

Title	Hex : visual social cues to encourage sociability and community awareness in the physical context
Sub Title	
Author	Wilbur, Kiyo Koda(Inakage, Masahiko) 稲蔭, 正彦
Publisher	慶應義塾大学大学院メディアデザイン研究科
Publication year	2016
Jtitle	
JaLC DOI	
Abstract	
Notes	修士学位論文. 2016年度メディアデザイン学 第483号
Genre	Thesis or Dissertation
URL	<a href="https://koara.lib.keio.ac.jp/xoonips/modules/xoonips/detail.php?koara_id=KO40001001-00002016-0483">https://koara.lib.keio.ac.jp/xoonips/modules/xoonips/detail.php?koara_id=KO40001001-00002016-0483</a>

慶應義塾大学学術情報リポジトリ(KOARA)に掲載されているコンテンツの著作権は、それぞれの著作者、学会または出版社/発行者に帰属し、その権利は著作権法によって保護されています。引用にあたっては、著作権法を遵守してご利用ください。

The copyrights of content available on the KeiO Associated Repository of Academic resources (KOARA) belong to the respective authors, academic societies, or publishers/issuers, and these rights are protected by the Japanese Copyright Act. When quoting the content, please follow the Japanese copyright act.

Master's Thesis  
Academic Year 2016

Hex: Visual Social Cues to Encourage  
Sociability and Community Awareness in the  
Physical Context

Keio University Graduate School of Media Design

Kiyo Koda Wilbur

A Master's Thesis  
submitted to Keio University Graduate School of Media Design  
in partial fulfillment of the requirements for the degree of  
MASTER of Media Design

Kiyo Koda Wilbur

Thesis Committee:

Professor Masa Inakage	(Supervisor)
Associate Professor Kai Kunze	(Co-Supervisor)
Professor Hiro Kishi	(Member)

Abstract of Master's Thesis of Academic Year 2016

Hex: Visual Social Cues to Encourage  
Sociability and Community Awareness in the Physical  
Context

Category: Design

Summary

There are various social technologies that enhance communication and social connection. People are motivated to use these technologies for the benefits of sociability, audience, and a sense of community and shared values in one's on-line network. Though these social technologies provide a strong model for social networking, social presence, and ubiquitous sociability, they tend to detach users from social interaction in their direct physical environments. Most current social technologies are largely virtual; however, virtual social relationships are often perceived as weaker and more superficial than face to face relationships. In fact, research has shown that physical and face to face relationships have valuable benefits over online interactions and relationships. As a result, more and more social technologies are shifting towards a focus on physical encounters and facilitation of face to face interaction. Hex aims to explore how nonverbal visual social cues can encourage sociability and awareness of community in the physical third place context. This research proposes the use of a sociability display that visualizes an individual's current social openness and number of connections in one's personal physical communities. Hex aims to empower individuals to start conversation, signal current social openness to interaction, and participate in a visible social network in the physical context.

Keywords:

Visual Cues, Social Capital, Sociability, Third Place, Offline

Keio University Graduate School of Media Design

Kiyo Koda Wilbur

# Acknowledgements

I would like to give my thanks to Masa Inakage, the dean of KMD, my main thesis supervisor, and project mentor. He has guided me through my two years at KMD with enthusiasm and a playful perspective. His insight has been invaluable to my understanding of design. I hope to draw on my experiences from the Play project to continue working on storytelling and the ability to create an effective narrative moving forward. I am sincerely appreciative of his support. I would also like to thank Kai Kunze, Hiroyuki Kishi, and Naohito Okude for helping me navigate the thesis process and develop my final concept. I would not have been able to complete my research without their respective expertise in technology, business, and design thinking. I am very grateful for the guidance from Atsuro Ueki and the other professors who have shaped my perspective of research and the impact of design on society as a whole.

Finally, I would like to express my gratitude to my peers at KMD. My Master's experience was so special because of the many early mornings, late nights, constant breaks, and general camaraderie, especially during thesis writing. Thank you so much for the memories.

# Table of Contents

<b>Acknowledgements</b>	<b>ii</b>
<b>1 Introduction</b>	<b>1</b>
1.1 IoT and Sociality . . . . .	1
1.2 Current Situation . . . . .	2
Mobile Social Softwares . . . . .	3
Face to Face Interaction . . . . .	4
1.3 Proposal . . . . .	5
<b>2 Literature Review</b>	<b>7</b>
2.1 Hybrid Places in the City as an Ideal Context for Communication Technology . . . . .	8
Contextual Environmental Cues to Guide Sociability in the Hy- brid Place . . . . .	9
2.2 Growing Importance of Social Capital in Communication Technology	10
2.3 Self Disclosure as a Means to Attaining Social Capital in the Hybrid Place . . . . .	12
Encouraging Social Identification with Physical Communities in the Hybrid Place . . . . .	13
2.4 Discussion . . . . .	14
<b>3 Hex</b>	<b>16</b>
3.1 Design Objective . . . . .	16
3.2 Ethnography . . . . .	17
3.3 Building a Sense of Community through Hospitality . . . . .	18
Mental Model . . . . .	20
3.4 Building on a Personal Social Network . . . . .	20
Mental Model . . . . .	23
3.5 Target Persona . . . . .	23
Actively Social Individual . . . . .	24

## TABLE OF CONTENTS

---

Passively Social Individual . . . . .	25
3.6 Design Concept . . . . .	26
Concept Building . . . . .	27
Prototype Process . . . . .	32
3.7 Concept Evaluation . . . . .	34
Pretest . . . . .	36
Interaction Survey . . . . .	37
Post-Test Survey . . . . .	38
3.8 Discussion . . . . .	38
Updated Form . . . . .	40
<b>4 Evaluation</b>	<b>43</b>
4.1 Concept Evaluation 2 . . . . .	43
Discussion . . . . .	44
Limitations . . . . .	45
<b>5 Conclusion</b>	<b>47</b>
Overview . . . . .	47
Future Works . . . . .	48
<b>References</b>	<b>49</b>
<b>Appendices</b>	<b>52</b>
<b>A Design Process</b>	<b>53</b>
<b>B Surveys</b>	<b>58</b>
Pretest . . . . .	58
Intervention Survey . . . . .	58
Post Test . . . . .	59

