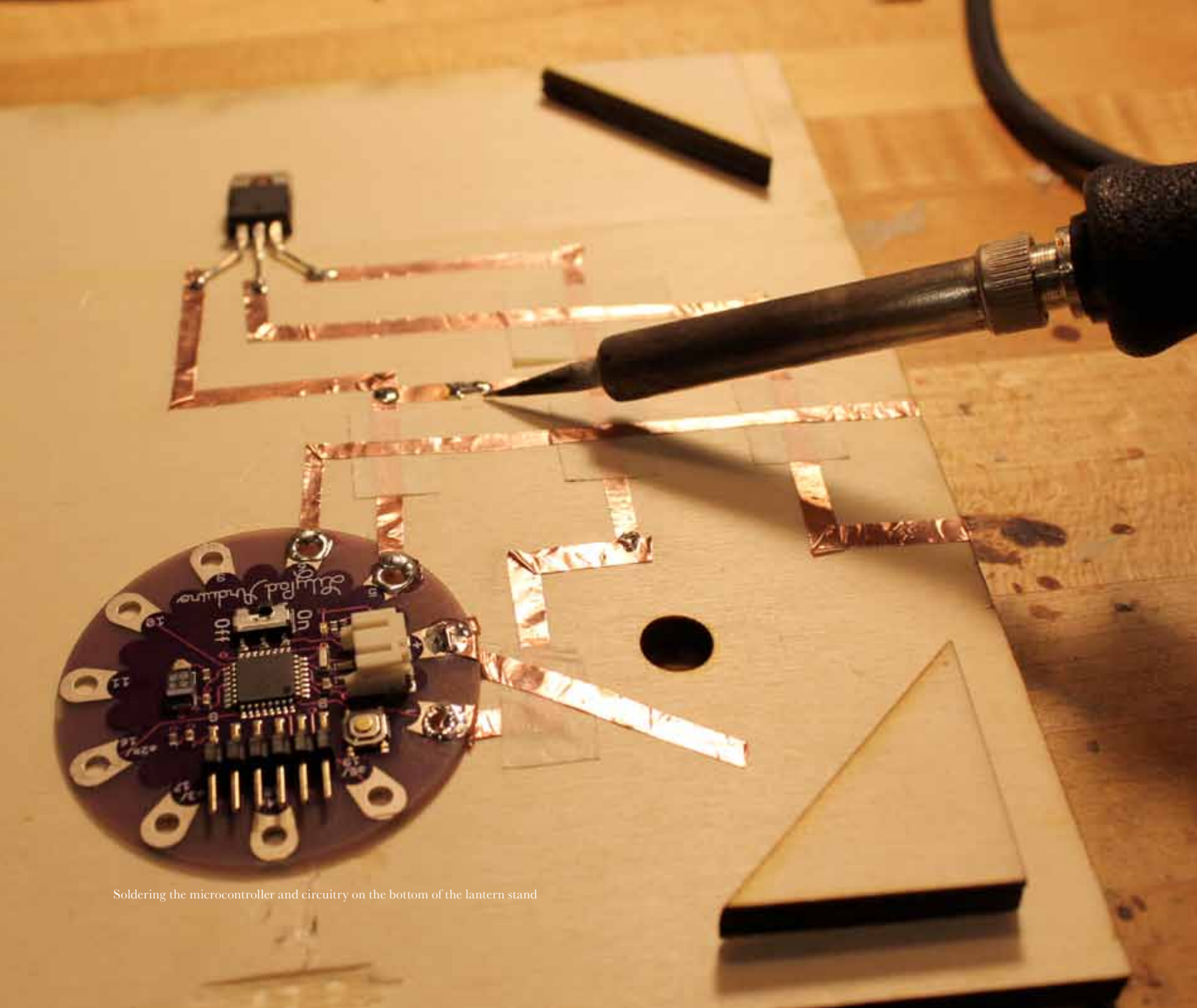
folding. Eventually, I came to the paper with proper texture and thickness for standing and folding. It is neither too thin that is easily torn nor too thick to be folded, and has some tension that is flexible to be expended and contracted.

Initially, my concept for this project was to use both Nitinol and a servo motor to realize both vertical expansion and rotation of the paper lantern. After I completed the programming part with Arduino, the construction seemed to work as well as the servo. However, I found the rotation of the lantern using a servo had overwhelmed the vertical motion of the lantern itself, which gave this sense of breathing. So I had to remove that part to focus on the movement of the lantern vertically.

Finally, I moved on to assemble each component together. To clean up a mess of clips and wires, the microcontroller and circuitry were soldered on the bottom of the body and were connected inside of the lantern through a tiny hole on the lantern stand. By doing so, it gave the lantern a clean look and a clear and distinguishable path of electric circuit.



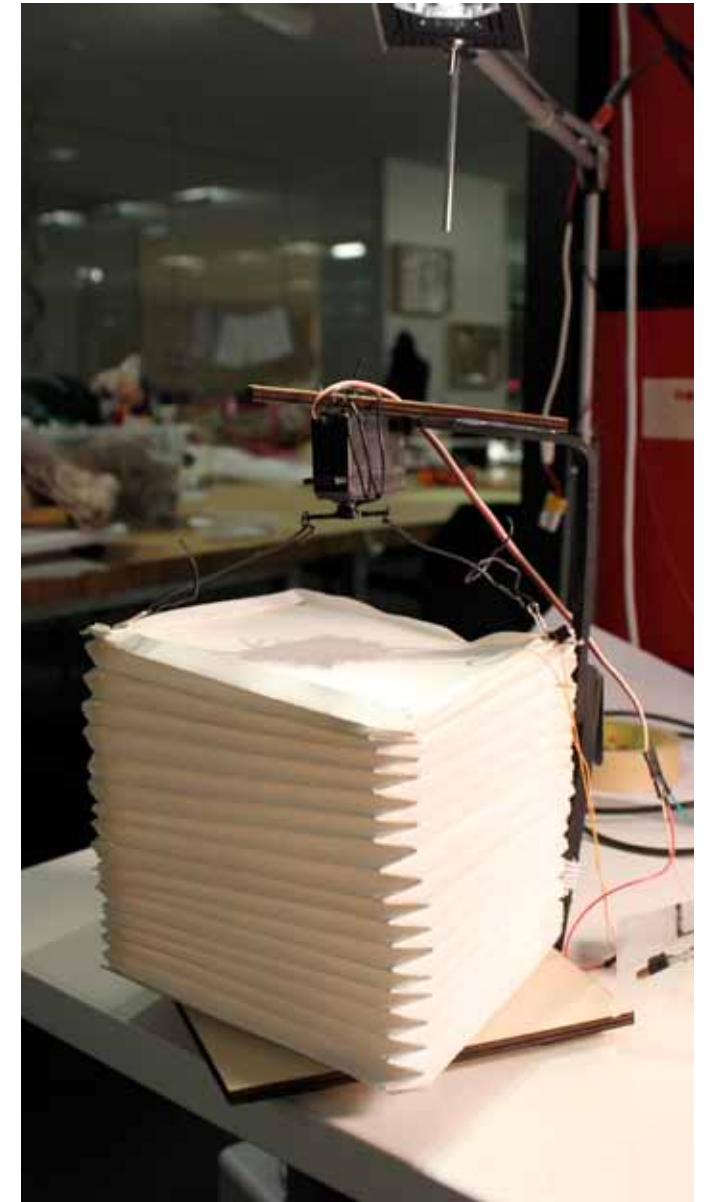
A couple of scissors structures I created



