Project by : Faryal Khalid   CMU School of Design Graduate Thesis   Advisor : Bruce Hanington

NEAR

connecting couples living over long distances

ABSTRACT

The pressures of job markets and globalization have forced an increasing number of couples to live apart. Technology mediates most of the communication for long distance couples but while it is efficient in transmission of information it has failed to allow couples to experience true closeness, in a natural, seamless manner. Through a yearlong research project, I propose 'Near'— a system that takes into account the unique needs of long distance couples to ensure that they experience closeness through expressivity, awareness and joint action. The focus of the project is to allow for an emphasis on emotion and shared sense of place.

Faryal Khalid
Graduate Student

Date _____

Bruce Hanington
Associate Professor
Director of Graduate Studies

Date _____

CONTENTS

INTRODUCTION

Back in the day when it took weeks to simply get a message from one town to another, people could never have imagined that getting a message across half the world would be a matter of one click and mere seconds. Communication, its challenges and the intersection that it has with the ever-changing world of technology — each impacting the other — has always fascinated me. Therefore, I considered my thesis project in this general field of study. Before focusing in on a particular question, however, I decided to take a step back and consider a broader question, 'What does it mean to be in touch?' which soon led to the inquiry, 'When is the need to be in touch most crucial?' This set me on a path that ultimately led me to explore the space of communication over long distance and how it impacts the relationship of people living at a distance from one another. As I delved deeper into this problem space, I shortlisted my potential subjects to long distance families and long distance couples. After some further study, I felt that the communication over long distance for couples was a richer context for design exploration and more appealing to me.

Pressures of job markets and globalization have forced an increasing number of couples to live apart. According to a study by the Center of Long Distance Relationships[1] there are just over 7 million couples in the US alone who are in a long distance relationship. Between 2000 and 2005, there was an increase in long distance marriages by 839,000 and the number of long distance marriages is constantly growing. With these increasing numbers it becomes even more essential for long distance couples to feel more connected to each other. With the rise in ubiquitous computing, mobility, and social networking, the collection and exchange of digital artifacts is increasing. Technology mediates most of the communication for long distance couples and in this regard, the exchange of digital artifacts offer a potential solution. As I started my work on this project I hypothesized that digital artifacts and the means of their exchange fail to embody true nuances of a couple's connection as opposed to their physical counterparts. Interaction with technology is still remote and ephemeral in human lives. Through my project, I wanted to explore how digital artifacts, the interaction and their place in a couple's day to day life can be designed and modified so that while apart they can feel closer to each other. How can their exchange become a quality, unique and personalized experience as afforded by their physical counterparts? Rapidly evolving technology and digital artifacts are here to stay and the goal was to fully explore the potential that they allow.
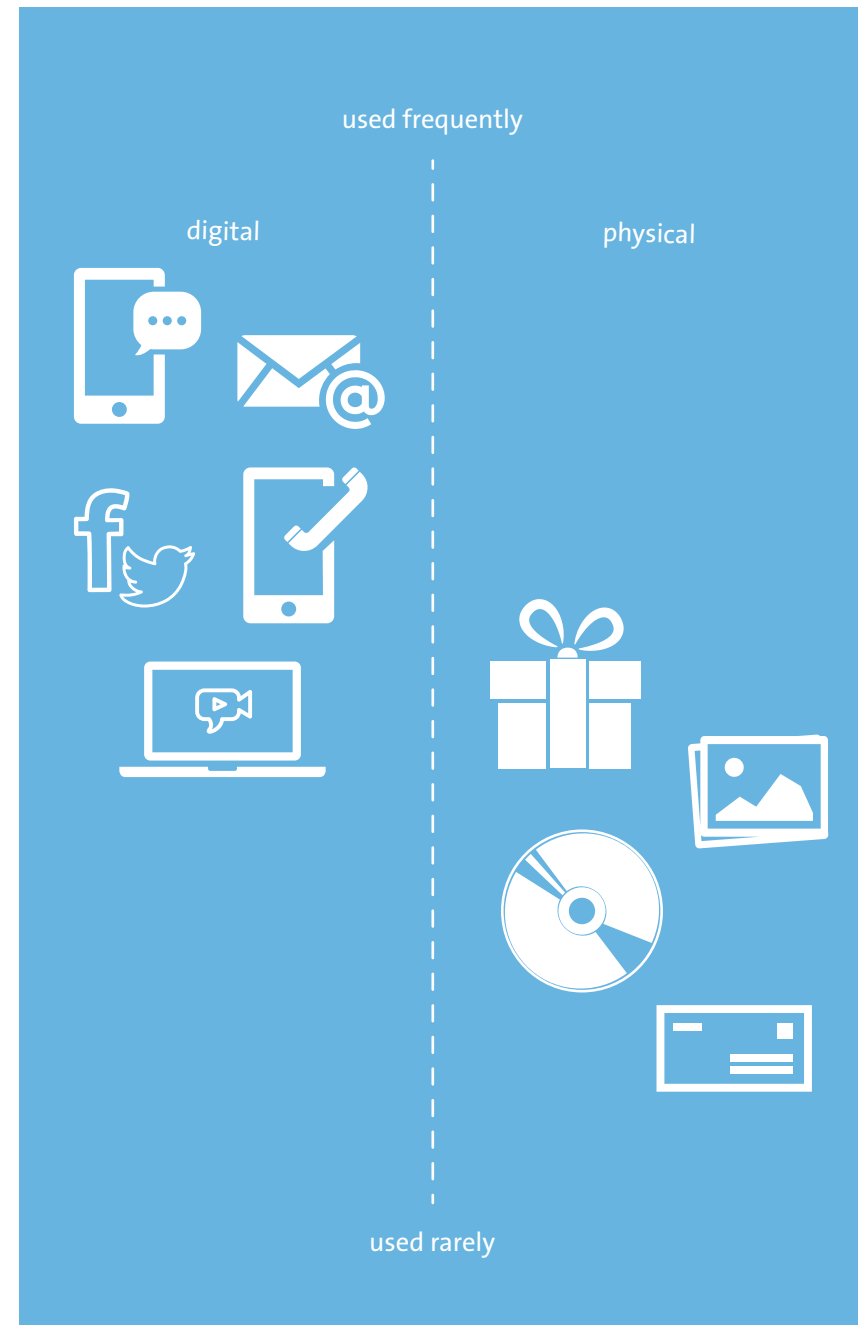
[1]http://www.longdistancerelationships.net

Fig. 1- artifacts mediating long distance communication

LITERATURE REVIEW

As I started my research, I realized that my project lay at the intersection of two very distinct fields of study- behavioral psychology and design. My literature review consisted of books, journals, case studies and articles from both these fields.

PSYCHOLOGY

I started off researching topics such as memory evolution, languages of love and self-actualization. Self-actualization is defined as the motive to realize one's full potential. Maslow's hierarchy of needs is a theory outlining the basis of human motivation with self-actualization at the core (Maslow, 1943). In this theory, Abraham Maslow outlines stages of growth as they meet human needs such as physiological, safety, love and belonging, and esteem, ultimately leading to self-actualization. Since people are complex many of these motivations can play out at the same time. Upon seeing Maslow's pyramid I realized that just as humans strive for self-actualization as they grow, so does a relationship and therefore the needs of couples might also fall into these categories.

Physiological needs translate to daily tasks and future goal setting so that the relationship is grounded in reality yet leans towards the future. This is the most important need and must be met for the survival of the relationship since it lies at the foundation of the pyramid. Safety takes the form of commitment, loyalty and trust which are the basis of a secure relationship. Belonging becomes love and affection through both verbal and non-verbal cues. Esteem is the value each partner feels in the relationship. Self-actualization can therefore be interpreted as the relationship and individuals in the relationship reaching their full potential. For long distance couples, communication must satisfy all these needs so that the relationship can grow.
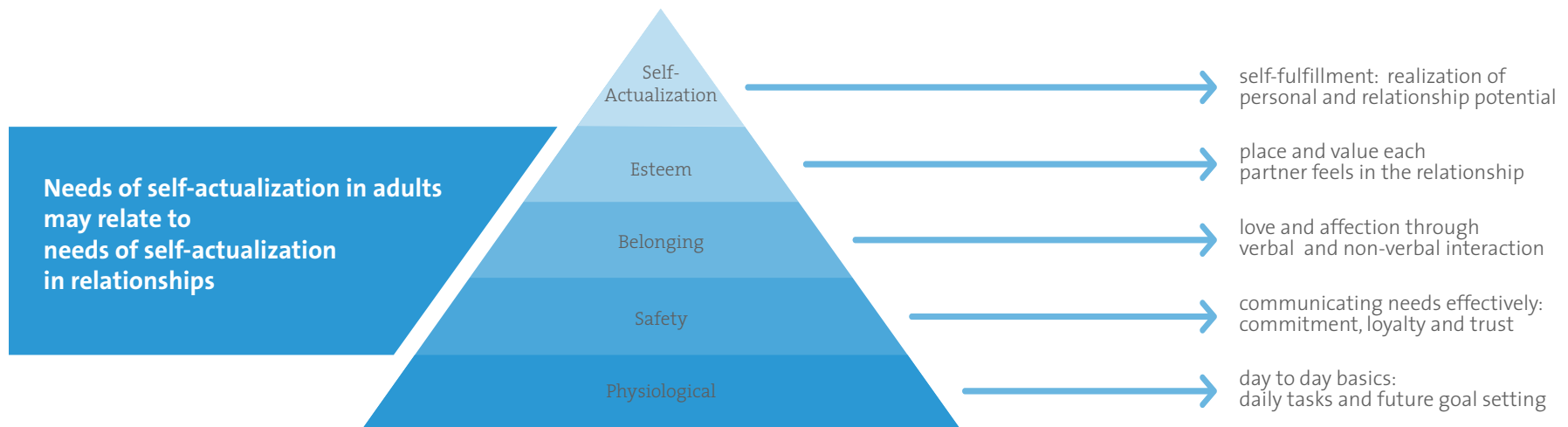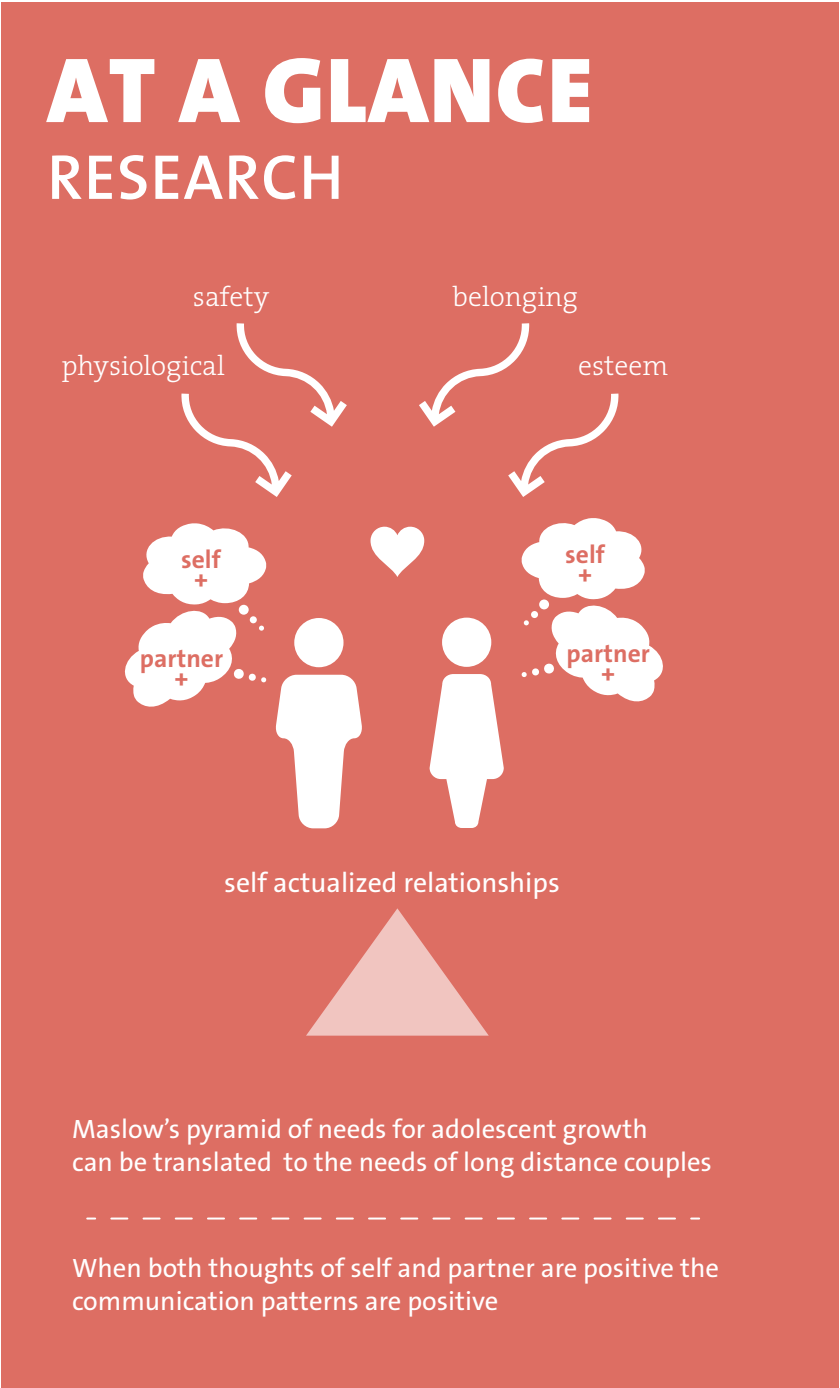

Fig. 2- translation of Maslow's pyramid from adolescents to long-distance couples (Maslow, 1943)

Another framework that informed my study is that of attachment styles based on 'The Five Languages of Love' by Gary D. Chapman. The framework outlines that there are four kinds of attachment styles- secure, preoccupied, dismissive, and avoidant (Chapman, 2015). Each of these impacts communication patterns and preferences, and in long distance relationships these get manifested and magnified even more.