# List of Figures

3.1	Stakeholders . . . . .	17
3.2	Fieldwork Master . . . . .	19
3.3	Mental Model . . . . .	21
3.4	Fieldwork Master Profile (Event Patron) . . . . .	21
3.5	Mental Model . . . . .	23
3.6	Key Findings . . . . .	24
3.7	Target Persona (Actively Social) . . . . .	25
3.8	Target Persona (Passively Social) . . . . .	26
3.9	Concept Elements . . . . .	27
3.10	Concept Sketch . . . . .	28
3.11	Use Case . . . . .	29
3.12	Key Path . . . . .	30
3.13	Concept Drawing . . . . .	32
3.14	Circuit Sticker Prototype . . . . .	33
3.15	Circuit Sticker Prototype . . . . .	34
3.16	Screen Based Prototype: Actively Social . . . . .	34
3.17	Screen Based Prototype: Passively Social . . . . .	35
3.18	User Testing . . . . .	36
3.19	User's Emotional Map . . . . .	37
3.20	Updated Form: Abstracted Sociability Display . . . . .	40
3.21	Actively and Passively Social Display . . . . .	41
3.22	Hex Use Case . . . . .	41
3.23	Hex Prototype . . . . .	42
3.24	Hex Prototype: Light Interaction . . . . .	42
4.1	Evaluation of Hex Prototype . . . . .	44
4.2	Visual Identity through Hex . . . . .	45
A.1	Sequence Model . . . . .	53



## LIST OF FIGURES

---

A.2	Flow Model . . . . .	54
A.3	Artifact Model . . . . .	54
A.4	Cultural Model . . . . .	55
A.5	Flow Model . . . . .	55
A.6	Artifact Model . . . . .	55
A.7	Sequence Model . . . . .	56
A.8	Cultural Model . . . . .	56
A.9	Story . . . . .	57

# Chapter 1

## Introduction

### 1.1 IoT and Sociality

The Internet of Things concept continues to expand the understanding and reach of connectedness by bringing the vast resources of the internet to physical spaces and everyday objects. IoT can be seen in both personal and public things and aims to make user's everyday interactions smarter, faster, and more intuitive for user and object relationship. While many different IoT objects and services have been introduced to the market, smarter objects haven't always proved valuable or effective to the users. In fact, the term smart is being used in branding and marketing of products that may simply be connected. In turn, these products may dilute the potential power and advantage of networked capabilities. Smart things try to achieve convenience and user efficiency, but can fail to provide real personal benefits or affect desired behavioral change.

It is important that IoT products evolve past function and avoid nonessential connectivity, and maximize potential of connectedness to realize personal improvement and value for individuals and society as a whole. Emotional investment in a product can serve as an invaluable form of input that can drive connected product and user relationships to the next level of effectiveness. Built on IOT's foundations, Social Web of Things<sup>1</sup>, coined by Ericsson's User Experience Research Lab, proposes an emotional bridge between people and their things, where social networks and IoT join to create an interconnected social web. In the Social Web of Things world, all things have personality, emotions, and function. Through relatable communication, people can better understand their things and their functions, as well as perceive their physical environment as social, not just smart.

The shift towards a social network of things and the emphasis on adding a social element to connected things has led to the concept of Social Things.

---

1 <http://www.ericsson.com/uxblog/2012/04/a-social-web-of-things/>

Social Things emphasizes not just the networked sociability of things, but their autonomous connectivity and formation of a new layer of social interaction in a person's everyday life. Social Things can be public and private, mobile and stationary, and exist within a virtual and physical form. As Social Things are part of the physical environment, they naturally become part of a user's lifestyle. Social Things also encourage an emotional attachment to the physical environment and current surroundings, and give a user an outlet to provide personal and direct feedback to their environment and vice versa. This research aims to explore the role of Social Things in tangible physical relationships, where people can improve their personal sociability through the benefits of mediated sociability applied in the physical space.

## 1.2 Current Situation

Alongside a generation of savvy social media users, people are becoming more willing and open to a wider social net of connections and acquaintances, both personally and professionally. As a result of this acceptance and shift in mentality, the definition of comfort and social norms in relation to social connectedness is changing for the collective whole. Accompanying this growing social awareness of online social circles comes a mismatch of virtual friends that may not be approachable in person, despite a connection online. Many social applications can open the door to potential social or professional connections, but this may not translate to a physical person to person relationship.

While people can use the mask of an online profile in a virtual setting, physical in-person social situations require proactive decision-making, cultural and social awareness, and more than just a mental motion to add or connect someone to your social circles. Physical everyday social situations call for the public to navigate the complexity of familiar strangers in one's surroundings. In order to understand the current social dynamic that social networks and connectedness have created in real social situations, it is important to re-assess the role that the latest technology can play in person to person communication. A user's environment and personal desire to be social, coupled with guidance from technology, can shape new social interactions and culture.

In thinking about physical social interactions, environmental factors can define expected social norms and interactions. For example, those at a bar might feel more comfortable striking up a random conversation than those on a train in

Tokyo. This leads into the idea that environments can either create forced physical social situations, like in the train, or conventionally understood social situations, as in a bar, where interaction can be expected or encouraged. By nature of physical context, people will share different social interactions to conform to the expected dynamic of that specific place. Many people frequent specific places by routine or by way of seeking out a certain environment. In turn, these places might evolve into their third places, or places that provide a practical and/or social function to a user.