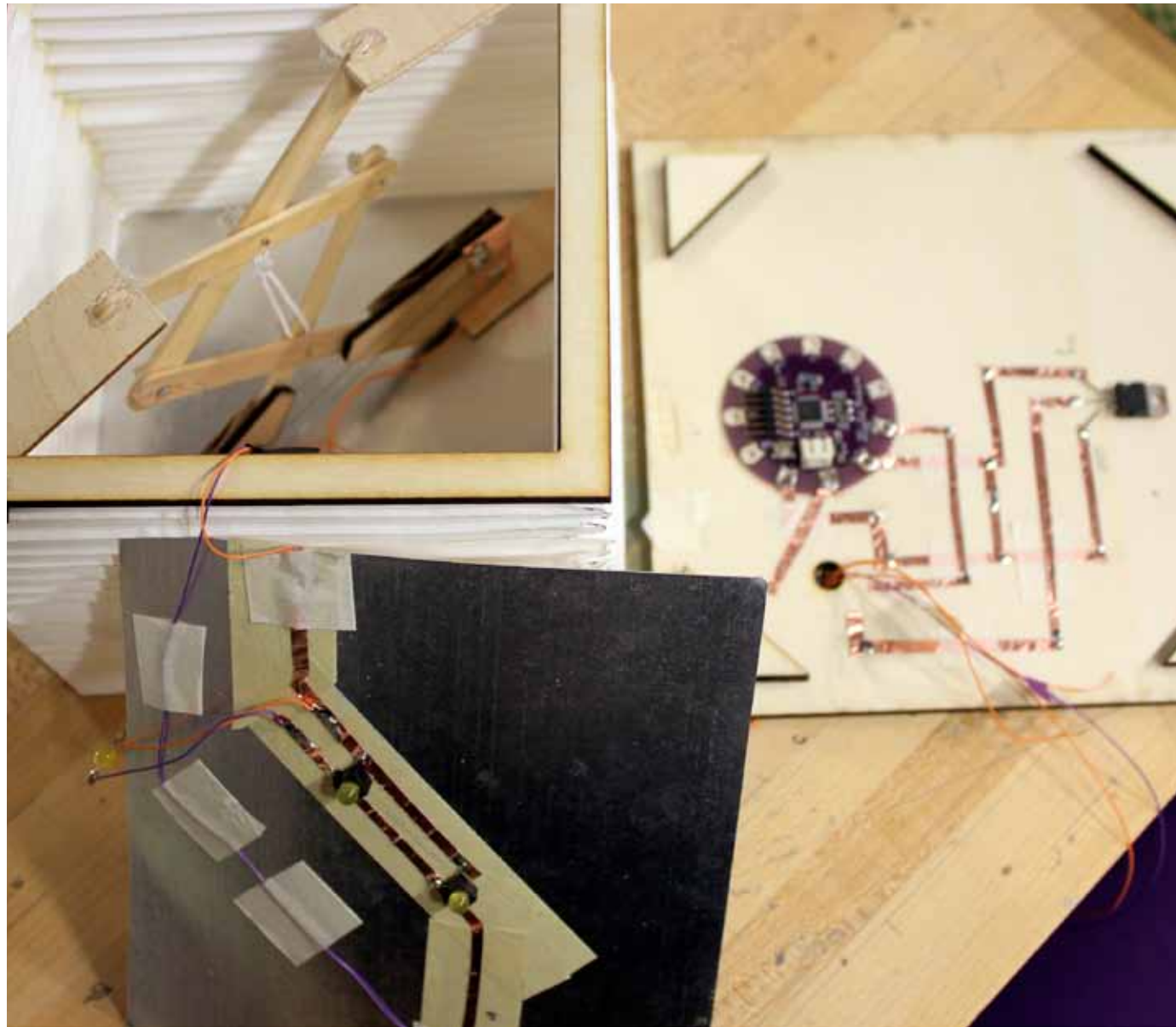
Soldering the microcontroller and circuitry on the bottom of the lantern stand



Inside of the lantern



Testing the servo motor



Assembling components together.