THOUGHTS OF SELF

	POSITIVE	NEGATIVE
POSITIVE	**Secure** Feeling comfortable with your own and partner's place in relationship	**Preoccupied** Feeling that the responsibility to ensure a good relationship solely lies on you
NEGATIVE	**Dismissive** Feeling resentful towards an overly attached partner- wanting independence	**Fearful** Feeling trapped in the relationship- avoiding one another

THOUGHTS OF PARTNER

Fig. 3- attachment styles (Chapman, 2015)

AT A GLANCE
RESEARCH

safety   belonging
physiological   esteem

self +
partner +

self +
partner +

self actualized relationships

Maslow's pyramid of needs for adolescent growth can be translated to the needs of long distance couples

When both thoughts of self and partner are positive the communication patterns are positive

DESIGN

Once I had a basic understanding of the psychological factors of relationships, I shifted my focus to learn how human connection in general and long-distance relationships in particular took cues from physical and digital artifacts and environments. Some of the topics I researched were emotionally durable design, artifactual libraries and communication practices of couples. I found the research done by Mihaly Csikszentmihalyi and Eugene Rochberg-Halton- 'The Meaning of Things-Domestic Symbols and the Self' particularly useful in clarifying the problem space (Czikszentimihalyi & Rochberg-Halton, 1981). They researched their participants' domestic spaces and the things that they owned. When participants were asked to bring items that allowed them to feel connected to memories and loved ones, physical things were most common, despite the quantity of electronics and digital products in their homes. In this research Csikszentmihalyi and Rochberg-Halton concluded that people felt more connected through physical artifacts such as photos and letters because they were most visible. For example, a photo on the desk may not be something that people notice everyday but they are aware of it's existence because of its tangible placement, while digital photos live insidecomputers, buried in folders and can be lost with one device breakdown.
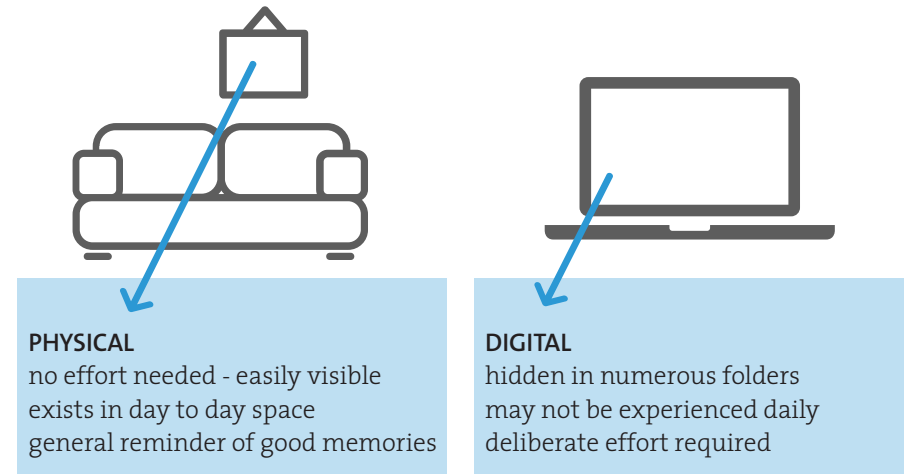
PHYSICAL
no effort needed - easily visible
exists in day to day space
general reminder of good memories

DIGITAL
hidden in numerous folders
may not be experienced daily
deliberate effort required

Fig. 4- physical vs. digital artifacts in domestic spaces

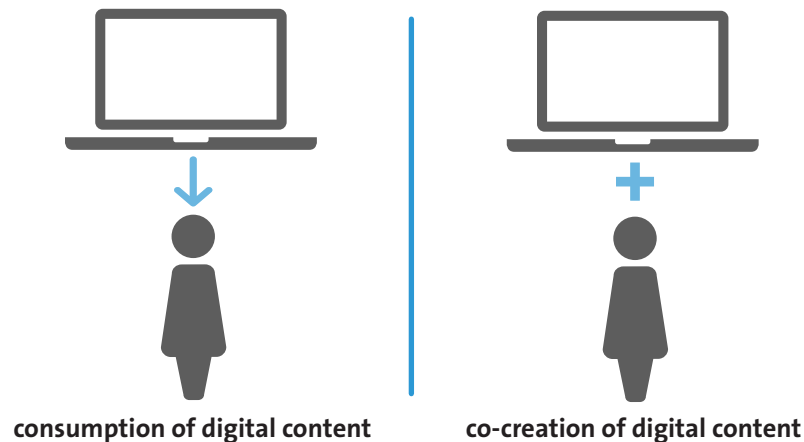**consumption of digital content**

co-creation of digital content

Fig. 5- phases of digital landscape change

Additionally, the research by Neil Beagrie on personal, digital libraries and collections allowed me to focus specifically on the digital realm. In his paper 'Plenty of Room at the Bottom? Personal Digital Libraries and Collections', he explains that with the influx of digital information around them, people are rapidly creating a digital landscape of their lives (Beagrie, 2005). There is a changing focus from consumption to co-creation of digital content. Today people make, capture and store an accelerating amount of data, which makes the need to create a narrative around it even more crucial for memory mediation and sharing. In long distance communication couples share a lot of data but it is fragmented and tied to certain devices unable to link to one another. For seamless communication this fragmentation of the experience must be overcome. Connection should be experienced with least bit of effort so that the moment of closeness can be experienced fully.

In another study observing intimacy in long distance couples over video chat, it was concluded that couples mostly use video chat to find opportunities for doing activities together (Neustaedter & Greenberg, 2012). Video chat is currently the means of connection where couples can be most connected. However, contextual problems such as scheduling conflicts and technical issues such as bad video quality create breakdowns that frustrate couples more than it connects them.

AT A GLANCE
RESEARCH

positive memories

Physical objects have a direct co-relation to positive memories, more so than digital artifacts

- - - - - - - - - - - - - - - - - - - -

Digital content today is not about simple consumption but also co-creation

- - - - - - - - - - - - - - - - - - - -

UGH!

Breakdown in video chat causes more stress than closeness for long distance couples

THE DISCOVERY

After my initial literature review I had a better grasp on different frameworks through which the communication problems of long distance couples could be interpreted, but I didn't know exactly what these problems were.

WHAT ARE THE PROBLEMS?

It was important for me to hear from real couples in long distance relationships and to do so I started off by sending out a survey. In order to take the survey, participants had to be in a long distance relationship, had been in one over the last two years or anticipated being in one in the next six months. The survey started by getting the basic set up of the relationship, reason for long distance and then delved deeper using open ended questions to inquire about the couple's communication patterns, unique practices and challenges faced. I made sure that the survey answers were specific and not just a generalization by seeking actual stories of the last time they felt close to each other while living apart, the last time they had a major argument when living apart and the last time they had to make a difficult decision that concerned both of them while being long distance. The participants predominantly listed scheduling conflicts, confusion about status of relationship, radio silence during fights and anxiety about their phone calls becoming a chore as their main challenges.

7 ➡ You...*

A are currently in a long distance relationship

B were in a long distance relationship in the last two years

C anticipate being in a long distance relationship in the next few months

D are not someone who falls under any of these three categories

17 ➡ Please tell me about the biggest challenges that you experience in your long distance relationship. And why?

18 ➡ How do you currently navigate through these challenges?

Fig. 6- snapshots of the survey

WHY DO THESE PROBLEMS EXIST?

Once I had a better understanding of what some of the problems were, my next stage was to focus on why the problems exist. I hosted a workshop for 10 participants that lasted 40-45 mins and comprised of three activities.

Map Out Your Day: In the first activity participants had to map out the times that they interacted with their significant other during the course of the day and if the pattern changed on any special days. This allowed me to extract information about how routines inform communication, what artifacts are used and what challenges are faced.

Map Out Your Space: The second activity asked participants to map out the spaces in which they interact with their significant other. This enabled me to see where the communication occurs as well as how the spaces informed the artifacts and channels used.

Magical Orb: The third activity asked participants to assign qualities to a magical orb that could fix all their long distance problems. This activity allowed me to gauge what the preferred future looks like.

Postcard: The last activity was a post-card that they wrote to their relationship. Participants were asked to take this post card with them and fill it out after seven days following the workshop. They used the phrase 'I Like' to write what they liked about their long-distance communication and the phrase 'I Wish' to write what they wanted to change. This was meant as a reflective exercise so that they could write any additional details that we hadn't discussed in the workshop.

Fig. 7- workshop materials

HOW DOES EVERYDAY LIFE IMPACT COMMUNICATION?

After synthesizing the results, I realized that all the activities asked participants to give details of short term interactions. However, an important factor to consider in long distance relationships is the fact that separate lives, routines and numerous external factors also play an important role in a couple's communication over time. I conducted a week long journal study with six participants. The journal aimed to find out how personal mood, daily activities and routines impacted the communication landscapes as well as the artifacts used over a longer span of time.
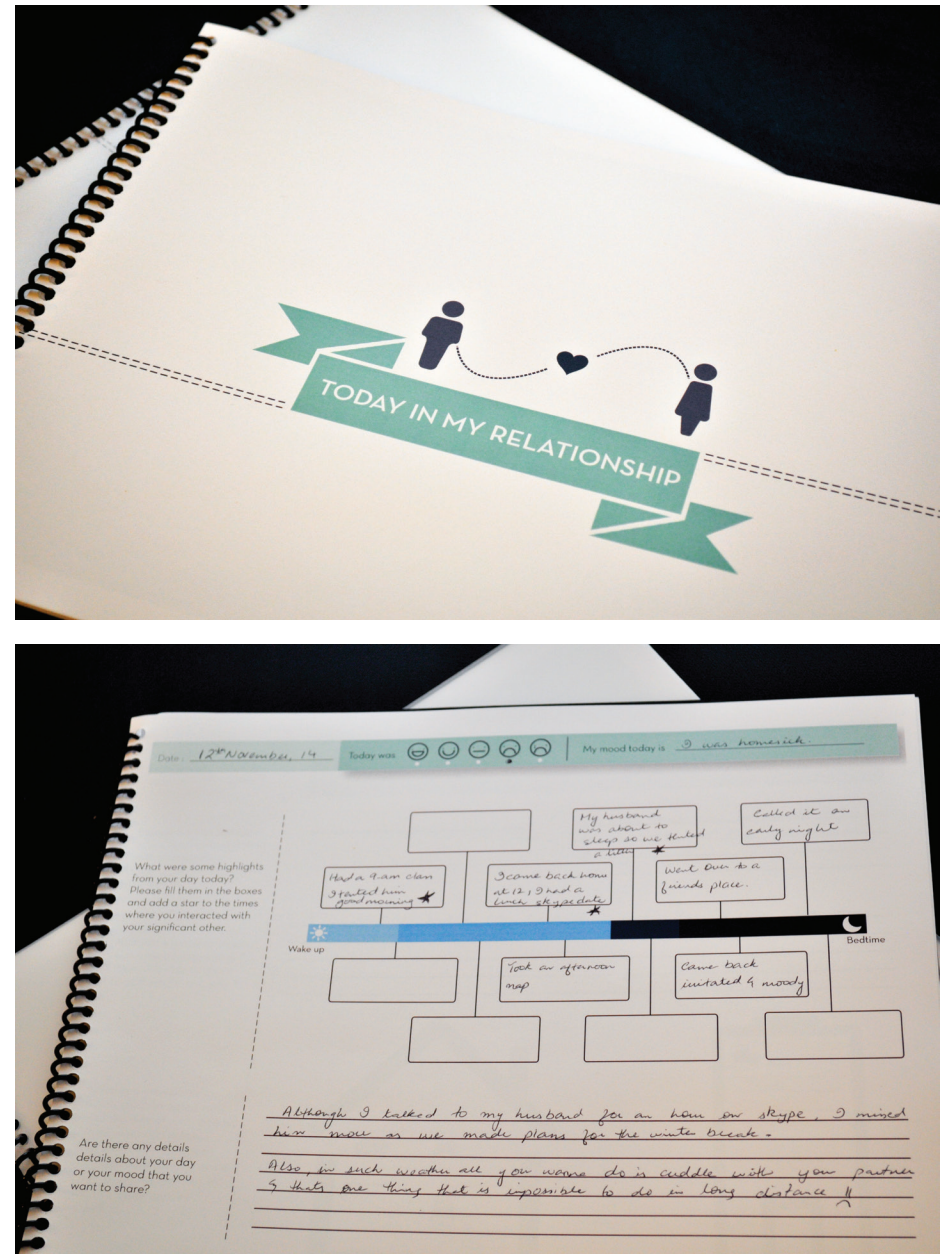

Fig. 8- long-distance journal study material

SYNTHESIZING THE DATA

NEEDS

As I was collecting all this data from the numerous activities, I also started synthesizing in order to see how it informed my future directions. Since I had used Maslow's Hierarchy of Needs earlier to conceptualize the growth of relationships, I could now write out the specific needs that couples expressed and see how they made up the broad buckets of Maslow's pyramid. Each relationship is unique and therefore the couples' needs varied greatly but after going through a few permutations of the data, I ended up with a list of six basic needs that all long distance couples had. They expressed them in different manners but the underlying root was the same. Participants expressed that it was hard to gauge a partner's commitment over long distance and they need to know that their partner is also thinking of them during the day. The ambiguity about a good time to connect is hard for couples and they need to communicate at regular intervals without feeling like they're disturbing their partner. Many participants expressed that their significant other started making new friends and experiences and they don't feel like they're a part of that life anymore. Additionally, they felt that they are constantly glued to their phones and therefore, they miss out on things happening around them. Both silence and words can be misinterpreted because of different attachment styles. My participants wished for more clarity to gauge their significant others' communication preferences. Lastly, many of them expressed that they felt loved when they got a post card in the mail or a care package but they rarely got those anymore. Most modern day technology is based on communicating efficiently. While it made sense to figure out logistics of the day-to-day, couples also needed a combination of logistical communication as well as expressions of love.