## Mobile Social Softwares

A community has different interactions between people to people, people and their things and things to things. The more social and interconnected these relationships get, things will inevitably become an influential factor in tangible social relationships. People are currently used to various social media platforms and the sociability that occurs on these virtual social graphs. For example, mobile social software (MoSoSo), which can include platforms like Facebook, Twitter, and other household social media names, use the medium of personal mobile phones to let users share and connect with remote friends with convenience (McCarthy, 2009).

As mobile phone users grow used to this ubiquitous connection to their virtual circles, MoSoSo's facilitate constant virtual presence as a window to their personal and professional networks. Though these social mediums can provide a good opportunity for physically remote connections, many of these softwares remove the physical face to face element of sociality. The use of filters, quantitative matching, recommendation processes, and virtual environments allow for users to fully control their social circles and interactions. Through this aim to perfect social process and network, these social mediums can lose touch with some aspects of the quantitative experiences of social interaction.

Research suggests the importance of face to face interaction in reaching a personal connection to others, where factors like nonverbal social cues and colocation can offer richer social experiences and require stronger personal investment than those available on current social media (Park, 2014). Face to face communication forces people to interact directly, and with immediate feedback and action expected. Some recent social media platforms promote offline social interaction,

including Tinder<sup>2</sup> and Happn<sup>3</sup>. These platforms provide users a way to realize their online sociability in their physical context and community. The Happn<sup>4</sup> app goes a step beyond Tinder, allowing user's a way to see other's profiles with people in their direct proximity. Despite being able to see others profiles, however, social action may or may not follow, and is still calculated based on the likability of someone's profile or personality projection.

## Face to Face Interaction

Informal face to face communication, as opposed to calculated or qualitatively recommended connections online, can be hard to navigate. There are no clear and easy avoidance strategies or involvement shields in face to face communication, whereas people have gotten more used to being able to adopt a personality through filters, structured spontaneous messaging, and without much effort or thought. For people to achieve stronger personal ties, it is important to not only maintain online and virtual presence, but also to interact with others in their tangible communities. Through Face to Face communication, people can improve their overall sociability and connect with others in a meaningful way. While people might go to a bar, cafe, or similar space to seek informal social capital, it can be hard to initiate conversation or be approached due to perceived social norms, individual personality, and the ability to escape to virtual third places in place of the physical context.

Thus, an opportunity arises for a third party actor to kickstart social interaction. Social situations are already manufactured by society's notions of what is acceptable, especially in a public setting. While smart things always follow a user's decision making, in order to really affect a user's social behavior, technology may need to push users to challenge their instinctual social interactions. Social behavior has been shaped by social media in becoming more superficial, impersonal and task-like in terms of what is said and when (Burgoon 2002). Though it may be effective for certain contexts and relationships, people are still seeking personal relationships in a tangible form, and value physical communities in their everyday lives. The question becomes whether or not learned online sociability can aid an

---

2 <https://www.gotinder.com/>

3 <https://www.happn.com/en/>

4 <https://www.happn.com/en/>

individual's tangible social circles, not just their perceived virtual connections.

## 1.3 Proposal

This research proposes Hex, a phone case accessory in the form of a modular display that allows users to visualize their sociability status in their current physical context. The accessory takes on the form of a flower shape made by seven connected hexagons to represent a visually stimulating and motivating social physical network. The flower shape is representative of the physical community while the individual and interconnected hexagons represent the user and the individuals that are in their network. As a whole, this display will indicate the user's current physical network of friends, the increase of physical connections, and their openness to sociability. Color and number will be used as a tool to signal emotion and network in a singular display. As the user meets more people, the flower shape will expand into a lattice of hexagons that surround the central hexagon, visualizing a user's physical network in a certain community. The goal of this research is to understand how this kind of sociability display might alter social decisions and increase an individual's sense of closeness to their personal relationships and communities in the physical context. With a physical and visual social indicator, individuals and groups can express themselves to others and overcome existing social barriers by encouraging a comfortable window of opportunity for interaction.

For the scope of this research, identity in personal physical communities is an important contextual cue in itself. The sociability display aims to provide an invitation to others to interact by creating another layer of commonality among co-located people. Most physical communities already have inherent goals or ambience that cater to a certain type of individual or group, where the community appeal can attract like-minded people to patronize a specific community. As a result, there is often a level of shared interest and mutual goals that are implicit in such communities. This can be said even more strongly for places that appeal to socially motivated persons that are trying to join or actively participate in a certain community. Their choice to attend an event or frequent a place that holds social value to its guests can be indicative of their goals or expectations of the place. Despite the shared interests and shared space, it can be difficult to meet others, approach others, or be approached by others due to existing social norms and social circles that have already formed. Social pressure can be especially

uncomfortable for people that do not have strong social skills or confidence to reach out to others. In this case, mediation can be helpful and inclusive on a collective and group level.

The phone was used as an artifact of personal and social meaning that could easily be added on to with a physical sociability display. Mobile phone usage is widespread and relevant as a tool for personal and professional connections, as well as an everyday physical belonging. As it can also be mobile and present in an individual's personal, physical, and professional spaces, it can also be used to permeate a person's physical experiences with a virtual or technology layer. In fact, phones themselves can be used as a social cue, as they are used as a medium for various forms of sociability with many personal groups. Social media platforms, desktop based social apps, mobile apps, personal contacts, and chat apps are among the various social mediums that people can access through their mobile phones. They have become social norms in themselves, as they have served as a way to escape social interaction, connect remotely with others, and have out at all times. As a result, It is also important that phones are physical, as to remain connected to the physical context and become a peripheral part of the environment and the persons present space.

This accessory relies on an individual's willingness to share this personal information to the communities with their immediately co-located community. If people are open to creating visible and immediate social circles, then they may find themselves connecting with others in new and exciting ways. With emphasis on lean mediation, this bracelet can offer a closed network that helps people identify with others based on their social openness to interaction. When people choose to go green, or indicate that they are busy, they will relay sociability at an individual and grouped level. The accessory's dynamic increase of number of physical connections in that community is intended to encourage both the individuals and the community to find each other and continue connecting with others. On the other hand, a smaller number of connections can cue others to reach out and join in conversation or simply remind the user of the good conversations that they had at that place. In Ch.2, I will discuss the hybrid place, social capital, and identification as key concepts that support current efforts to realize online sociability in a physical context.