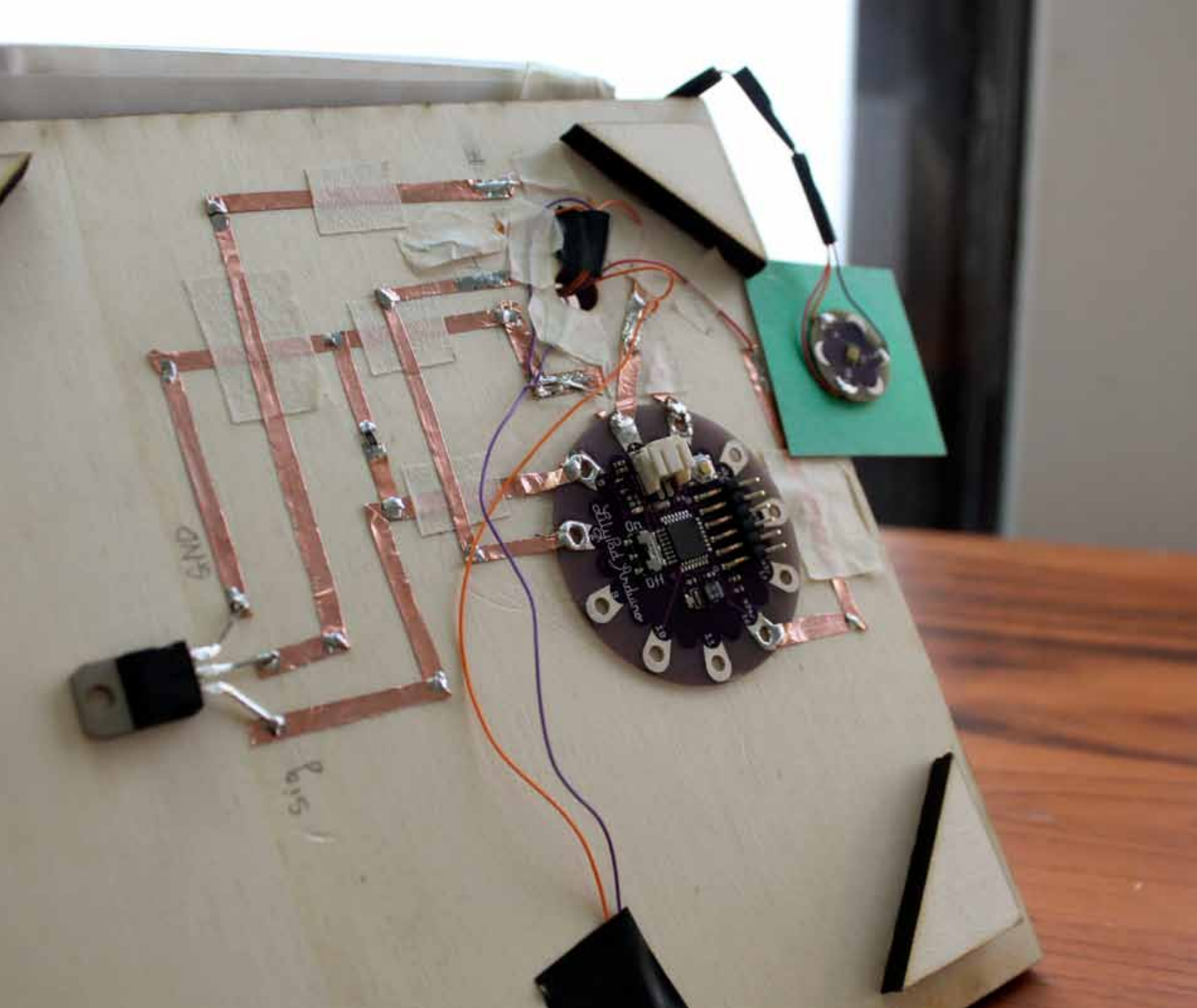
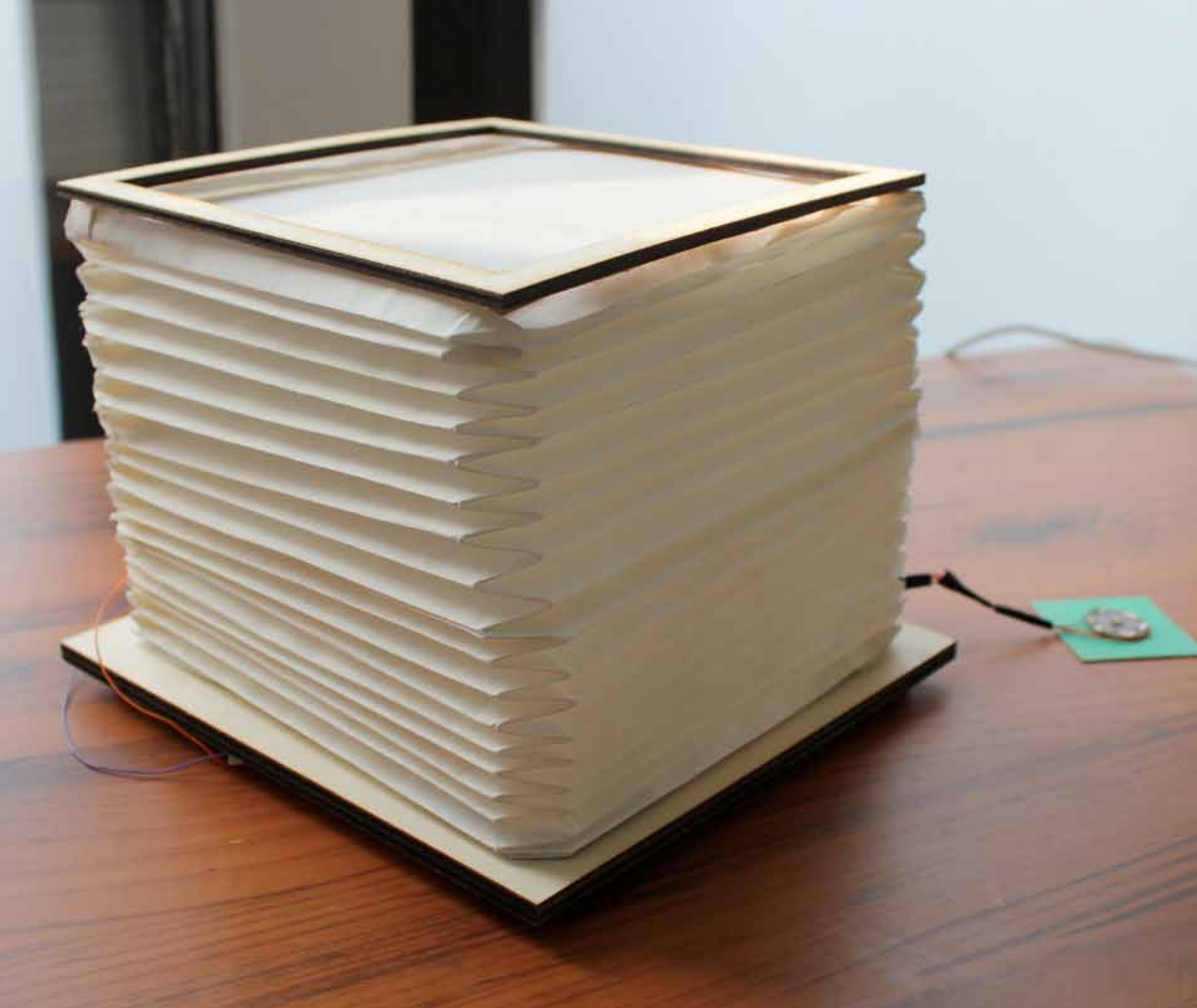
CONCLUSION