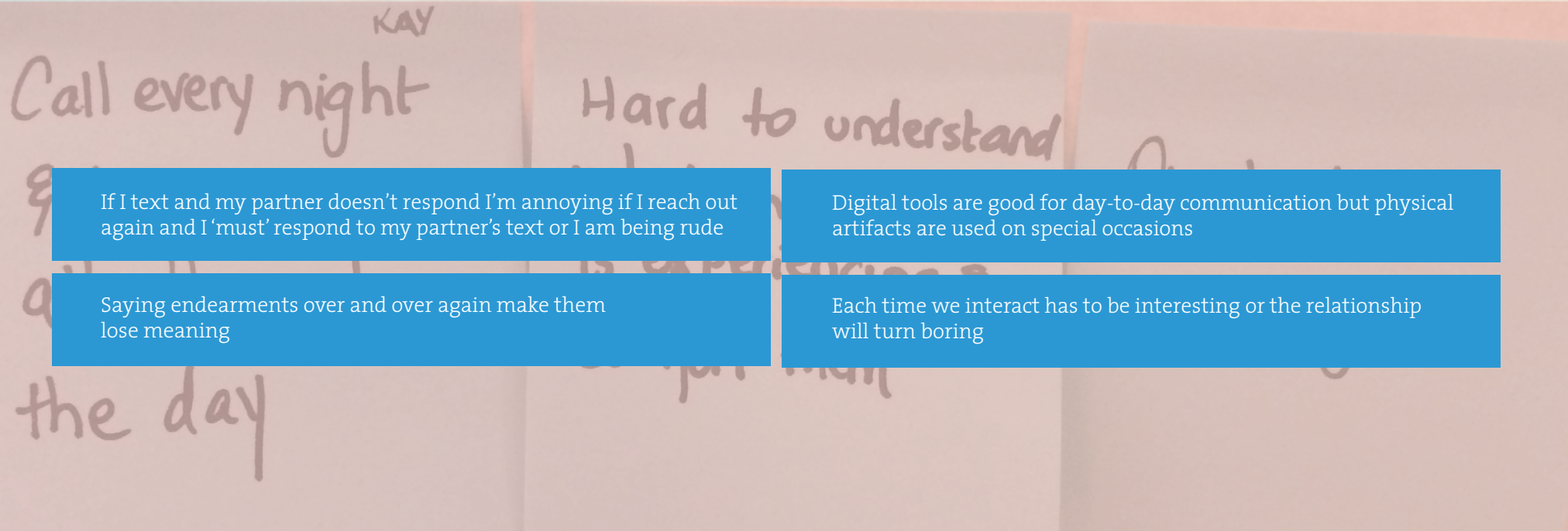|	
Need to know that your partner is thinking of you as well and is emotionally invested	Need to enjoy being where you are and not always glued to the phone to communicate
Need to communicate at regular intervals but have it sync perfectly with both your and partner's schedule	Need to have clarity on partner's attachment style so that their communication patterns are not misinterpreted
Need to know details of what is happening in partner's life (e.g. friends, coworkers)	Need a combination of logistical communication as well as expressions of love

FRAMES

Additionally, I did another exercise where I extracted the frames of reference that my participants had. Frames informed their perception and formed their understanding of events, people and circumstances. Since most of the communication in long distance relationships relies on the interpretation of each partner it was important to consider these frames as I moved forward with synthesizing the data that I had. I observed that there was a large overlap across all couples, which was expected since frames are usually learned behavior from the society and what we hear or see around us. Couples in long distance relationships felt that if they text their partner and their partner doesn't respond they would be annoying them by reaching out again. Similarly, they felt pressured because there is an obligation to respond to texts in a timely manner. They thought that saying endearments over and over again such as 'I miss you', 'I love you', etc. would render them meaningless. They used digital tools to stay in touch day to day but they exchanged physical artifacts such as flowers and greeting cards for special occasions since they had more meaning. Lastly, they felt that each time they interact they have to be their most interesting self or their relationship would turn boring.

If I text and my partner doesn't respond I'm annoying if I reach out again and I 'must' respond to my partner's text or I am being rude

Digital tools are good for day-to-day communication but physical artifacts are used on special occasions

Saying endearments over and over again make them lose meaning

Each time we interact has to be interesting or the relationship will turn boring

INSIGHTS

This framework of needs and frames allowed me to decipher the complex data I had gathered in incremental steps and subsequently arrive at insights that were informed by all the research. Initially some of these insights seemed obvious to me but after having gone through this process, I validated my hypothesis and had a much deeper understanding of the mostly latent reason why digital artifacts used by long distance couples felt remote and ephemeral.

Most of today's technology for long distance communication predominantly exists on a phone and sometimes on a laptop. For long distance couples it is always a struggle as to whether they should fully enjoy their current place, surroundings and company or be glued to their phone to communicate with their partner. Long distance couples are also stuck in a dichotomous situation- they miss out on spontaneity in their communication since everything must be planned in advance but if they do not plan, the ambiguity about each other's schedules makes it impossible to ever sync up. Since long distance communication relies very heavily on conversations, those days when there just isn't enough to share leads to silence that can be interpreted the wrong way. Also, joint action is predominantly how great memories are made for couples and currently there are very limited ways long distance couples can have that. Couples feel closest doing daily routine things like cooking and falling asleep together via video chat.

Since the only way to communicate regularly is by being glued to the phone, long distance couples feel they can not enjoy their current place

Long distance couples miss out on spontaneity and excitement since most instances of communication need to be planned

Joint action brings the couple closer but currently they can only make that happen in very limited ways

Ambiguity about each other's schedules makes it hard to find times to sync-up and takes the charm away

Communication can be strained because sometimes you have nothing to say, but silence can be interpreted the wrong way

Couples feel close doing daily routine things together like cooking or falling asleep

DESIGN IMPLICATIONS

These insights were then refined into four design implications that became my guiding principles as I started generating some early concepts. I decided that the refined communication solution that I would propose for long distance couples must be able to facilitate joint action. Additionally, it should be a combination of physical and digital and it cannot involve more interaction with a phone. Lastly, it should be adaptable to accommodate for different routines and attachment styles.

facilitate joint action

cannot involve more interaction with a phone

combination of physical and digital
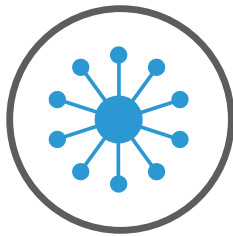
adaptable for different routines & attachment styles

Fig. 9- design implications

AT A GLANCE
SYNTHESIS

Frames   Needs

I extracted 'needs' from the exploratory research and discovered frames of reference that long distance couples had
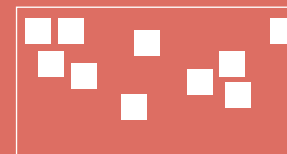
Insights

These were then used to get a deep intuitive understanding of the problems that long distance couples faced

Informed by my research, I had four design principles leading me forward in the project

INITIAL CONCEPTS

Based on these design implications, I came up with four initial concepts. These concepts were purposely not fleshed out and left open for interpretation so that the feedback could be focused on whether this was something that would be desirable for long distance couples rather than the specifics of form, logistics and set up.

FIRST ITERATION
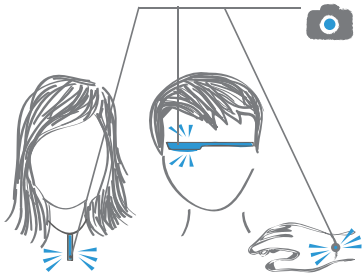
A wearable camera allows individuals to take photos of their surroundings with a simple touch so that at the end of the day they can share special details with one another and feel involved in one another's daily lives.
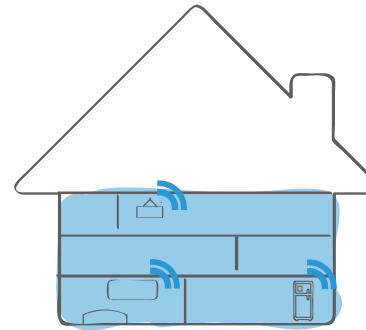
Long distance couples utilize everyday objects in different environments and they become means of interaction with one another so that they do not feel bound to a phone or computer.
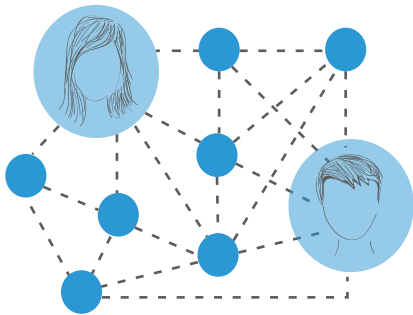
An automated system uses the internet of things as well as other details shared by each partner to find moments in which the long distance couples can sync up without any added stress.
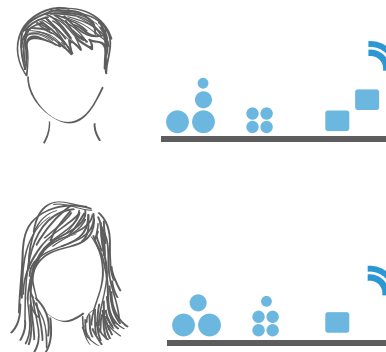
A game that has both physical and digital components that long distance couples can interact with to share in a fresh way and collaborate or compete in a playful manner.

FEEDBACK

As I tested these early concepts, the general response that I got was that couples liked how they allowed for interaction that wasn't based solely on conversing over the phone. They also liked that they got to experience their own environment in a meaningful manner while experiencing closeness with their long distance partner. However, they all felt that all these concepts were still approaching the problem in ways that were not seamless and added something new that the couple needed to add to their plate. After this feedback I realized that I was trying to solve for too many problems. Long distance couples face numerous challenges on multiple frontiers such as closeness, conflict resolution, goal setting, and managing finances, but the solution for each would have very unique considerations. Moving forward I needed to make a decision about which of these challenges I wanted to tackle, or at least prioritize.

CHANGE IN FOCUS

While they were all great opportunity spaces, my research pointed me in the direction of closeness. The couples that I had spoken to in the earlier stages of my project had all pointed out that they struggled with maintaining closeness and this usually led them to have other issues with one another while being apart. My study of Maslow's Hierarchy of Needs also pointed to closeness as a building block for growth both in individuals and relationships. In addition to Maslow's work highlighting the importance of closeness, I also consulted Epstein's 'Cognitive Experiential Self Theory' that declared it as one of four essential human needs (Epstein, 1990). Closeness here is referred to as a feeling that one is connected to a loved one through regular, meaningful contact. People who do not experience closeness often feel lonely and neglected. Therefore, closeness is very important for an individual's mental wellbeing.

There are two main dimensions that lead to closeness- explicit expression, and implicit experience rich in emotions. Upon dissection of current technologies, I realized that most modern technology relies on explicit expression through talk or text but if it is going to truly bring long distance couples closer, it needs to probe deeper into the realm of emotions.

REFINED CONCEPTS

In my generative phase I decided to focus on how technology can be used to re-imagine communication through a wide array of expressions centered around emotions, feelings, awareness, joint action, gift-giving and memory formation. With this new direction I ideated and developed short animations for three refined concepts.

LOVE BOX
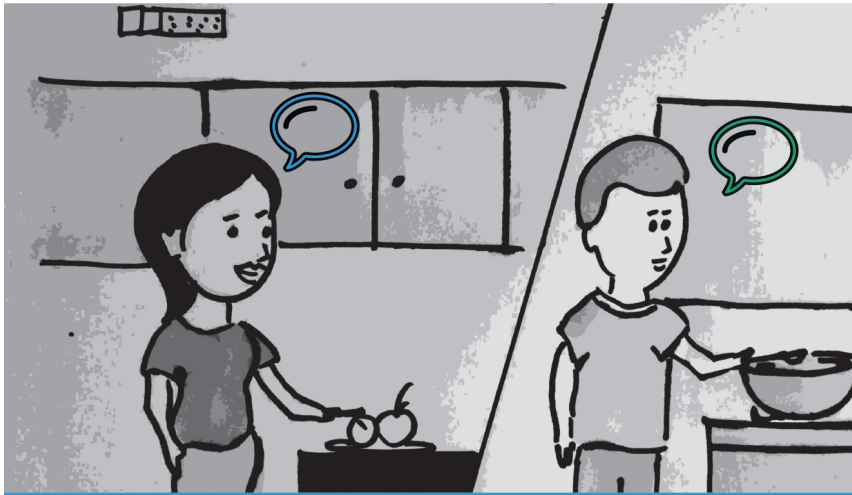
The 'Love Box' allowed the couples to speak to each other and hear each other in different parts of their respective homes through a motion activated sound and light system.

FEEDBACK: The couples loved the idea of not being tied to a device when connecting. They also liked that they could be moving in their space freely and hear each other as they lived their lives. However, they wanted control of when they might start or end sharing because there is a fine line between connection and surveillance and time zone differences could impact the interaction.

LOVE BAND

The 'Love Band' allowed couples to let each other know that they are thinking of them by tapping a wearable that made the partner's band turn warm, light up or vibrate.

FEEDBACK: Since many couples felt that the over reliance on words was not a natural way to communicate, they liked that the love band allowed for a new interaction. Jewelry and wearables traditionally hold a significant place in romantic relationships. They liked the idea of wearing something for a partner that was meant for just the two of them and this helped them feel even more connected.

MEMORY BOX

The memory box was a digital and physical portal that allowed couples to record sound clips, photos for each other for a trip down memory lane or to plan new adventures.