## Chapter 2

# Literature Review

Early internet concepts predicted that the growth of technology would lead people towards virtual presence and communication, lessening the importance of presence and interaction in the physical world. The ubiquitous computing paradigm, coined by Mark Weiser, foresaw society's future as a constant virtual embodied presence led by the phenomenological transition of personal technology devices in the future. With computing technology immersing users into the virtual world, individuals would be ever present in a virtual reality enabled by pervasive computing (Weiser 1999). This virtual computing would be so well-integrated with the physical world that the inefficiencies of a day to day life, along with a user's physical participation in existing obligations and norms, would be relieved by technology. In a sense, Weiser's vision of the future of computing has become today's reality, where society off-loads various aspects of its daily activities into the virtual world.

Though technology has advanced and imparts influence and usefulness across a growing list of individual and societal needs, people have not detached themselves from their physical obligations and environment. This is especially true in the case of communication in the physical environment, where the personalized aspects of social relations remain a necessary part of interaction in both personal and professional settings today. Communication technologies (CT's) are thus becoming important mediators in what once might have been solely organic, static social interactions and networks that were largely dependent on face to face interaction. The shift towards targeted new mediums of sociability have expanded upon the potential for communication beyond just the physical environment. In turn, this has emphasized the role that computing can play in managing personal and professional sociability. Users of these virtual worlds have come to find meaning and value in both virtual and physical worlds in different ways, and it is now an individual's challenge to maximize the potential of extended networks and sense of connectedness. Chapter 2 aims to outline the role of recent communication



technologies in regards to social capital, hybrid places, and social identification.

## **2.1 Hybrid Places in the City as an Ideal Context for Communication Technology**

Recent technologies have established a clear notion of extended physical spaces. Society is now able to participate in a multitude of online communities and expand their networks outside of their physical, in-person circles. These virtual communities have a stake in helping people maintain close relationships as well as expanding one's circle of connections, thereby blending one's face to face relationships with the virtual world. This blending of the two worlds, and technology's involvement between them, has led to the concept of the hybrid space (e Silva 2006). The hybrid space becomes the space where a person's virtual and physical worlds are interconnected, and therefore influence a user's physical interactions and sense of place. The concept of the hybrid space is often applied to the city, where streets are now inundated with information mapped out by users themselves. This information orients people to places and communities that might match a user's current virtual interests, friendships, or past internet history, making it possible to guide oneself to desirable experiences. As a result, these hybrid spaces represent ways to change daily behavior, decision making, and more in regards to one's direct environment. Most importantly, the connectedness opens up the ability to customize and personalize personal physical communities applicable to a user's daily life. By making this kind of personalization available, people can now navigate their physical communities by using readily available crowd sourced information to find their way through daily routines, including their face to face relationships.

Through virtual social mediums, society can now access their direct or closest network remotely. This virtuality also aids individuals to join and participate in niche social communities, professional networks, and more at their own convenience. There is no doubt that this extensive and extended virtual network can be convenient and fulfilling, as well as accessed anywhere. Users can now participate in their physical space and interactions with virtual social filters. With access to or possession of certain technologies, such as a mobile phone, people can curate their experience of certain physical spaces and interaction that can help them join others that want to interact or understand the same spaces in a similar fashion

(Frith 2012). As more like minded people find their match of desired experiences online, people will set out with a layer of understanding of physical places and their surroundings. This new control over physical space that is available through technologies can be advantageous, but can also detach users from their immediate environment and physical communities. Current social technologies have only encouraged a city dweller's natural tendency towards a blas attitude, where people will set their routines through the aid of algorithmically made, personalized recommendations and naturally filter out others in the process(Frith 2012). Though efficient, the physical experience, natural personal communities, and sociability in these spaces are often exchanged for virtual social interactions. Despite an existing layer of social networking and community in the physical spaces, social mediums have only started to translate these connections into physical relationships and tangible connections. There is an opportunity for communication technology to build on the notion of the hybrid place and guide social interactions in physical communities.

## **Contextual Environmental Cues to Guide Sociability in the Hybrid Place**

One end of communication technologies and their role in the hybrid space is the potential for accuracy and calculated decision making, giving users the feeling of full control over their perceived environment and space. Current mobile social softwares are able to use contextual cues, such as light, sound, location, time of day, and more to provide highly contextual information to the user (Johansson 2008). These cues become significant in personalization to the user's physical experience, and can be used to permeate the physical space with a visible social layer. In fact, the current trend is for many social apps and devices to further a user's connection to physical circles and environment. By merging into a users environment, technology can present higher value and opportunity for individuals seeking to benefit from the hybrid space and communication technologies. Location based social networks show this trend, by utilizing location as a main fixture of relating to a user's needs. LBSN's are becoming increasingly relevant, intertwining a user's physical and virtual needs to reflect into one's direct environment (Schrock 2012). LBSN's promote their value through high context personal information and preference, which can be sensitive ground for communication technologies moving forward.

This concern can be seen through Yoriko Inada's case study of Dragon Quest 9, a Nintendo DS game that incorporates user location as a resource for game cooperation and rewards (Licoppe and Inada 2012). As user proximity is used as a trigger for action in the game, people started to coordinate virtually for offline meet ups that could gain them points in the game. Whereas people did choose to approach others in this game community for advancement, Inada suggests that players maintained seamfulness, or a way to protect themselves from revealing too much personal information to others (Licoppe and Inada 2012). Whereas seamlessness refers to the total integration of task and environment, or in this case, players as people in a public context, seamfulness serves as social boundaries and reinforced social norms present in public places. Players that did set up offline meet-ups referred to and communicated with each other to the extent of what was required from the game.