This case study was my exploration of applying new materials to traditional items to redesign in a digital interactive environment. Some new materials today including shape memory alloy, conductive thread, conductive ink and so on have given opportunities to diverse audiences in designing and building their own technologies in new cultural and material contexts. The research of these new materials inspires and supports the redesign of traditional crafts.

I actually had little experience in electronics before and it was my first time to build a complicated electrical system like this. I had learned building prototypes using electricity in a smart way after failing numerous times. Because of the time limit and lack of technical skills, I compromised on some functionality of my prototype, such as the sensitivity of light and stability of shape. But it is very helpful that I got some technical

advice for future development from Professor Leah Buechley and those experienced students from the Media Lab, such as the following: Regulating the circuit for transiting electricity efficiently; adjusting the construction to make it stable and being able to resist higher compression; using a stronger power supply.

It not only brought me to another level of understanding of the new materials like shape memory alloy but also developed my understanding of the way to make simple and playful actions for the users. When I brought it to the class, people liked the format of a traditional lantern I created and expected to find out a more subtle motion when they interacted with it. It reminds me that even when focusing on figuring out the technical problems, I should also be aware of the kinds of experience that I want the users to have from my project. For an interactive designer, it is very important to come back to the concept instead of only pursuing the technology.



Wishing Well

CASE STUDY 4



A wishing well at MoMA, New York

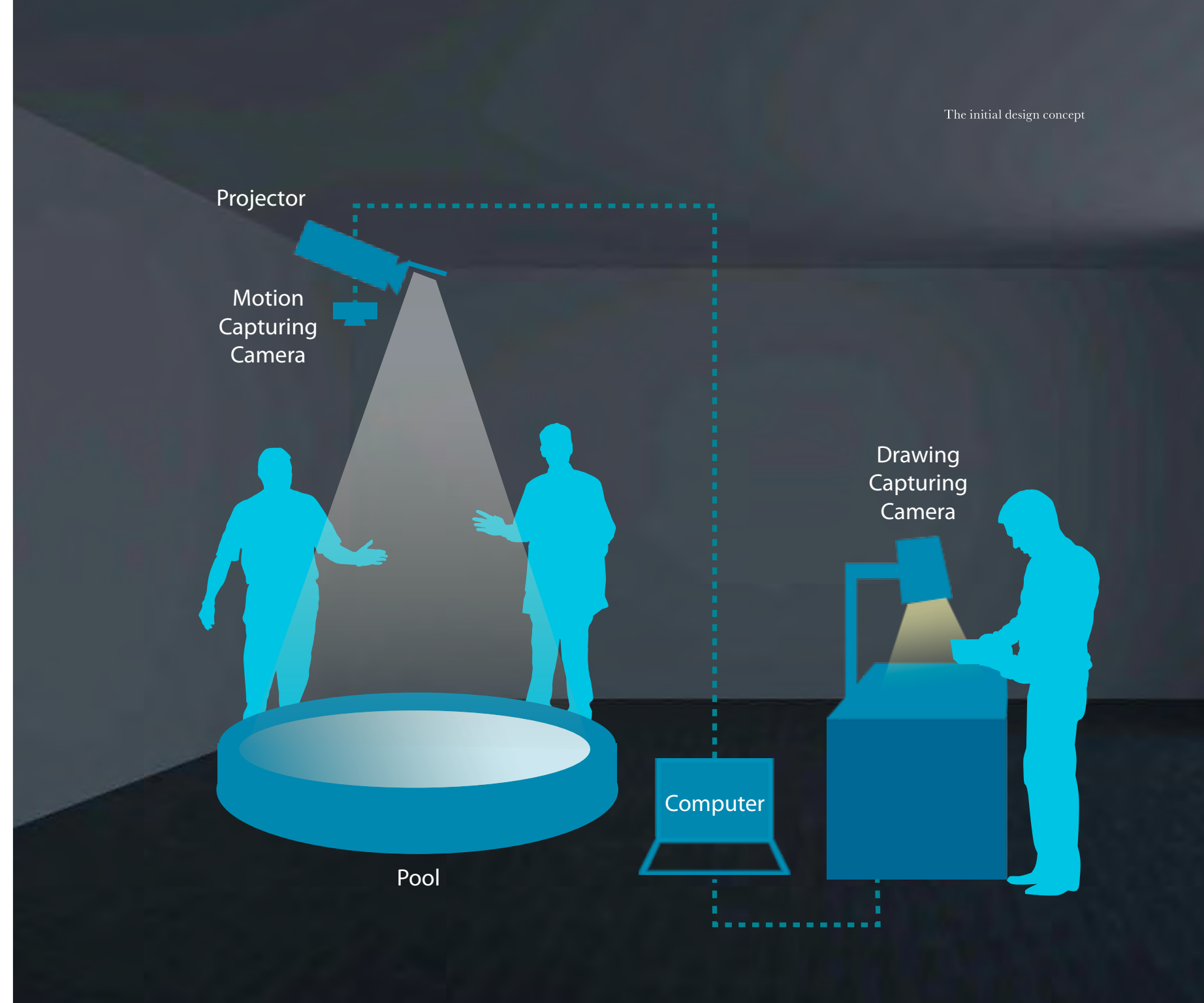


OVERVIEW

Wishing Well is an interactive installation that simulates the real life action of making wishes. Applying principles of dynamic media can endow the tradition of an interactive environment, and thus offer users a digital experience. The project is made up of two pieces: the projection of a pond and a drawing stand for users to complete drawings. It provides a platform to collect users' drawings and transforms them onto floating "coin"

images that are projected into the "well". Users can design their own "luck coins" and make their own wishes.