FEEDBACK: This was the least favorite of the three concepts when tested. Couples enjoyed the combination of digital and physical but they felt as if this was a glorified email and one more thing to keep track of.

AT A GLANCE
INITIAL & REFINED CONCEPTS

Upon initial testing of the concept, the most predominant feedback I got was that I was trying to solve for too much and I decided to hone in my focus on closeness between long distance couples

CLOSENESS

PIVOT

Love Band   Love Box   Memory Box
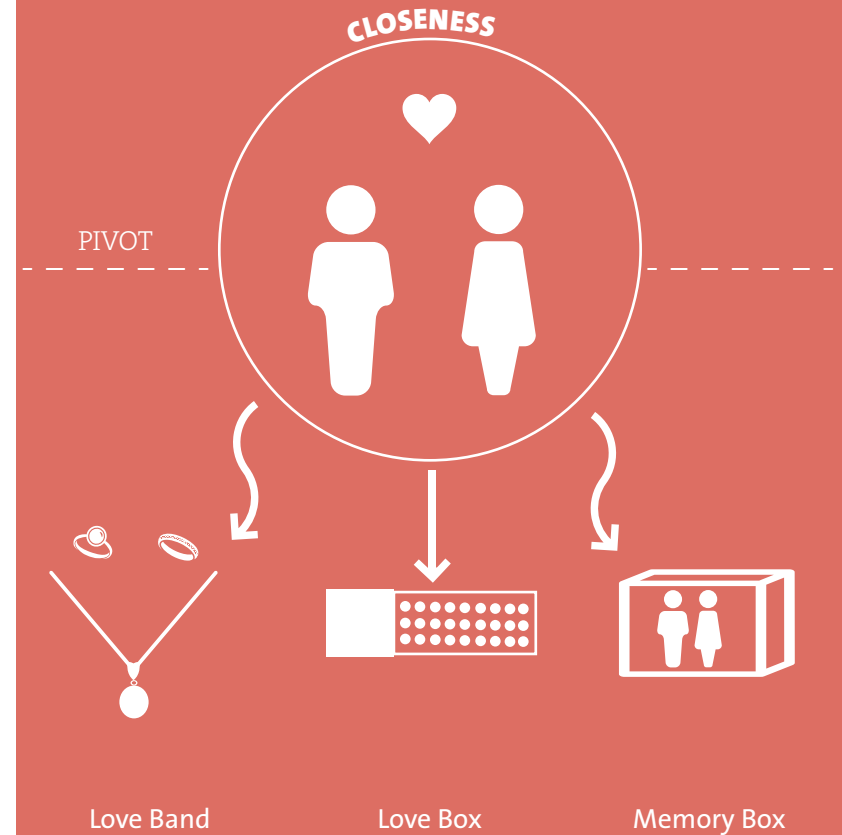
PRODUCT TO SYSTEM

Some of the over arching feedback that I got, was that there are many different rhythms of operation and activities during the day. These interactions, like numerous others that already exist today such as apps on the cell phone, work remotely but don't go well together to create an entire wholesome, immersive experience. My research showed that the way couples wanted to interact outside of home was very different from the way they wanted to when at home. Therefore, a system affording those special considerations of each place was necessary. The 'Love Box' and 'Love Band' were two avenues where I saw potential based on testing feedback. As I considered them carefully, I quickly concluded that they could merge to create a system that provides a full experience of closeness for long distance couples in a meaningful manner. The wearable being personalized, quick and private can be used outside of the house to connect specially when there are no long windows to communicate. The sound and light system can be used effectively inside the house by utilization of the couples' respective environments to create natural interactions and avenues for joint action.
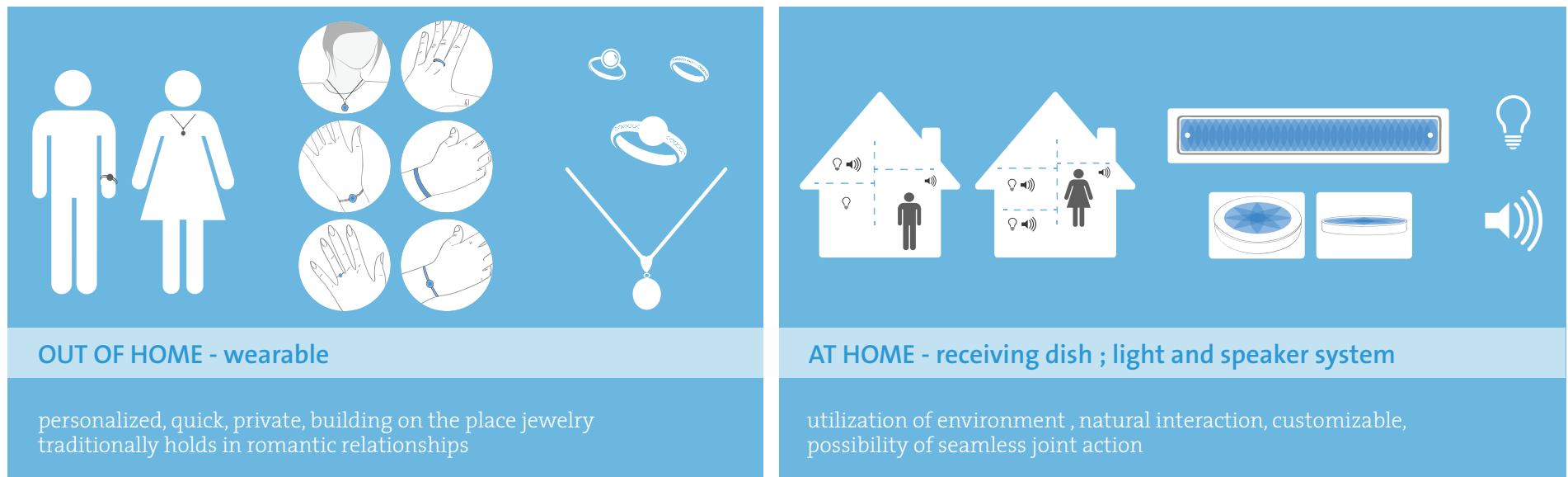
OUT OF HOME - wearable

personalized, quick, private, building on the place jewelry traditionally holds in romantic relationships

AT HOME - receiving dish ; light and speaker system

utilization of environment , natural interaction, customizable, possibility of seamless joint action
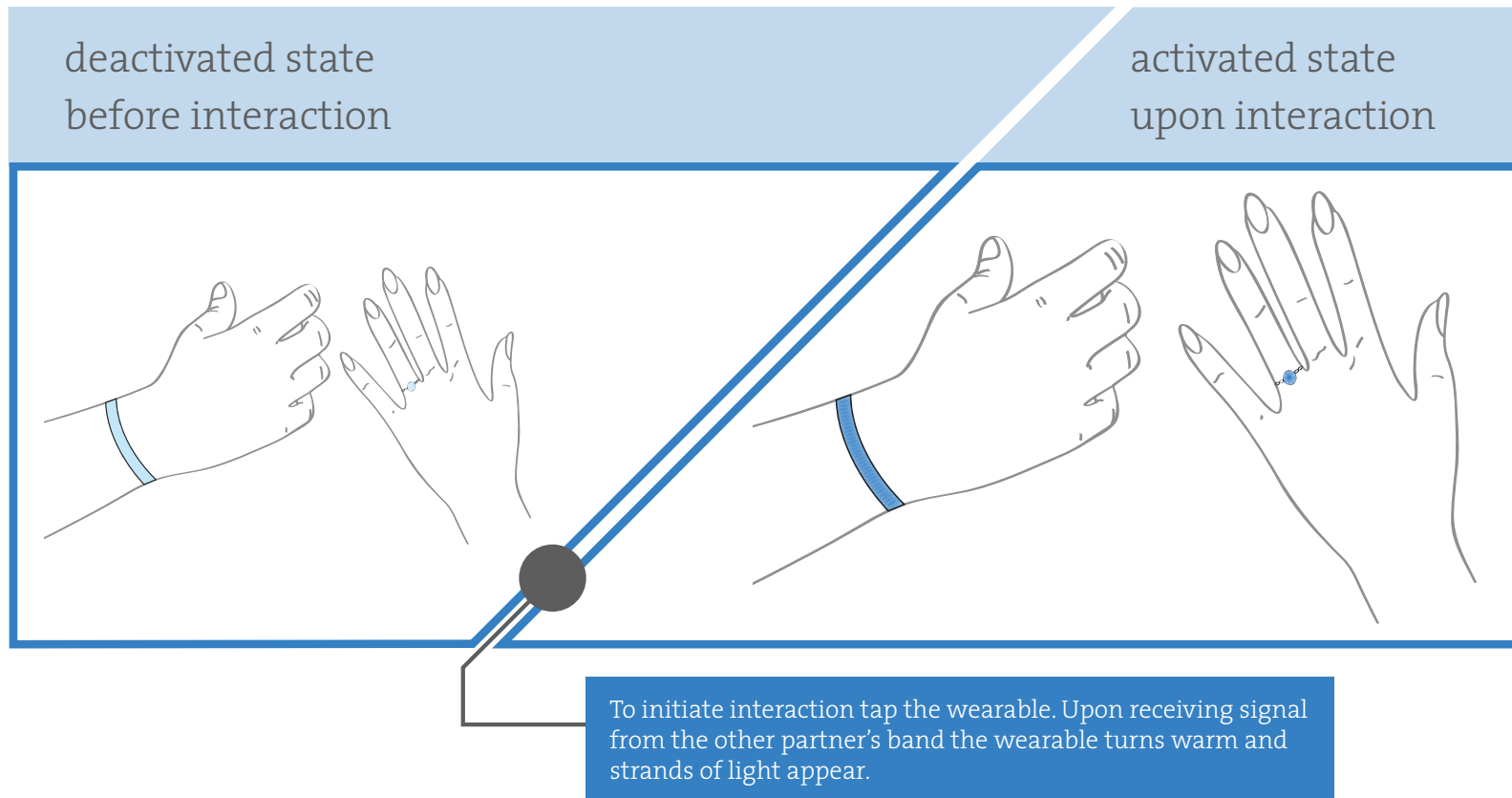
Fig. 10- system map

'NEAR'- COMPONENTS

The system I conceptualized as a result of my research is called 'Near'
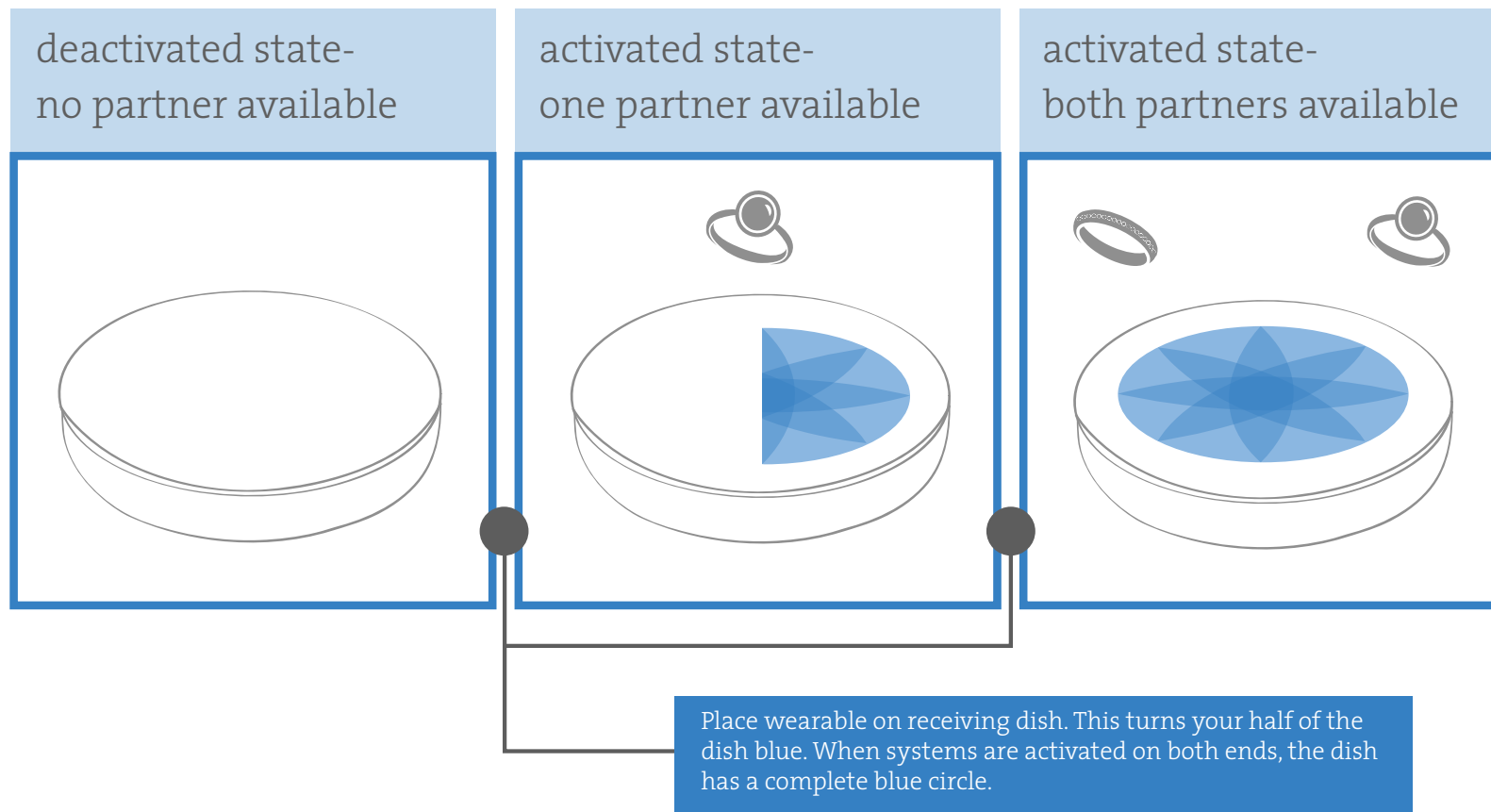which has three major components.