With the addition of the physical relationship, people were still bound by the rules and norms of the physical world. Seamfulness, incidentally, is rooted in the existing structure of social norms, where people place value on maintaining some distinctions between their personal lives as private versus public. Just as cities were found to encourage a blas attitude, virtuality that was overly public, as shown in this game, reinforces the player's value of personal privacy. This game also showed that there is a sensitive balance between virtual and physical personas, and how virtual technology can influence physical relationships to the extent desired in the context of the game. Similarly, communication technologies offer certain social contexts that allow users to connect to strangers in a comfortable setting and with certain protections. Attempts of virtual to physical relationships need to understand contextual needs and balance that information within the boundaries of the physical environment norms. Hybrid places create a hybrid cultural ecology, where communication technologies can flourish, with context and user needs in mind.

## 2.2 Growing Importance of Social Capital in Communication Technology

Many communication technologies aim to provide users access to community, and a sense of virtual mobility to others that are desirable and beneficial. In fact, studies have shown that familiar social networks aim to function as an inter-

face of social capital, where users share and receive personal information with others, which can provide the illusion of the social obligations and community (Huhnt 2014). Though social media does provide a method to share as well as receive information about others, the exchange is not one to one but one to many. Additionally, the ease of posting and the ease of acknowledgment can be problematic in connecting with another user on a personal level. Social networks try to engineer social capital, but instead may create a false sense of community and identity within that community. With the ease of posting, the quality of content is not controlled and the audience is often a mixture of personal and impersonal connections.

With acknowledgment buttons and the ability to follow others easily, an individual might feel validation for contributions that are quickly satisfying, but not necessarily meaningful as a contribution. By applying social capital to social media, there is pressure to provide the platform to contribute, but also contribute to others in a personalized way. With out of context sharing and receiving, the social capital that is possible on current social media outlets is large in scale but hard to control for quality and personalization. Additionally, with the possibility of brand sponsorship and involvement, distributed information is easily manipulated. Social capital is arguably most desirable when there is a personal benefit from the relationship, and where the tacit obligations can be understood as tangible (Coleman 1988). The question then becomes whether or not current virtual social networks can successfully establish social capital.

The comparison of online and offline relationship satisfaction is important in understanding the role of virtual social media versus physical social interaction. Whereas online social mediums provide a way to remotely connect with close and distant friends, as well as introduce new acquaintances, the level of connectedness has been found to be quite low. Research has shown that current social mediums do not replace the value of face to face interaction; offline social interactions have been shown to provide more emotional support than online interactions (Trepte et al. 2015). Online social mediums can be seen as a positive and supplementary outlet of sociability, but do not necessarily support emotional investment or closeness.

This may be attributed to the possible passiveness of interaction, and the resulting irregularity of direct communication with a large scale network. According to the social brain hypothesis, people have limited cognitive capacity for interpersonal relationship maintenance; in turn, an individual's offline inner circle has

been found to be the same as their online inner circle (Dunbar 2016). This finding suggests that social mediums might help to maintain an inner circle, but do not help to nurture close ties with others that are not already within one's friend group. Due to the sheer amount of possible connections that a user might have, it is difficult to manage closer ties through a solely virtual medium. Though loose ties are important, this finding also suggests that physical interaction is necessary to support and establish real relationships.

There is also the issue of individual personality and the role that it might play in online sociability. Studies show that extraverts may make more use of and interact better with communication technologies than introverts (Goodman-Deane et al. 2016). This finding alludes to the fact that people are rooted in the sociability that they project in their offline circles, and user initiated communication technologies do not provide a way to change their sociability. The limitations of many current CT's lie in the fact that they are outlets of sociability rather than triggers of new behaviors. Additionally, they may be limited by the scope of their environment as a largely virtual medium.

According to Media Richness Theory, the four key aspects of communication are the availability of instant feedback, the use of multiple cues, such as physical presence, voice inflection, body gestures, and graphic symbols, and so forth, the use of natural language for conveying a broad set of concepts and ideas and the personal focus of the medium (Sheer and Chen 2004). This theory suggests that communication technologies may be lacking in physicality, and the variety of nonverbal cues that it has to offer, as well as the potential passiveness of feedback. Without these aspects of communication, it may be hard to establish social capital in current social mediums.

## **2.3 Self Disclosure as a Means to Attaining Social Capital in the Hybrid Place**

Within a hybrid ecology permeated by current communication technologies, there is a need for a delicate balance between social norms in a physical versus virtual or technology mediated context. It is evident that people joining online communities are open to seeing, if not hopeful of, improved sociability with the goal of receiving the benefits of social capital. A study on motivation for Facebook use refers to the idea of We-Intention, where an individual perceives themselves as a part of

a collective social group, and thus feels responsible for carrying out the group intention and norms (Cheung et al. 2011). We-Intention has a strong influence on the individual's interactions and sense of community, as well as their role in enacting and maintaining a level of social norms as part of that community. Facebook and other such virtual communities that offer mediated interactions, especially those that are in the hybrid place, have the ability to directly affect physical interactions and sociality. This is in part due to the social capital that can be received as a result of conforming to norms, but also as part of the learned aspect of social norms in any environment. In order to receive the benefits of cooperation in any community, it can be important to maintain social expectations and appearances. Participants bringing this learned sociability to the physical space, coupled with the use of communication technologies, can view themselves as part of a unique blend of existing physical social norms and the guided interactions normal in that virtual environment.

### **Encouraging Social Identification with Physical Communities in the Hybrid Place**

One prerequisite of We-Intention, and achieving a sense of community and cooperative social capital, is social identification. According to the Social Influence Theory, which asserts that sociability occurs through the process of compliance, internalization and identification (Cheung et al. 2011). An individual first perceives the benefit of participation in this community, and decides to act accordingly to receive that benefit. Then, the individual will slowly adopt the social norms of that community as a part of their own actions, conforming to the community expectations with the goal of becoming part of that group.