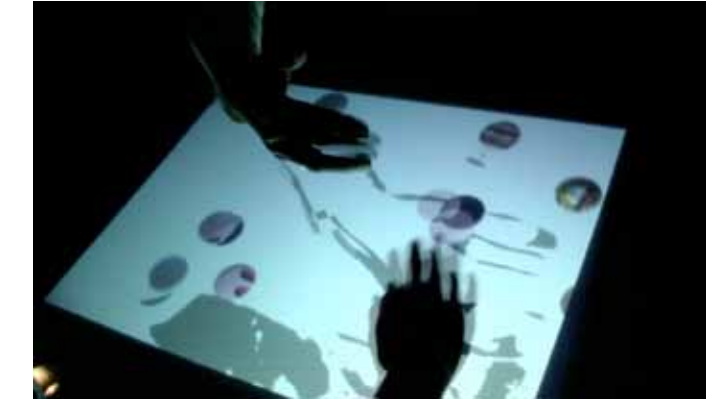
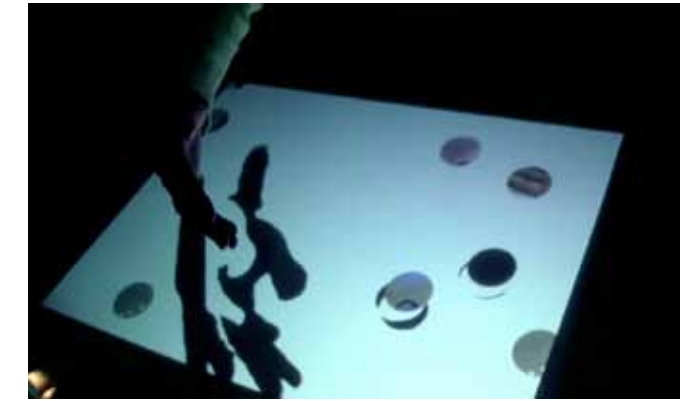
There are three main steps of interaction: first, create the coins by drawing or writing down anything inside the circle on a piece of paper; Second, click the mouse after completing the drawing to let the camera capture drawings, and wait to see the drawings projected in the well; Last, people are invited to leave and hang their works on the wall nearby to share their creation.





Some graffiti written or drawn in public places of Boston.

Interacting with the "coins".



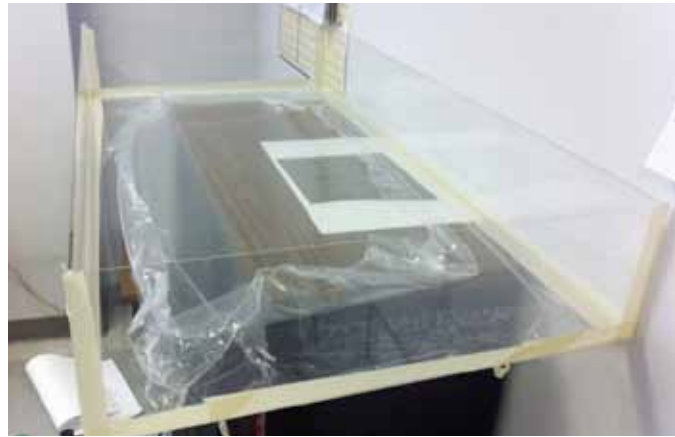
CONCEPT

Wishing Well was developed from an independent study with Professor Gunta Kaza from the fall semester in 2011. I wanted to make a project with drawings because of my interest in graffiti and its quick sketch style of images. So I researched many examples from the very early example like cave paintings 35,000 years ago to the contemporary graffiti art, the psychologists point out that it is human's natural instinct to draw on blank space. For example, small kids tend to draw on walls or paper before they are educated to know that it is not right to do so. I assisted Professor Kaza in a drawing course for sophomore students, and at the same time, I was doing research on drawings. During the classes, Gunta had adopted various ways to inspire students to draw. A variety of tools, such as oversized brushes and many irregular drawing tools (toothbrushes, straws, threads, and so on), were distributed to students to create drawings on large sheets of paper. Observing the drawing process was an inspiring experience. When the class came

to an end, drawings lined the floor of the classroom and the lounge. The process of hand drawing was exciting; meanwhile, coming from the background of interactive design, I could not stop thinking what and how to apply digital experiences to change the experience of hand drawing.

In my previous case study *Make A Wish*, I had also done some experiments on writings and drawings with the users. In that project, people create writings or drawings that are shown on the surface of sky lanterns. I am so involved in collecting handwritings and drawings created by the public. As a result, I wanted to further develop the idea of letting people join the activity of creating sketches in my project. As a concept developed from the tradition of making wishes, the *Wishing Well* employs the metaphor of coins in a well, which connects the digital environment of the wishing well with the real world. According to the experience I learned from my previous projects, the tradition of the wishing well is used in multiple cultures and could be more easily accepted by people from various backgrounds.