WEARABLE

The first one is a wearable used to signal to a long distance partner that
you are thinking of them. To initiate interaction you can tap the wearable
which will signal the partner's band turning it slightly warm as well as
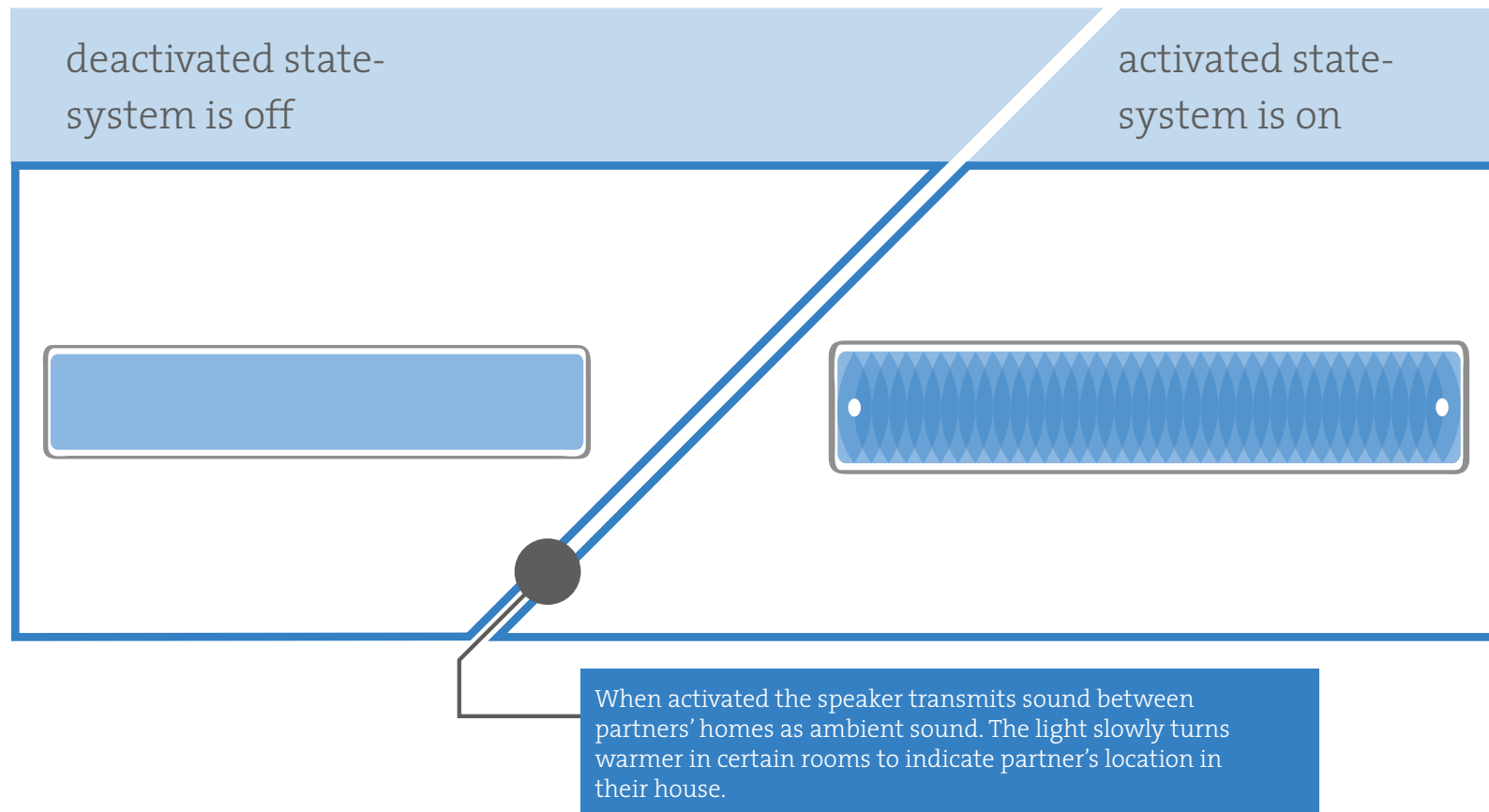changing its color to a brighter blue.

deactivated state
before interaction

activated state
upon interaction

To initiate interaction tap the wearable. Upon receiving signal
from the other partner's band the wearable turns warm and
strands of light appear.

RECEIVING DISH

The second component is a receiving dish in the home environment which is used to let the partner know of your availability at a glance in that moment. It also turns on the system in the home at your end. When available to engage simply place the wearable in the receiving dish. A blue semi circle appears for each partner and the whole circle shows that both partners are available to engage.

deactivated state- no partner available	activated state- one partner available	activated state- both partners available

Place wearable on receiving dish. This turns your half of the dish blue. When systems are activated on both ends, the dish has a complete blue circle.

LIGHT AND SOUND UNIT

Small light and sound units are placed in key rooms throughout each partner's home. Once the receiving dish triggers that both partners are available to engage, the ambient light and sound system activates. The speaker transmits between the partners' homes as ambient sound and conversation and the light turns slightly warmer in certain rooms depending on where the partner is in their house.

deactivated state-
system is off

activated state-
system is on

When activated the speaker transmits sound between partners' homes as ambient sound. The light slowly turns warmer in certain rooms to indicate partner's location in their house.

AT A GLANCE
'NEAR' - SYSTEM & COMPONENTS
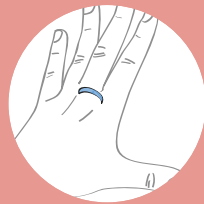
WEARABLE
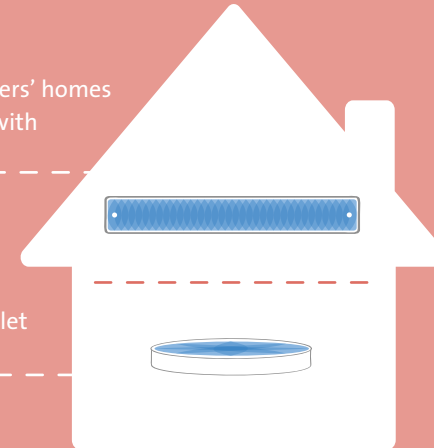wearable used to indicate to the long distance partner that you are thinking of them
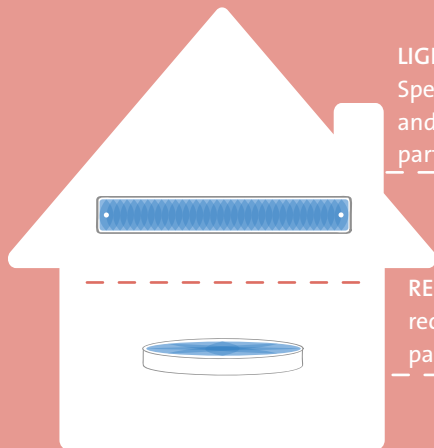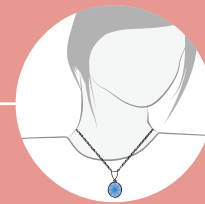
LIGHT AND SOUND SYSTEM
Speaker transmits ambient sound between partners' homes and light turns slightly warmer in certain rooms with partner's location

RECEIVING DISH
receiving dish in the home environment used to let partner know of your availability

PROTOTYPE TESTING
SOUND SYSTEM TEST

Once I had the initial concept done, I wanted to start prototyping so that I could see whether this would be something that would bring long distance couples closer by creating a sense of relatedness. There were numerous components of the entire experience and since I had not built the product I was not sure how I would test it. After researching experience prototypes for systems, I learnt about the marshmallow test. The spaghetti, usually used in team building exercises, challenges groups to compete amongst each other to see who can make the tallest, free standing spaghetti tower with a marshmallow balanced on the top. The groups that test their tower by placing the marshmallow on top frequently as they build it usually end up with the tallest tower and it is this frequent testing that ultimately makes or breaks their tower. In designing my experience prototype it was important for me to test my 'marshmallow'. This would be that piece which would result in rendering the entire concept useless, in its failing. As I studied all the separate components of the system, I deduced that my assumption of the sound system allowing couples to interact freely in their environment, creating a sense of relatedness, and shared space, as well as facilitating joint action, was this marshmallow.

Therefore, I got a set of baby monitors that I had the couples place in different rooms of their respective houses, connect the monitors to their wifi and then communicate using google hangouts so that sound from different parts of the house could be picked up by the video chat and transmitted. While the sound quality suffered when set up like this I was able to achieve a mid fidelity voice transfer from all parts of the couples' respective homes without interacting with a device. Six couples participated in this week long study, where they used the status on google hangouts to gauge availability and then started the video chat, activating the sound transfer when both parties were available. They were then told to live their lives as they usually would and I spoke to them a week later about their experience.

Fig. 11- baby monitors placed in homes during testing

FEEDBACK: All six couples said that they felt a heightened sense of closeness during this week. They said that earlier they only interacted at night and it almost felt like a chore sometimes, but with this system they realized there were many other times they could interact for very short bouts of time. Additionally, couples also developed practices of joint action over the course of the week. One couple started learning how to cook and eating dinner at the same time since the husband could hear the wife making food and started cooking alongside her in his own kitchen. Another of my participants mentioned that when his girlfriend was doing some mundane chores, she would often hum to herself without even realizing and just being able to hear that sound made him feel closer to her. Two of the couples were in different time zones, and they said that during this test they were able to connect with each other more often since they were not just making assumptions about one another's schedule.

SYSTEM CONCEPT TEST

Once I found out that the sound system allowed the couples to feel closeness, I tested the entire concept through an animation with twenty-five long distance couples. This animation showed the concept in its entirety and how all the different components came together to create 'Near'. It showed different screen shots of the couple's interactions with one another over the narrative of a day.

FEEDBACK: My participants said that there were many times in the day when there's really not much to say since they're just at work or school, but want to let their partner know that they are thinking of them. Terms of endearment said over and over again start to lose meaning and therefore the wearable component would make connection quick and easy, but what they liked most was that the interaction was about the feeling and not words. Ambiguity plagues long distance couples. Am I being too distant? Am I being too nagging? Not knowing what a good time to connect is causes anxiety in couples. They liked that the receiving dish made expressing and gauging availability a glance away. Additionally the act of taking off the wearable when ready to engage in the home setting felt like a continuation of the experience and this concrete action resonated with them. Time bound conversations on phone calls or Skype dates can lead to numerous 'umms' and put a lot of pressure on couples to be their most interesting self in the span of 30 mins to an hour, during which time they are completely removed from their environment and the spark of spontaneity is lost. They expressed that the sound system would allow them to have conversations naturally as things happen. What they seemed most excited about was that it would also allow for pockets of silence and a possibility for joint action as they go about living their life. Once the system is engaged there are no added steps or effort to connect. There is a closeness in awareness, or rather 'peripheral awareness' (Hassenzahl, Heidecker, Eckoldt, Diefenbach & Hillmann, 2012). that doesn't need one's full attention. If your girlfriend is in the kitchen making coffee when co-located you don't have to ask if she is there. You just know seeing the kitchen light on and hearing her in the background that she is present. The couples felt that through the light and sound system they could get a shared sense of place, even at a distance.
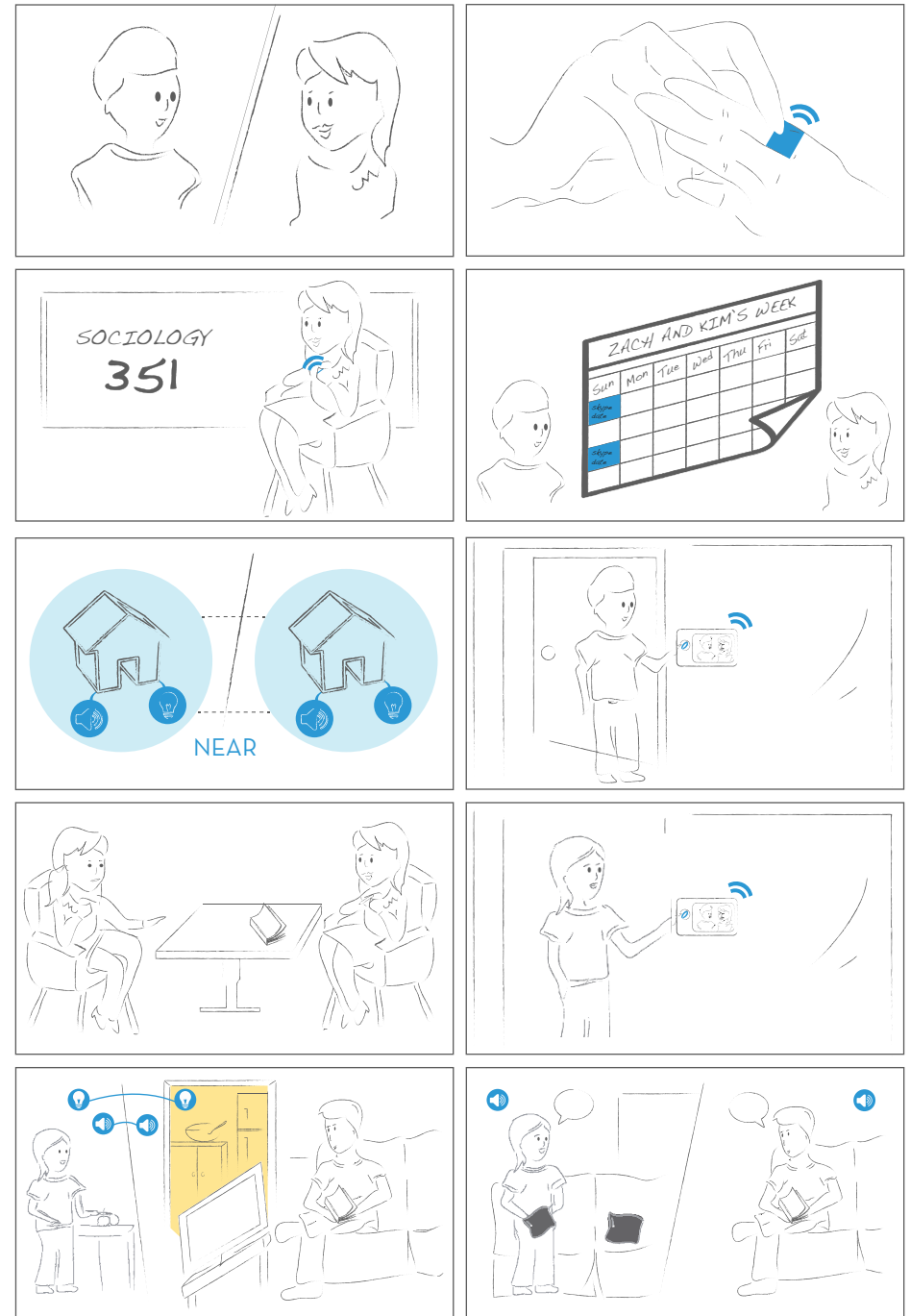