Identification, which occurs once the individual has accepted the group goals as their own individual goals, is key to understanding We-Intention and an individual's sense of belonging in a community. This common group mentality, as well as adoption of social norms, reflects the importance of the role of a mediator or influential actor between the individual and the community. In this research, the common actor is the communication technology, which can not only serve as a guide for social norms, but an actor that allows access into a certain desirable community. By accessing this community, they will add another individual layer to the community as a whole, and become another influence on others that are like minded. This collective social influence is in line with the Social Presence

Theory, which suggests that the higher the perceived or visible social presence, the more people will want to participate in this community (Cheung et al. 2011). Social Presence Theory is important in motivating the growth of and maintenance of a community, which can have a reciprocal effect on identification, individual participation, and interest of new members.

Once social identity is established, individuals can be motivated to contribute to that community through the added value of personal information and content that reflects the mind of that community. In fact, in regards to community and relationship maintenance, studies have concluded that self-disclosure and the willingness of members to share personal information is correlated with the trust and perceived benefits of that community (Taddei and Contena 2013). In order for community members to engage with and maintain relationships through social networks, the medium through which information is shared must protect an individual's sense of privacy and communicate benefits of that community back to the individual. This in turn makes the environment and the members of that community in the environment crucial to effective and meaningful interaction.

Though it has been shown that people are willing to share personal information in online social media settings, the increasingly hybrid nature of social communication technologies has led to the sharing of what can be considered highly personal information, such as full profiles, contact information, pictures and more (Trepte and Reinecke 2013). As a result, users are learning to share much of their own personal information to an arguably large network of trusted connections. Through this learned sociability, users experience quick rewards, feedback, and the feeling of social capital through the medium of communication technology platforms. By using social capital indicators to reinforce sociability and value of shared information, people are not only learning to share online, but may feel comfortable sharing to in their offline settings if the conditions are right (Trepte and Reinecke 2013).

## 2.4 Discussion

CMC's therefore have the power to change offline sociability, and encourage face to face interaction when the environment and community reflects desirable feedback and interaction style. If the conditions are right, then people might be willing to apply their learned online sociability to the physical context and engage in conversations with those in their physical communities. In a personal physical

community, nonverbal contextual cues can offer a positive and natural way to identify with others in a social situation.

An opportunity arises for social technologies to improve their experience by permeating the physical experience. Social technologies are increasingly focusing on social capital, which is the value of potential reciprocity from belonging to a social network, to improve customer experience and move closer towards the benefits of face to face relationships. In turn, as technologies start to permeate the physical social experience and interaction, they begin to create hybrid places, where physical experiences are influenced by technology. As more social technologies shift towards incorporating physical experiences, different methods of identification are being used to help people meet others in an offline setting. Hex aims to be a very public and face to face experience, where it can influence both one on one and community social interactions. Instead of using pre-defined matching from online profiles like many CMC's, which might limit social interaction to one on one interactions, this research tries to apply the effectiveness of an online social network more directly to the community in a real time, user defined, and in context manner. Hex tries to apply popular elements from social virtual technologies to cue physical social interaction in a visual and ambiguous way. Additionally, Hex tries to capitalize on the existing notion and familiarity of a hybrid place, which can support both virtual and physical experiences combined to define a new experience for users that seek greater sociability.



# Chapter 3

## Hex

### 3.1 Design Objective

The goal of this research is to encourage face to face conversation and awareness of one's personal physical community through a sociability display. This sociability display tries to capitalize on the comfort and increased sociability available through current online sociability mediums and translate this level of sociability back to the physical context. Through the use of a visualized social status, people can participate in their physical communities by signaling personal social openness and gaining a greater sense of presence and openness to communication with people in their direct surroundings. By creating a visual trigger for conversation starters and face to face connections, people can reconnect with their physical places and engage with people that they may not have socialized with otherwise. Additionally, people will have an opportunity to identify with other similar groups or mediate conversation between different acquaintances and groups. There are a couple main challenges to make the design effective, which are listed as follows:

- Willingness for Self Disclosure of Visual Social Cues
- Means of Identification in a Visualized Community in the Hybrid Place

Above are the expected design challenges that may be faced in trying to apply online sociability to a physical context. The aim for this design is to provide effective incentives and a means to identification in order to encourage increased sociability. In order to do so, it is important to consider the form, interactions, and means to identification that can serve as a motivating and illuminating tool for personal and physical sociability. The design also intends to focus on physicality and the potential to build upon pre-existing social norms, both online and offline to achieve a sense of physical community.

## 3.2 Ethnography

This research was motivated by a focus on the hybrid place, and how people interact with others and the environment in their immediate physical context alongside the pervasiveness of communication technology. Social network users that participated in hybrid physical communities and used communication technologies were vital in understanding both the perception of place and their sociability in that context.



Figure 3.1: Stakeholders

In trying to observe the hybrid place, fieldwork was conducted in places where people using communication technologies gathered, frequented, and were likely to face social interaction with people in their immediate proximity. Initial observations were carried out at various locations including coffee shops, commuter trains, bars, and casual seminar events. Though patrons of these places came for different reasons, and participated with the present communities in different ways, the common thread seemed to be that these places formed natural and temporary communities as a result of routine or desired ambience. Due to colocation, patrons found themselves inevitable participants of this space and the existing community and social norms within that space.

In order to focus in on potential users that were most willing to share and most open to potential social interaction in the physical context, fieldwork was

soon narrowed down to places that served as a socially motivated third place. The third place refers to places where patrons might frequent out of routine or and feel comfort based on the availability of social capital and like minded individuals in the same space. Through a socially motivated third place, it was possible to see patrons that wanted to join the community or be more involved in these communities for personal social benefit and growth of network. As a result of these patrons, these third place communities could benefit through growth of network and expected social capital among the patrons in the group. Thus, it was chosen as an ideal place for the introduction of communication technology focused on physical mediation, as both patrons and community have incentive to invest in one another.