An acrylic tank built for the *Wishing Well*



Test of projecting on water



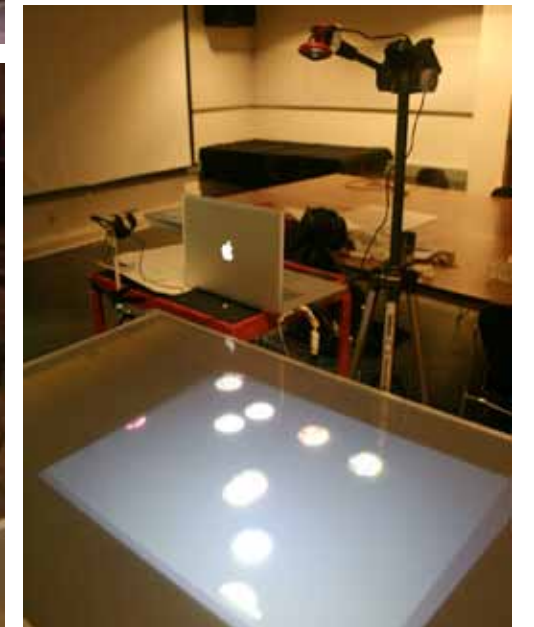
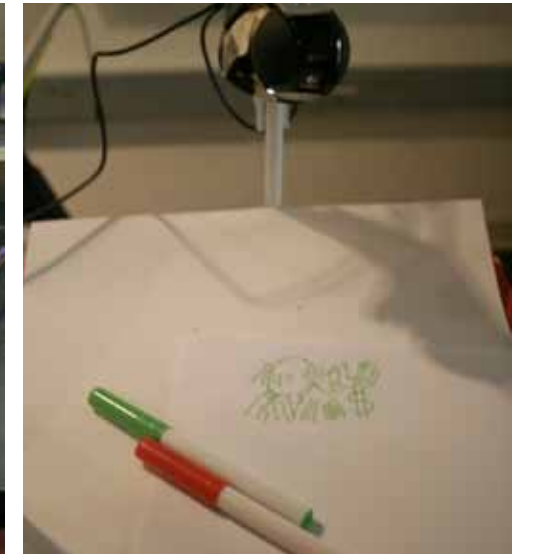
PROCESS

To take the advantage of having exhibitions for user tests, the *Wishing Well* was initially designed for the DMI 2012 *Fresh Media* exhibition and MassArt MFA Thesis exhibition. The concept had been changed a number of times in order to fit the needs of the exhibitions and the gallery space. At the beginning, I planned to use a kiddie pool filled with water, and project images straight into the water. A webcam was supposed to be installed on the top of the pool for capturing people's motion, so that the floating "coins" would bounce against each other in the water and interact with people's motion. For capturing drawings of people, I wanted to build a drawing stand. It had a webcam on top of it and a platform for placing paper on bottom. Every time people clicked a button, it took a photo of the drawings.

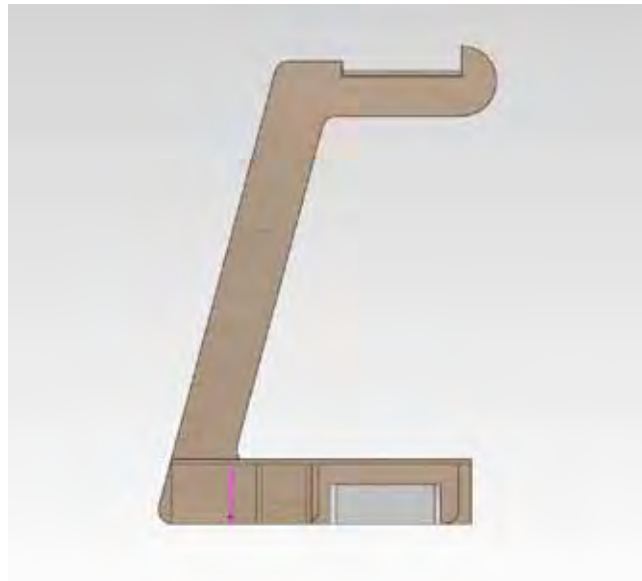
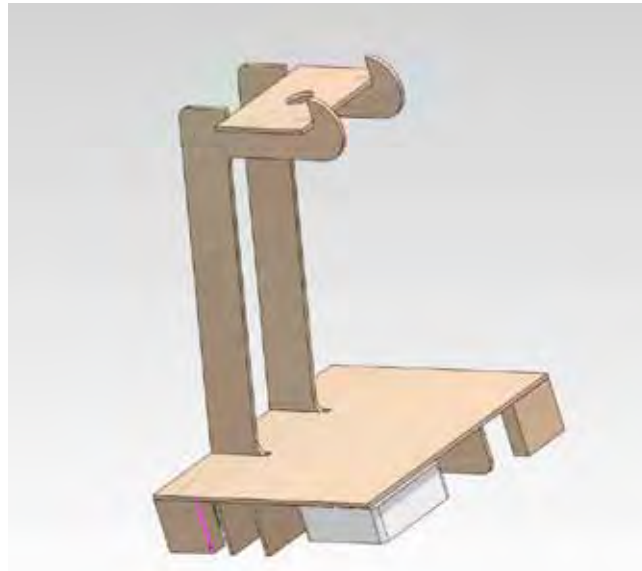
In the beginning, I built a basic prototype of the installation, played with it to see what would happen, and checked if the interaction was friendly to users. I used a webcam to capture the drawings and made them appear as if they were floating

on the interface of a large screen. The "coins" were able to respond to the motion of people, which was captured by a webcam set on top of the projection area, but the interaction and response did not go smoothly. In an ideal situation, they were supposed to bounce off when the user tried to catch them. However, the response was not so good; the "coins" were stuck. While I was building up the prototype at DMI studio, some of my classmates tried my project, and we had conversations about the interaction. In fact, I found there was enough fun for people just drawing and looking for their drawings on the interface. I think that maybe I focused too much on the interaction of the circles instead of the drawing part, which actually should be the key of this project.

With those suggestions from my first prototype, I came back to the core concept of collecting drawings and tried to make the project have a more concrete look, like a real wishing well. After I got the kiddie pool for testing, I realized that it was not metaphorical enough as a wishing well, to be shown in the gallery. My next attempt was building a large tank with acrylic and silicon by myself, which also failed, because the thin



First user test at DMI studio



Drawing stand layout

acrylic was not strong enough to support the pressure. Eventually, it cracked when it was shipped to school. Some other ideas just popped up, such as the film-developing container, garden pot, large bowl, or even a real fountain used for garden, but it is not easy to find something fits the project very well. At the last moment, I decided to build a pond in the gallery with wood frame, pond liner, and a quantity of pebbles. I could put the pond liner on top of a three by four feet large wood frame, and pour water into the pond to have the pond liner fit in the frame. Pebbles would pave the inside and be arranged on the outside of the pond in order to create a look of the real wishing well.