Fig. 12- screenshots of the animation tested

AMBIENT LIGHT TEST

Now that I had my major assumption tested, and I had evaluated the entire experience with real long distance couples, there was another part of the experience that was crucial to test. The system changed the light in certain rooms to indicate the partner's location in their house. However, the feedback from my earlier sessions indicated that light has a very distinctive connection to moods and my participants felt that this light change would work only if it induced a feeling of warmth and romance. Additionally, it couldn't be too distracting. In order to figure out what light would induce this kind a mood I got the Philips Hue bulbs[2]. These bulbs are specialized and the color and intensity of light can be controlled through a smart phone. I showed forty participants a range of light at different brightness and asked for them to describe that light with the first words that came to mind. Additionally I also tested the speed of change and the brightness of the light with them to find the correct balance.

FEEDBACK: I found that a warm yellow light that slowly changed was the one most people noticed yet didn't find distracting and they associated it with words such as warmth, romance and 'easy on the eyes'.
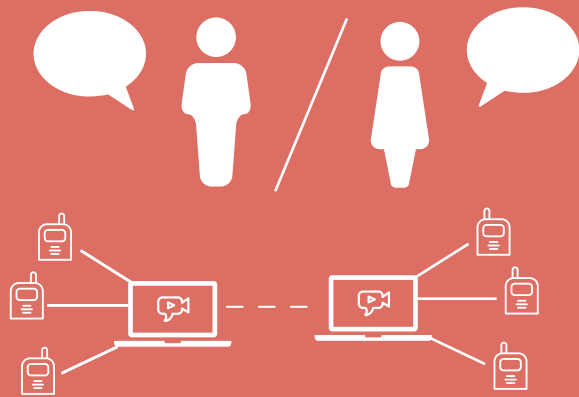
[2]http://www2.meethue.com/en-us

Fig. 13- samples of light tested

AT A GLANCE
PROTOTYPE TESTING

Sound System Test

Baby monitors placed in key rooms in the couple's homes, which they then connected via wifi to google hangout for sound transmission.

Feedback:

heightened sense of closeness

interaction did not feel like a chore

developed routines of joint action like cooking together

hearing one another living life in their space allows for more closeness

allowed couples with time zone differences to connect without a worry

System Concept Test

Animation showing all the different components of the system working together as a couple interacted over the course of the day

Feedback:

interaction about feelings not just words

easy to gauge partner's availability

natural interaction where couples can not only speak but also enjoy silence

peripheral awareness of one another and a shared sense of place

System Concept Test

Light changes to test the right brightness, intensity and hue so that couples feel closer through it but do not get distracted

Feedback:

warm yellow light sets the right mood

must change slowly so its not harsh

must be 'easy on the eyes' and not too intense

'NEAR'- Be connected in ways you truly want

With the insights from testing I was able to finalize my design solution and propose it through a video sketch and a poster. While the system was not built with working technology, the video presented a compelling and believable simulation.


Rayan and Hira are in a long distance relationship and lead very busy lives.
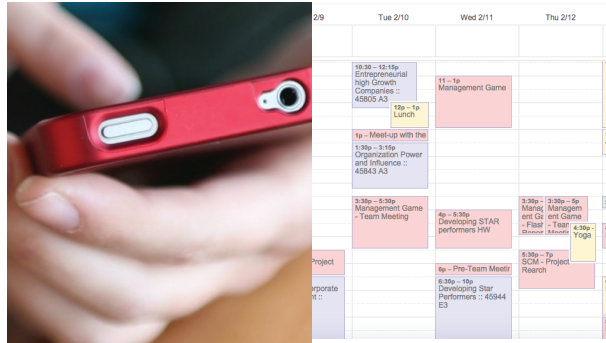
They miss spontaneous interaction with one another and their relationship feels more about scheduling than about them.

how then do they maintain closeness in a natural, hassle-free manner?
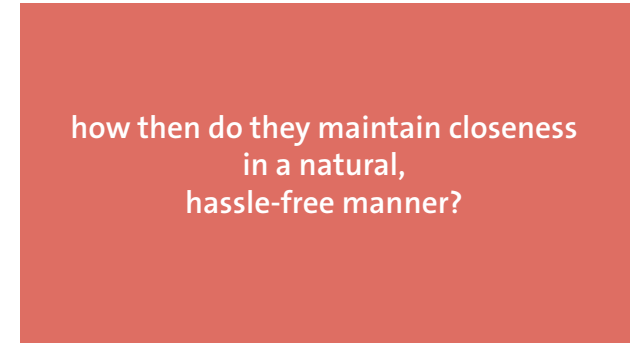
How then do they maintain closeness in a natural, hassle-free manner?

introducing

NEAR

connecting you as you lead lives in two different locations...
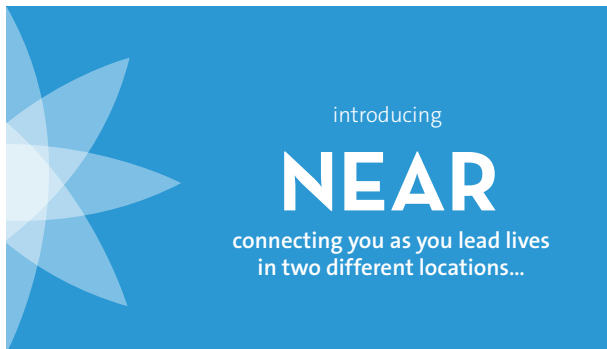
Introducing 'Near'- a system connecting you as you lead lives in two different locations
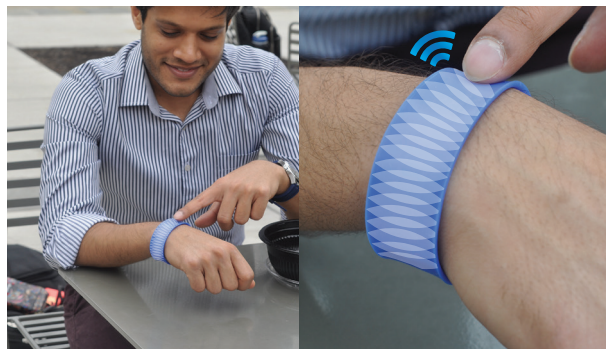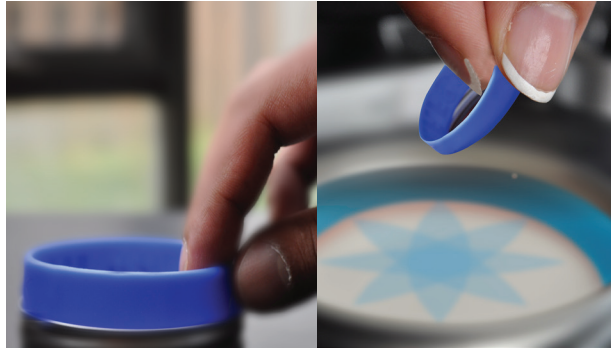

The wearable allows them to steal quick windows of interaction as they go about their day...

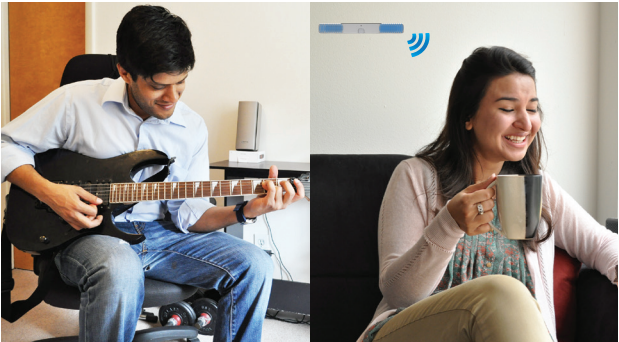...without any disruption in a private, personalized manner
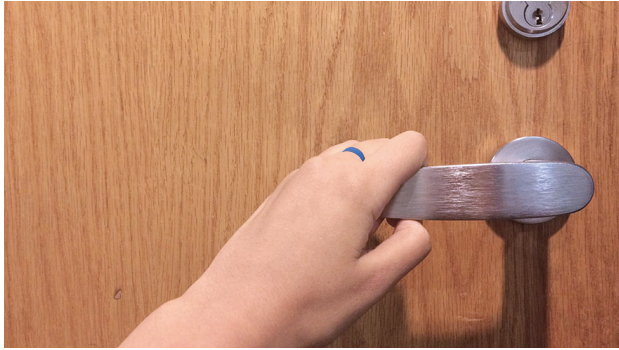
They continue the connection seamlessly as they go home.

The Near- sound and light system at home is activated easily at will.

They experience awareness of one another as they go about their daily tasks through subtle ambient light changes.

And find little windows of spontaneous interaction through convenient sound transmission.

Through Near; they're able to share as they live and lead their day-to-day lives.

being far does not mean being distant
be connected the way you truly want
through NEAR
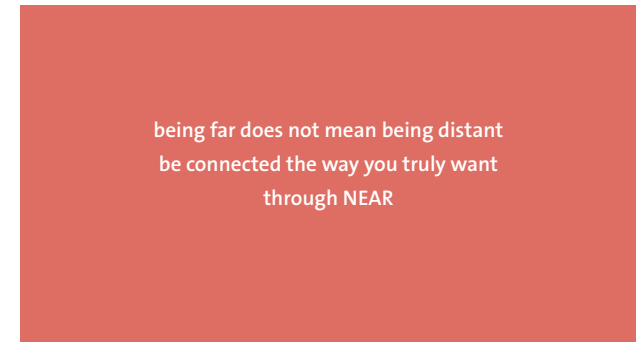
Being far does not mean being distant. Be connected in ways you truly want throuh Near.

FEEDBACK: When I delivered the concept in this form to my participants, they all liked how 'Near' was not showing them something that would exist in some imaginative future, but they could see it incorporated into their own homes. They liked how technology almost disappeared in some parts because of the seamless interactions it created using the environment but then re-appeared as a significant part of that environment bridging the physical and digital worlds. They did mention that this system would work only for couples with an established, trusting relationship.

REFLECTION

As I wrap up this project and propose the system 'Near' as a way for couples to experience true closeness when being apart, I understand that there are still further areas that must be explored. Currently, with these interactions 'Near' would work for people who are in a long term relationship. For people who just entered a long distance relationship, the interpersonal trust necessary for a system such as this to work would not be established. A closer look into tweaking some of the interactions and further testing would be necessary in order for the system to be adapted for newer couples. Moreover, today there are numerous smart watches among other wearable gadgets as well as home security systems that people already engage with. Another avenue for this project could be an exploration into how this system might be combined or channeled through existing devices like these. Lastly, security would be an important concern in this system. I do not have much expertise in the topic and was not able to research it in the given time frame of this project, but with more time that is an immediate concern that I would have liked to answer.

When I started this project, I had no idea that I would end up where I am today. At the beginning of this project when I asked if couples feel truly connected through modern technology, their response was always that they felt like they could be connected but something was missing. Through my year long journey in this project I have been able to discover what exactly is missing. In my project I have been successful in combining the multitude of opportunities presented by the digital realm with the tangible affordances of the physical. Moreover, I feel confident that my design principles as well as the avenues of emotion explored by my solution proposal, outline the frontiers besides efficiency of communication that modern technology must embark on to find true integration into human lives.

REFERENCES

Abrams D, Baecker R, Chignell M (1998) Information archiving with bookmarks: personal Web space construction and worganiztion, ACM Press, New York.

Ames, M., Go, J., Kaye J., & Spasojevic, M. (2010) Making love in the network closet: the benefits and work of family videochat, Proceedings of the 2010 ACM conference on Computer supported cooperative work, Savannah, Georgia, USA.

Argyle, M .(1987) The Psychology of Happiness. Methuen, London.

Beagrie N. (2005) Plenty of room at the bottom? Personal digital libraries and collections. D-Lib Mag 11(6).
http://www.dlib.org/dlib/june05/beagrie/06beagrie.html

Brewer WF (1986) What is autobiographical memory? In: Rubin D (ed) Autobiographical memory.
Cambridge University Press, Cambridge.

Chapman, G. (2015) The 5 Love Languages: The Secret to Love that Lasts. Northfield Publishing.

Chapman, J. (2005) Emotionally durable design objects, experiences and empathy. London: Earthscan.

Cohen, G. (1989) Everyday memory. In: Cohen G(ed) Memory in the real world. Erlbaum, Hillsdale.