### **3.3 Building a Sense of Community through Hospitality**

The goal of the first fieldwork was to observe how a restaurant manager created a sense of community and social atmosphere at his restaurant, and how this applied to personal growth as a host of this community. His regular face to face social connections made it possible to develop deeper loyalty and sense of community in a specific place, enhancing the experience and providing a positive social environment. His behavior and decision making was documented in detail to understand his ability to create this community and social experience.

Masaru (M, 35) was observed managing and serving patrons in a high end restaurant in Tokyo's Roppongi Hills complex. The restaurant was completely full for the evening, with many patrons laughing and enjoying their meals for dinner time. Being the manager, Masaru worked at all different posts including the initial host, the occasional server, the overseer, and the farewell host. There were personalized notes on all the tables, which he hand wrote with special greeting messages for those that made a reservation beforehand and customized notes for the regulars that he was familiar with. He would hold efficient but thoughtful conversations with customers that he knew, smiling and laughing with them easily. Customers asked for their regular order, and the manager would know without further explanation.

Masaru had full circle interaction with the customers that he served, and made sure to make them feel comfortable. An example of his mediation with



Figure 3.2: Fieldwork Master

a customer and a coworker at the restaurant shows the social atmosphere that he was able to encourage through his role as a host. Masaru finds out that a regular customer is currently attending Keio University. He immediately thinks of his colleague, who is a part time worker at the restaurant, and also happens to study at the same university. At the next service check in, Masaru brings over his colleague that studies at Keio, which eventually lead to the waiter and the customer connecting on Facebook. Through Masaru's active social gesture and the waiter and the customer's participation in social media, the two were able to realize a new connection within an existing personal network (Keio University).

Once Masaru was observed in his role at the restaurant, it was important to understand his motivations and any external influences that unconsciously guided his behaviors. In depth interviews were carried out to understand the key players in the community and the way he interacted with those players to achieve the perfect ambience in the restaurant. The Flow Model identifies the key players and the observed interaction exchange between the players and the manager. Each individual interaction shows his efforts to provide a good experience and feeling of comfort to the customers, as well as mentor his work colleagues to do the same.

The physical items that were used during these interactions were also analyzed as a way to identify personal physical artifacts important to social mediation and interaction. These items worked as tools for the manager to present his efforts in a physical way. Each artifact worked to satisfy and comfort the customers. One of the most important Artifact's was the cell phone, representing an intangible

gift of connection. This connection could be accessed and called on outside of the restaurant, giving the customer a gift of increased social capital potential in their personal network.

The Cultural Model refers to the external cultural influences of Masaru and the key players. This model revealed that Masaru has a passion for his restaurant's mission, which is to serve customer's fresh, organic, and farm grown vegetables. As a result, he has a vested interest in sharing his identity through the restaurant as well as getting to know customers and staff that are part of that community. His past work and personal experiences, which includes formal vegetation education and agricultural work, have motivated him to appreciate and share this community in his workplace with other similarly minded people.

## Mental Model

Masaru's mental model was constructed to propose how his values and personal philosophy manifest themselves in his cognition and actions. When he saw that customers or staff needed something, he would fill the role or make sure it was filled so that the restaurant ran smoothly. When he heard personal network details about a customer, he made a mental note to connect him with his own colleague, who belongs to that same personal network. He encouraged this communication as a result of his passion for his familiar customers and the knowledge of shared community. He strived to connect people from his trusted network and physical community through the trust and comfort of the environment. Through his efforts, he was also able to cue people to interact socially and create a socially connected experience with his restaurant and the customers.

## 3.4 Building on a Personal Social Network

The second fieldwork was conducted on a patron of a socially motivated community, where both social norms and communication technologies affected sociability. The objective of this fieldwork was to observe an individual patron in a social setting and understand the triggers in place that helped him meet others. This individual was also observed to understand the motivations to patronize a certain community, and the benefits received through participation.

James Moore was observed at a networking event for international and local young professionals in Tokyo, Japan. He was invited through a good friend, who

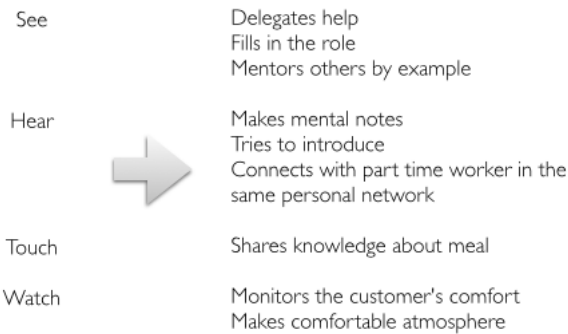


Figure 3.3: Mental Model

also doubled as the organizer and host. James attended the party with a friend that had no direct connections to the host or the other attendees. On the other hand, James was very familiar with the crowd of people as they were mostly connections through the host. James weaved through the mixer, chatting with friends, mutual friends, and meeting new friends. Though he was still learning Japanese, he was open and tried his best when the situation required. He approached and was approached to start conversation, and was able to introduce his friend to many others at the event.



**Name:** James Moore  
**Age:** 28 years old  
**Sex:** Male  
**Current City:** Daikanyama, Tokyo  
**Hometown:** Portsmouth, U.K.  
**Occupation:** Graphic Designer

**Personal Profile:** James was born in London. His mother is Japanese and his father is English, but he spent most of his time growing up in the U.K. He went to the University of Portsmouth and studied mechanical engineering. Post graduation, he decided to try living in Tokyo to immerse himself in Japanese culture as well as live in a different city. He is learning Japanese on his own, and takes advantage of opportunities to practice. His hobbies include skateboarding, trying new bars, going to social and networking events, graphic design and architecture.