Wishing Well was first brought to the DMI Fresh Media show for a test. The installation there was not built as the final vision due to the limitation of space and transportation problem of the materials. But I used the pebbles that paved the floor for projection, opened a piece of the ceiling of the space and installed the projector inside, and put a mirror in front of the projector's lens to have the image projected on the pebbles underneath. In addition, I designed the frame of a drawing stand for users making drawings. I laser cut the stand with wood board, set up a webcam and flat LED lights (spotlights on drawings) on top, outlined the area on the platform for placing drawings.

For extra fun, there is a wall for users to hang and share their works with others, so people who came later also can find the works that had been done before. I was very happy that I left several lines of string with clips on the wall nearby. During the show a number of people displayed their drawings and there was almost no space left for people coming later to share. To avoid an empty show area, I just made a few strings for hanging. But the show area later became another attraction for people to stop and watch for extra fun.

Drawing stand for users making drawings





Visitors in the Fresh Media exhibition, 2012





The wall used for sharing users' works.



CONCLUSION

During the process of developing the project, I was nervous to bring such a large-scale installation into the gallery because of lack of experience with installations. Intense work was needed as well as attention to so many details for building up a project at the gallery space. It is ironic that I had worked for a gallery for years and helped with preparing various exhibitions before I came to DMI, but I never had a chance to join each part of preparing projects for shows. Going beyond the scope of screen media, I had to educate myself how to use electronic saw and screw driver with woodwork. I spent a whole day searching for nice looking and polished pebbles. It took a couple of hours just to adjust the size of every finger crosses for laser cutting the drawing stand in laser cutter's place. Many problems happened when installing it for the shows, such as some unpredictable programming problems that made the application crash, installing problems in the real space, coordinating with time and materials. But based on the experience that I learned from my previous projects, I was able to solve multiple problems and find ways to realize the project.

Observing people interacting with the project and talking with them for any questions was a great experience. I learned what would firstly attract people attention, what they thought about it, and the difficulties they encountered with the installation. The metaphor of making wishes with wishing well helped people understand the concepts. They could easily connect the interaction design with using a real wishing well. The materials I used like pond, pebbles and water have also given a clear

form and shape of the wishing well for engaging audiences with the concept of the real one.

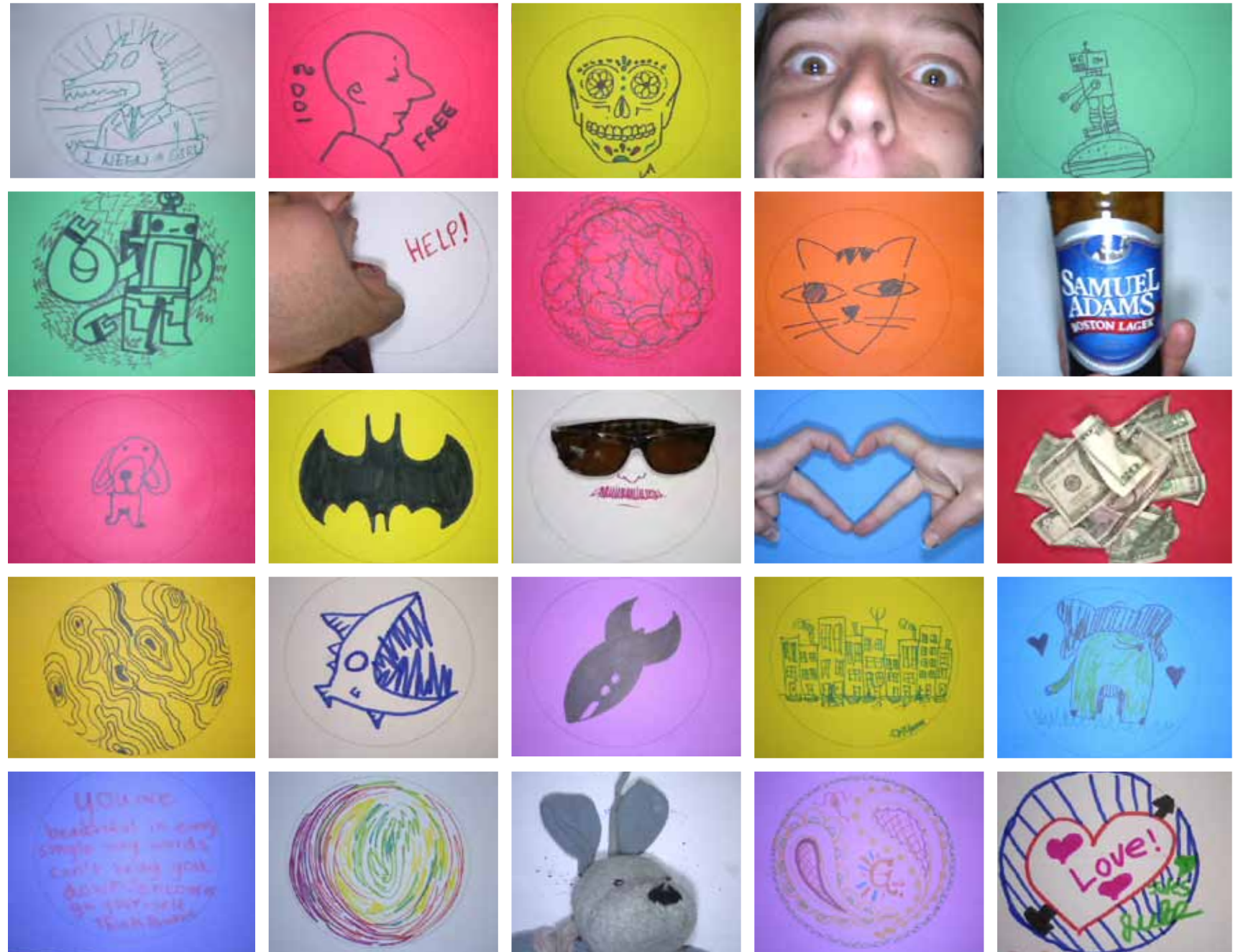
In the show space, people even created the rules themselves that brought extra fun. The "wishing well" displayed images of a variety of drawings and hand-writings as well as some abnormal ones such as pictures of bills, beer packages, a scarf, key chains, folded paper, people's hands, and even their faces. I think creating their own patterns with personal objects allowed people to have more fun, especially for people not comfortable drawing.