Czikszentimihalyi, M., & Rochberg-Halton E. (1981) The meaning of things- domestic symbols and the self. Cambridge University Press, London.

Engeström, Y. (1999) Activity Theory and Individual and Social Transformation. In Y. Engeström, R. Miettinen, & R.-L. Punamäki (Eds.), Perspectives on Activity

Epstein, S. (1990) Cognitive-experiential self-theory. In Handbook of Personality Theory and Research, L. A. Pervin Ed., Guilford Press, New York, NY, 165--192.

Fivush R, Nelson K. (2004) Culture and language in the emergence of autobiographical memory. Psychol Sci 15(9).

Greenberg S. (2009) Sharing digital photographs in the home by tagging memrobalia. CHI '09

Hassenzahl M., Heidecker S., Eckoldt K., Diefenbach S., & Hillmann U. (2012) All You Need is Love: Current Strategies of Mediating Intimate Relationships through Technology. ACM Trans. Comput.-Hum. Interaction.

Jordan, P. W. (2000) Designing pleasurable products: an introduction to the new human factors. London: Taylor & Francis.

Van Dijck, J. (2007) Mediated Memories in the Digital Age, Stanford University Press. Stanford, California.

Klein, S. B., Cosmides, L., Toby, J., & Chance, S. (2002) Decisions and the evolution of memory: Multiple systems, multiple functions. Psychological Review, in press.

Maslow, A. (1943) A theory of human motivation, Psychological Review, vol. 50, 1943, 370-96.

Maslow, A., & Lowery, R. (Ed.). (1998) Toward a psychology of being (3rd ed.). New York: Wiley & Sons

McDonagh, D. (2004) Design and Emotion: The Experience of Everyday Things. London: Taylor & Francis.

Neustaedter, C., & Greenberg, S. (2012) Intimacy in long-distance relationships over video chat. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '12). ACM, New York, NY, USA

Norman, D. A. (2004). Emotional design: why we love (or hate) everyday things. New York: Basic Books.

Van Gorp, T. & Adams, E., (2012) Design for Emotion. Elsevier.

Woo, E., Yoo, D., "In Love and War" (2010). Thesis, Carnegie Mellon University School of Design.

APPENDIX A

Survey

After giving some information about the project and ensuring participant consent, the survey asked basic questions regarding age and profession. It then prompted participants to pick from one of three groups they fell under in order for their participation in the survey to continue.

You... are currently in a long distance relationship

How long have you been in a long distance relationship?

Where does your significant other reside?

What is the reason for you both living apart?

When was the last time you both were co-located?

How frequently do you both meet?

How long does the co-location last?

What are some methods through which you both keep in touch when apart?

What are some of your biggest challenges as a result of being long distance?

How do you currently navigate through those challenges?

Think back to the last time the following happened and tell me about it:
You felt well connected with your significant other when being apart
You made a difficult decision that impacted you both when being apart
You had an argument and resolved it when living apart

What are some unique communication practices that you and your partner have developed.

You... were in a long distance relationship in the last two years

How long was the relationship long distance?

Where did your significant other reside?

What was the reason for you both living apart?

How frequently did you both meet?

How long did the co-location last?

What were some methods through which you both keep in touch when apart?

What were some of your biggest challenges as a result of being long distance?

How did you currently navigate through those challenges?

Think back to a time and tell me when:
You felt well connected with your significant other when being apart
You made a difficult decision that impacted you both when being apart
You had an argument and resolved it when living apart

What were some unique communication practices that you and your partner have developed.

You... anticipate being in a long distance relationship in the next few months

How long will the relationship be long distance?

How frequently did you both expect to meet?

How long would the co-location last?

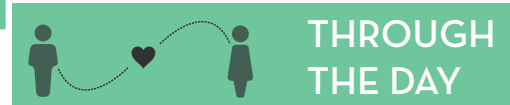Are there any steps that you have taken to prepare yourself for the change?

What challenges do you expect to facie in terms of your relationship?

How do you plan on overcoming these challenges?

APPENDIX B

Workshop Material — Map Out Your Day

During the course of a day map out how you interact with your signigicant other when you are apart.

THROUGH THE DAY

Wake up　　　　　　　　　　　　　　　　　　　　　Bedtime

Week Day

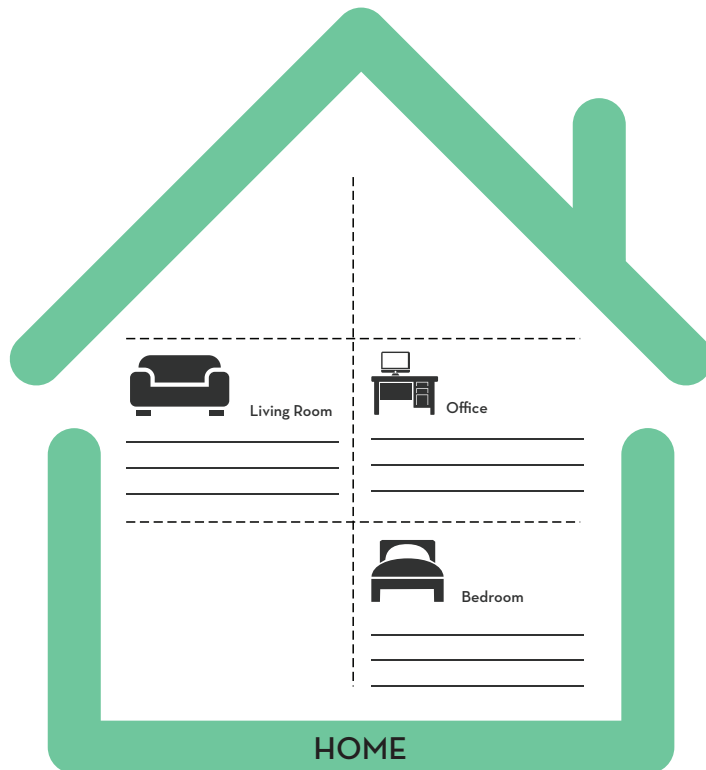Wake up　　　　　　　　　　　　　　　　　　　　　Bedtime

Weekend

APPENDIX B

Workshop Material — Map Out Your Space

What are the spaces in which you interact with your significant other? What is used in these interactions? The spaces provided here are just some entry points.

IN WHAT SPACE

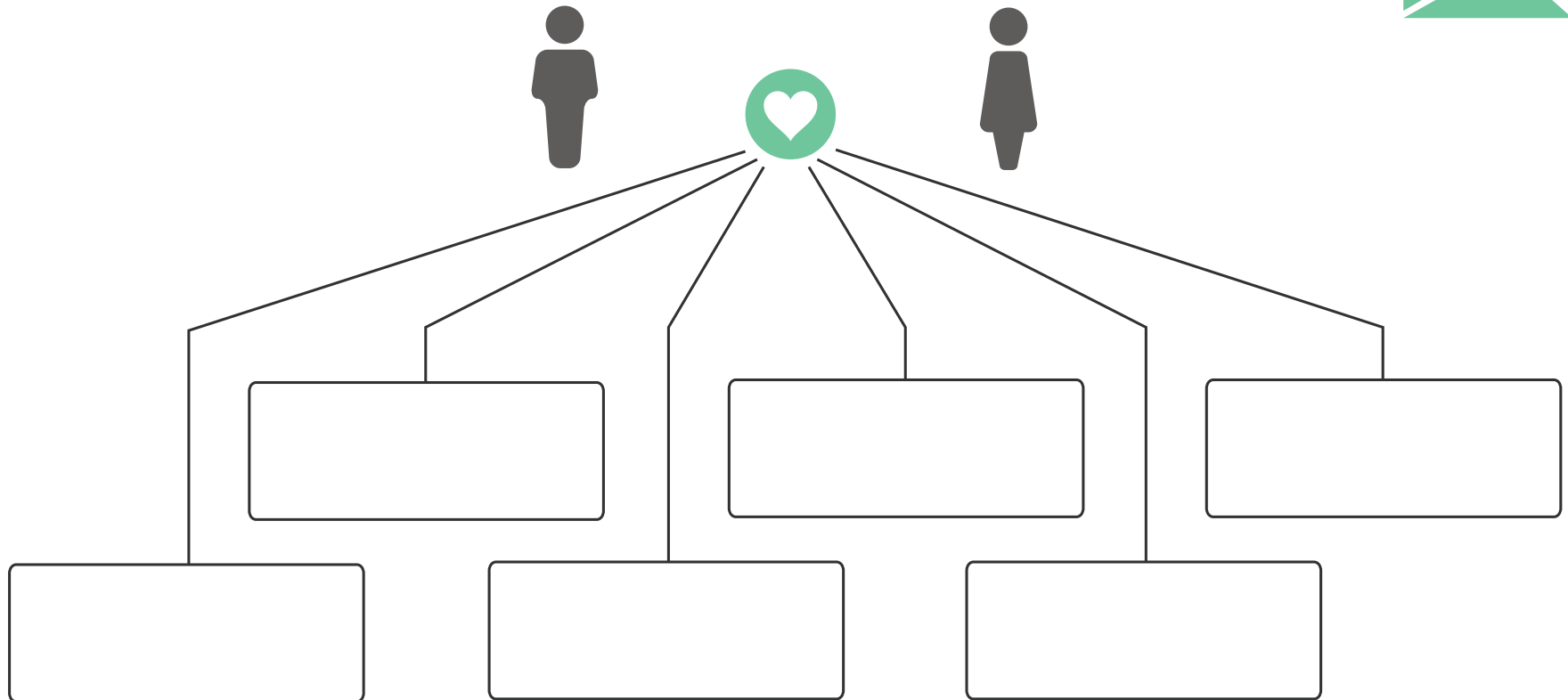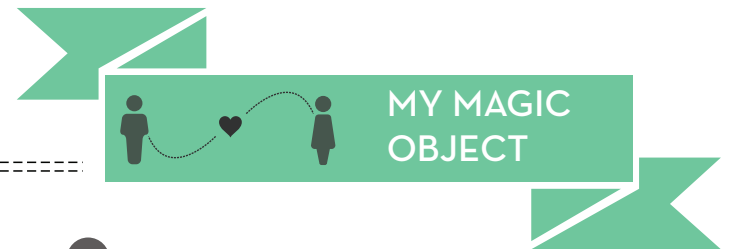Living Room

Office

Bedroom

Work Desk

HOME

WORK / SCHOOL

APPENDIX B

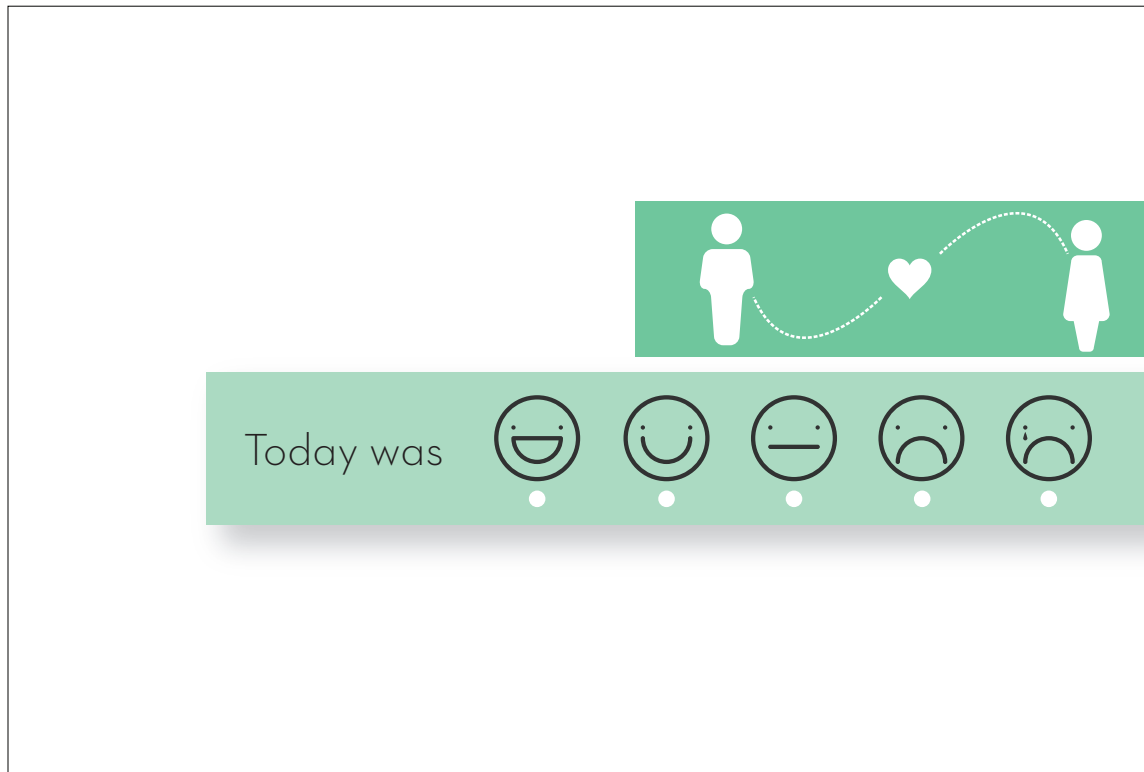## Workshop Material —Magical Orb Activity

Imagine an ideal future. This circular orb is going to allow you to communicate most effectively with your partner when they are away. What do you envision this orb will do? What are some characteristics or features that it will have?

MY MAGIC OBJECT

APPENDIX B

Workshop Material — Postcard

APPENDIX B

Workshop Material — 'I Like' Postcard

This is a safe space. Think of your communication with your partner during your long distance relationship and write of the things that you liked about your communication with them. Start each new point with 'I like .... '

Faryal Khalid
327 N Neville St
Apt 4
Pittsburgh, PA. 15213

i like ...