Some people took their time creating their drawings. They carefully selected different colors of paper and pens, adding decorations and so on. The users looked so excited to see their own creations being projected onto the "wishing well" immediately after they clicked the mouse. Some of them left and came back with friends to find and see their works. Also, the wall nearby worked as a gallery for showing people's drawings, which looked very nice in the space.

During the time of production, I was sometimes immersed into programming too much when I worked alone that I could not jump out of the technology and come back to the concept of the initial idea. I think it is very important for me to know what to reserve and what to ignore to simplify the projects. There is always unpredictable experience for the designers when a number of people are involved in the projects. But as an interactive project, people need to use it. Feedback from users is crucial for the designers to get better ideas for this projects and explore the potential development.



Visitors in the MassArt MFA Thesis Exhibition, 2012



Works created by users during the exhibitions.

Conclusion

RELATED THEORIES

My case studies introduce how interaction design is applied to redesign tradition via metaphor. The scope of my work was limited to the area of redesigning traditions—referring to art, ritual, and ceremony. What I have explored so far has given me some ways to apply the emerging technology to a cultural environment. Those experiences are related to users' concepts and attitudes toward applying technology in traditions and the potential to use them.

There is no fixed tradition. In different periods of time or spheres of research, traditions give designers different comprehensions. The understanding of culture shifts depending on where people live. Being interactive designers in a digital age, we keep updating with the newest technology, but don't have enough chance to look back. I have not simply reproduced traditions, but respond to traditions through the medium of interaction design.

Based on the observations made with my case studies, there are three important ways that dynamic media can redesign tradition with its cultural environment. First, shapes or forms can be changed due to the needs of redesign, but what should be reserved and developed from the traditions is more curial. Second, having a clear understanding of the target users, and the fact that they come from multiple cultural backgrounds, perceptions, and experience is an important fact to the design. Finally, it is significant to match the original cultural

tradition and provide appropriate ways of interacting so that people can naturally be a part of it. My first case study, *Learning Chinese Calligraphy*, refers to a specific cultural background. Most of my users are supposed to come from a background that had no prior experience with writing Chinese Calligraphy. Thus, it is important to make the learning process not only a playful experience but start from a basic level so users can be educated step by step.

Metaphors are integrated in my case studies to help users understand concepts easily and interact organically. I have learned that metaphors are cultural and contextual. People hold different ideas with specific items, such as colors, totems, and customs, because of their own experience. Designers should be conscious of the differences in traditions when picking metaphors that must span multiple cultures. People use various ways of ceremony for making wishes, but some commonly shared concepts, like the use of light, can inspire the feeling of hope that is employed in making wishes. In some of my case studies, lanterns were used to convey the concept of making wishes to ensure the content overcomes the barriers of language and cultural differences. In some of my previous projects, I tried to interpret my concepts based on the ideas that people commonly shared. For example, in the project called *the Solar System* I did in the Design Studio II class, I used the structure of the Solar System for organizing information, so that people can navigate through it easily with their experience of the real Solar System.

THESIS STUDY PROCESS

One of the most important lessons I have learned is the value of experimentation. People are unpredictable. I had to experiment and gather users to help test the projects. Only by trial and error could I understand why and how we perceive and interpret forms, motions, and behaviors in a certain way. Through the process of each case study, I had been testing, observing, stopping, reflecting, changing, and starting over. I could not know how the motion of Flexinol actuator wire worked in my *Breathing Lantern* project until I tested and burned it a number of times and restarted with a new one. It is like making coffee or tea. It is hard to get exactly what we want at the very first time, so we need the spirit of experimentation, and to try and try it again. When we don't like how it tastes, we will change the brewing time, add some water, milk or sugar so it eventually tastes how we like. Only by trying and tasting a couple of times can we have a cup of coffee or tea that fits our tastes. Accordingly, to develop my project, I feel that I need to do much more investigation and research to reach that point, and always need to uncover more things, when I was in the

process of production.

Sometimes I worked in solitude and tried to make the rules of interaction up by myself; however, I have found that this process was too isolating. When I was working on the "*Wishing Well*", I enjoyed many days staying at home and programming by myself. I tried to think about the rules but found it was somehow too predictable and too controlled. However, when I was setting it up at DMI studio, some of my classmates stopped by and played with my project for a while. Even though the project had not been fully developed at that time, by observing people interacting with it, I found what they like and what they dislike, what blocked the interaction and what attracted their attention. I found the direction that I wanted to develop with the "*Wishing Well*" after I had people interact with it. People's feedback was really helpful based on their experience of playing it. They were more focused on the changing the motion of circles than the drawing itself, which was not coincident with the original concept of the project. This kind of experience helped me to figure out the unpredictable results and pushed the concept further. The production process was fun with other people and ultimately more fun than interacting

with my final project.

In addition, simplicity is something I always need to keep in my mind, both for redesigning traditions and doing physical interactive projects. As said by Ludwig Mies van der Rohe, "Less is more." Simplicity brings a more enjoyable experience. When I added too many dimensions into the project, it became hard to understand by the users. Over-written rules will become obstacles for those who have no idea about my projects. For the *Wishing Well* project, it reached a much better solution by reducing the rules of interaction, keeping it simple but fun for exhibitions.

Coming from the background of graphic design, I have had plenty of fun to exploring physical interaction and it has brought my thinking from the 2D world into the 3D world. I plan to keep my awareness constant by working with multimedia. In my future exploration, I will try to combine screen-based media with physical interface for an entirely new viewpoint.

From the digital paintings, the print designs to the interaction designs, no matter what kind of media I applied with traditional elements, I have been looking for my own language

of redesigning with traditions. I used metaphors to connect people with their experience, thereby helped them to understand better. The natural forms adopted in my projects, such as pond, rocks, water, and light, humanize the digital world and make it less abstract to users. When I was facing many unfamiliar users in the exhibitions, the metaphors enabled the users to identify themselves with information I want to give without much explanation. In the future, I will continue to explore the use of metaphors with screen-based media to develop richer experience.

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