APPENDIX B

Workshop Material — 'I Wish' Postcard

This is a safe space. Think of your communication with your partner during your long distance relationship and write of the things that you wish you could improve in your communication with them. Start each new point with 'I wish .... '

Faryal Khalid
327 N Neville St
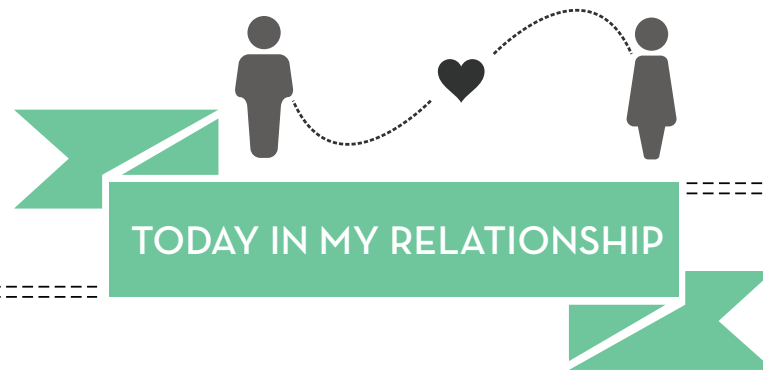Apt 4
Pittsburgh, PA. 15213

i wish ...

APPENDIX C

Journal Study

TODAY IN MY RELATIONSHIP

APPENDIX C

Journal Study

Date : _____ Today was 😄 🙂 😐 🙁 😢 My mood today is _____

What were some highlights from your day today? Please fill them in the boxes and add a star to the times where you interacted with your significant other.

Wake up   Bedtime

Are there any details details about your day or your mood that you want to share?

_____
_____
_____
_____
_____
_____
_____

APPENDIX C

Journal Study

Which did you use to communicate with your significant other today ?

Text Message

Email

Phone Call

Video Chat

Social Media

Online Chats
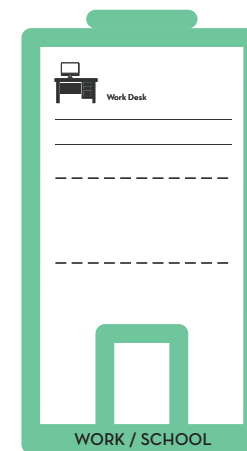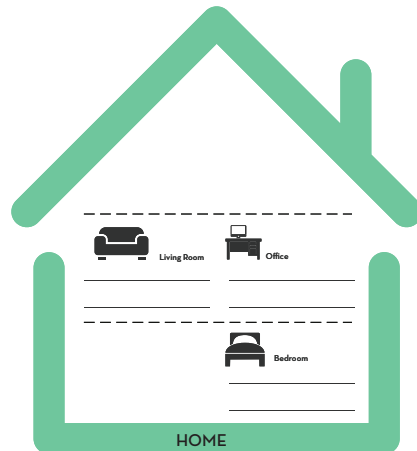
Other : _____ _____ _____

Please mark on the scale how it was communicating with your significant other. Also, please explain the answer.

Easy   Hard

What were some things that you wanted to share with your partner today ? Were you able to share all of them ? If not, why ?

What are the spaces in which you interacted with your significant other today? What was used in these interactions? The spaces provided here are just some entry points, so feel free to add any other spaces as well.

Living Room

Office

Bedroom

HOME

Work Desk

WORK / SCHOOL

DIGITAL ARTIFACTS
EPHEMERA & HUMAN CONNECTIONS

With increased distances it becomes even more essential for long distance couples to engage with one another meaningfully and feel more connected through different channels of communication. In this regard, exchange of digital artifacts seem to offer a potential solution. However, they fail to do so because the interaction with these artifacts and their place in human lives is still remote, surface and ephemeral. Long distance couples are sharing continuously but do not feel true connection to one another. I hypothesize that this happens because digital artifacts fail to embody nuances of the couples connection as afforded by their physical counterparts.

How can digital artifacts, the interaction with them and their preservation be modified so that couples living over long distances can feel closer to each other as they go about their everyday lives? How can their exchange be a quality, unique and personalized experience that solves the problems these couples face because they're not co-located?
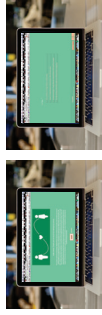
LITERATURE REVIEW

The problem area for my thesis project lay at the intersection of two very distinct fields of study: design and behavioral psychology. Therefore, it was necessary to not only become well versed in design patterns and theory but also the framework of psychology to fully grasp the way couples perceive, engage with artifacts in long distance communication. The topics included:

long distance communication
memory evolution
memorabilia and emotionally durable artifacts
artifactual libraries in digital age
mediated memories
attachment styles
hierarchy of needs

Fig 1. Maslow's Hierarchy of Needs

- Self Actualization | self-fulfillment: realization of personal and relationship potential
- Esteem | place and value each partner feels in the relationship
- Belonging | love and affection through verbal and non-verbal interaction
- Safety | communicating needs effectively; commitment, loyalty and trust
- Physiological | day to day basics: daily tasks and future goal setting

Fig 2. Attachment Styles

	POSITIVE	NEGATIVE
POSITIVE	Secure: Feeling comfortable with your own and partner's place in relationship	Preoccupied: Feeling that the responsibility to ensure a good relationship solely lies on you
NEGATIVE	Dismissive: Feeling essential towards an overly attached partner; wanting independence	Fearful: Feeling trapped in the relationship; avoiding one another

THOUGHTS OF SELF / THOUGHTS OF PARTNER

RESEARCH

What are the problems?

Surveys | 60 participants | 20-25 min activity

main purpose to get information about over all communication in long distance relationships; not just problems so that the patterns as well as the challenges became clear

participants asked to call out distinct events and share specific stories
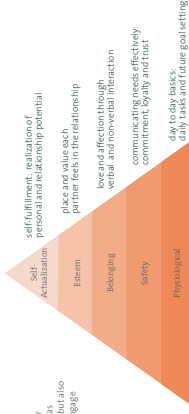
open-ended questions to elicit rich details

Why do these problems exist?

Workshops | 10 participants | 40-45 min activity

'how do you communicate with your partner over the course of a regular day?'
how do routines inform communication? what artifacts are used?
what are the challenges faced?

'Where do you communicate with your partner?'
do different spaces and settings inform the communication style and the artifacts used? does most of the interaction occur when they're at home or in other places as well?

'if a magical orb could solve all the communication problems that you and your long distance partner face what would the orb do?'
anticipate what a preferred future may be through collaborative design

How does everyday life impact communication?

Journals | 6 participants | 1 week long activity

filled over the course of 7 days - participants to keep a log of their personal mood, daily activities, communication with partner, artifacts used in communication and the spaces where communication occurred

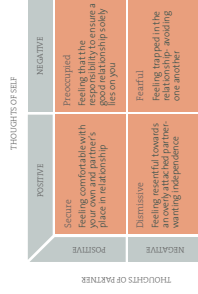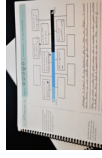numerous fill in options to help expedite the process but spaces to write provided for additional details

NEEDS

The needs of long distance couples fall into many different levels of the Maslow's hierarchy of needs framework. When these needs are not met it is difficult to have a completely satisfying relationship.

- Need to know that your partner is thinking of you as well and is emotionally invested
- Need to communicate at regular intervals but have it sync perfectly with both your and partner's schedule
- Need to know details of what is happening in partner's life (e.g. friends, coworkers)
- Need to enjoy being where you are and not always glued to the phone to communicate
- Need to have clarity on partner's attachment style so that their communication patterns are not misinterpreted
- Need a combination of logistical communication as well as expressions of love

FRAMES

Frames inform our perception of things, events and are usually learned behavior. Through these frames couples in long distance relationships make assumptions about their communication patterns.

- If I text and my partner doesn't respond I'm annoying them by reaching out again
- Saying endearments over and over again make them lose meaning
- Digital tools are good for day-to-day communication but physical artifacts are used on special occasions
- Each time we interact has to be entertaining or the relationship will turn boring

INSIGHTS

The framework of needs and frames derived directly from my research allowed me to come up with a set of insights that could inform the future design implications.

- Since the only way to communicate regularly is by being glued to the phone, long distance couples feel they can not enjoy their current place
- Long distance couples miss out on spontaneity and excitement since most instances of communication need to be planned
- Joint action brings the couple closer but currently they can only make that happen in very limited ways
- Ambiguity about each other's schedules makes it hard to find times to sync-up and takes the charm away
- Communication can be strained because sometimes you have nothing to say, but silence can be interpreted the wrong way
- Couples feel close doing daily routine things together like cooking or falling asleep

DESIGN IMPLICATIONS

Facilitate joint action

Cannot involve more interaction with a phone

Combination of physical and digital

Adaptable for different routines & attachment styles

APPENDIX E

Final Poster

PROJECT BY: FARYAL KHALID   ADVISOR: BRUCE HANINGTON   CMU GRADUATE THESIS 2015

DIST-SYNC

EXPLORING
DIGITAL ARTIFACTS,
EPHEMERA &
HUMAN CONNECTIONS

The pressures of job markets and globalization have forced an increasing number of couples to live apart. Technology has made the transmission of information easy and efficient but fails to explore the nuances of human connection. In my exploratory research couples expressed frustration about having to rely on their devices all the time. There was a struggle between loss of spontaneity and planning times to communicate and they missed sharing mundane, routine things with each other.

In the generative stage of my research I focused on in-sync, in-the-moment exchanges between couples exploring dimensions of closeness such as awareness, expressivity, gift-giving, joint action and memory formation.

EARLY CONCEPTS

LOVE BOX
The love box allowed the couple to speak to each other and hear each other in different parts of their respective homes through a motion-activated sound and light system.

LOVE BAND
The love band allowed couples to let each other know that they are thinking of them and missing them by tapping their wearable band, which would make the long distance partner's band turn warm.
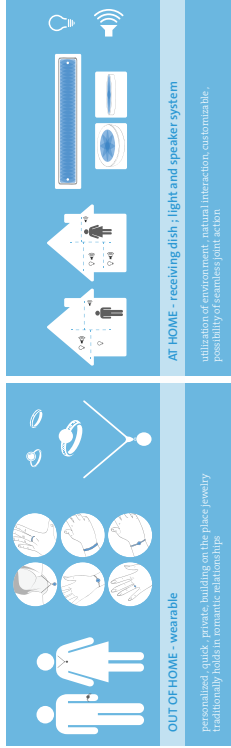
MEMORY BOX
The memory box is a digital and physical portal of connection that allowed couples to ffrecord sound clips, photos for each other for a trip down memory lane or to plan new adventures.

FEEDBACK

✓	Communicating without being tied to a device
✓	Hearing each other as they lived their lives with no added steps or effort
✓	Warm light metaphor for warmth in connection
✗	Automation blurred line between connection and surveillance

✓	Allowed interactions to be more than just words
✓	Quick interaction that they didn't have to carve time out for in the day
✓	Wearing something for a partner seemed like a symbol of having them along
✗	Might be a distraction for "focus heavy" tasks

✓	Combination of physical and digital
✓	Versatility of usage
✗	Felt like a glorified email- another thing to worry about
✗	Reliant on yet another device

SYSTEM MAP

OUT OF HOME - wearable
personalized, quick, private, building on the place jewelry traditionally holds in romantic relationships

AT HOME - receiving dish ; light and speaker system
utilization of environment , natural interaction, customizable, possibility of seamless joint action

COMPONENTS, STATES AND INTERACTIONS

WEARABLE
Wearable jewelry used to signal long distance partner that you're thinking of them in that moment

deactivated state
before interaction

activated state
upon interaction

INTERACTION
To initiate interaction : tap the wearable
Upon receiving signal from the other partner's band the wearable turns warm and strands of light appear

RECEIVING DISH
Receiving dish used to let partner know you're available to engage and turn on the system at your end

deactivated state-
no partner
available

activated state-
one partner
available

activated state-
both partners
available

INTERACTION
Place wearable on receiving dish. This turns your half of the dish blue. When systems are activated on both ends the dish has a complete blue circle and sound and light transmission begins.

LIGHT AND SOUND UNIT
Ambient light and sound system used to help the couple gain peripheral awareness of one another even at a distance and get a shared sense of place

deactivated state
when system is off

activated state
when system is on

INTERACTION
When activated the speaker transmits sound between partners' homes as ambient sound. The light slowly turns warmer in certain rooms to indicate partner's location in their house.

"IT'S ABOUT FEELINGS NOT WORDS ALL THE TIME"

For those moments when there is not much to say but all you want is to let your partner know that you are thinking of them.

Tap your band to turn your partner's band slightly warm. Without words, or worrying about removing yourself from task at hand steal quick moments of connection in your day

"I WISH I KNEW WHAT WAS A GOOD TIME TO CONNECT"

Am I being too distant? Am I being too nagging? Is this a good time? No need to ask yourself those questions anymore.

Receiving dish used to turn the system on also allows you to simply express your availability and get an idea of your partner's by their activation status.

"HALF THE MOMENT IS LOST BY THE TIME YOU GET ON THE PHONE. SOMETIMES YOU JUST WANT TO HANG OUT"

Those forced, time bound conversations, while struggling with the phone and laptop are now a thing of the past.

Activate the sound system, have natural conversations, enjoy pockets of silence, share as you go about living your life and get a shared sense of space.

"LIVING TOGETHER, I DON'T HAVE TO KEEP ASKING 'WHAT YOU UP TO?'. THERE IS SOMETHING SO NICE ABOUT NOT ASKING... JUST KNOWING"

Experience closeness in awareness. A subtle way to bring couples closer through peripheral awareness

Upon activation, the light system uses a change in the warmth of light to connect partners. If your partner is in the kitchen in her house, your kitchen light too turns a slightly warmer tone.