**Working Profile:** He currently works for a small design firm in Tokyo, where he handles the user interface web design for various clients. His previous job was at an architecture firm, where he combined design and engineering. He enjoys his work, but also tries to maintain a good work-life balance.

**Goals:** To understand Japanese culture better and increase his personal and professional network.

Figure 3.4: Fieldwork Master Profile (Event Patron)

The key players in this place included the event host, a first time acquaintance, and his own friend that he brought to the event. The event host acted as a trigger for new connections, where others would walk by and greet him quickly. As a result of his role and relations with people at the event, the host had the potential to serve as a mediator for James to network with new faces. James who had come over to the host himself was able to meet a new acquaintance. As a result of this interaction and introduction, he was able to then bring this new acquaintance over to his own friend for an introduction, which led to an exchange of contact information. James and his friend connected with her on both Facebook and LINE. It was observed that mediation created an easy and comfortable invitation for social interaction that otherwise might not happen due to social norms or the tendency for passive sociability in social contexts.

The sequence of events that occurred at the event reinforced the importance of mediation in social interaction. Not only was the host playing his role in making introductions, but the cell phone was used to both remove and connect from the physical community at present. James was able to meet a new friend, as well as share this connection, through the initiation made by the mediator. James was able to make these connections and introduce a new acquaintance through the medium of communication technologies. Among the observed physical artifacts, the cell phone played an important social role in this community. Facebook was used as the first trigger to invite James and his friend, by extension, to the event. Then, after James initiated conversation, he was able to connect to others through Facebook for future opportunities and friendship.

Based on the observed and self reported personal backgrounds of attendee's, there were many overlapping external influences present in the key players. Two notable insights were the use of social media and the communities that each individual patronized. James was very active on social media and regularly used Tinder, a social dating application, to meet with others. In contrast, his friend was a non-active member of certain social media platforms. This might imply that James and his friend perceive sociability in different ways, as well as approach face to face social situations with different expectations and motivations. While James' actively sought out company, his friend was okay to stay to the side and follow his lead when it came to meeting others. However, once James was able to meet someone that he thought was well-suited to his friend, he was able to make that connection. As a result of the community present in the event, it was easy to identify with others that came to that place.

## Mental Model

The mental model is used to compile the insights taken from observations and understand the fieldwork master's thought process and behavior. The observed mental model emphasizes actively sociable behavior where if James sees a crowd, he tries to mingle. If he sees a new face, he'll try to greet them. If he sees his friend looking bored, he can return and introduce his newfound acquaintances to his friend. Through face to face conversation and presence of overlapping community participation, James' could identify with others easily once the first step had been taken. He was happy to make connections, intros, and networking happen in his present environment, especially with those that were involved in his personal networks outside of the event.



Figure 3.5: Mental Model

## 3.5 Target Persona

With a better understanding of the ethnography of hybrid place communities and their patrons, the next step was to incorporate these ideas in a user centric approach and design. Based around the values and behaviors observed, the concept tries to cater to co-located third place patrons by recognizing the role of personal-ity and its role in personal sociability. The range of extroversion and introversion largely guided individual and group interactions, and in turn revealed opportunities for mediated communication as a cues for desired sociability. As observed in the fieldworks, the following patterns emerged as effective mediation that led to



social connection and a sense of community.

- Comfortable mediation through nonverbal social cues
- Presence of communities and a way for identification among these communities
- CMC's that were used to connect or avoid social interaction, but not initiate interaction

Keeping these patterns in mind, target personas were designed with qualities and motivations that could interact well and benefit from the above findings. These personas aim to create a relatable background and a framework to the potential users of the design. As shown in ethnography, an individual's personal profile contributed greatly to their social interactions and behaviors; these target personas are introduced as ideal representations of stakeholders.

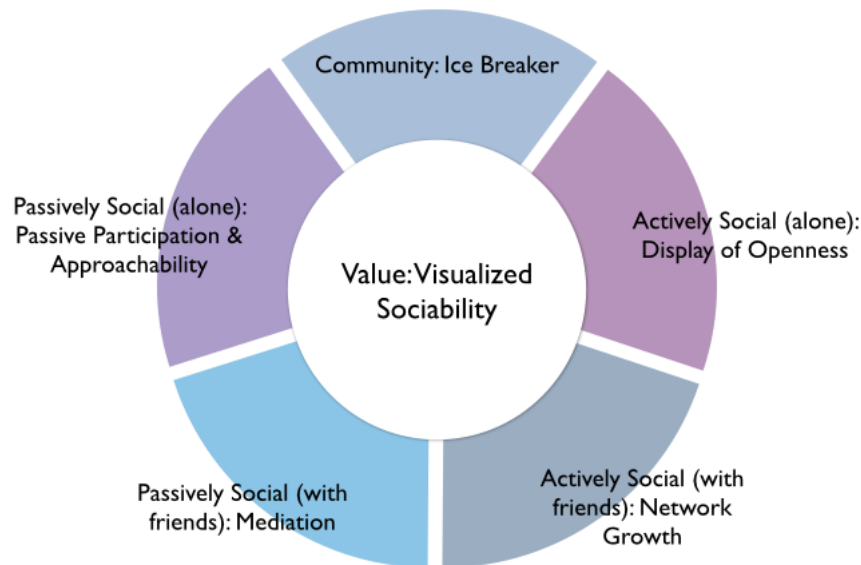


Figure 3.6: Key Findings

## Actively Social Individual

The first target persona is Remi Hosaka, a 25 year old female born and raised in Tokyo. She attended Keio University for undergrad, and studied abroad at

UCLA for one year. Her work as an Account Manager requires her to excel in communication and relationship building, which she tries to extend to her personal social interactions as well. She loves to meet others and feels that there is much to gain from new friendships and connections. She sees others and wants to learn from them, and is keen to participate in the community in a social way. Though she is always trying and open to meet new people, she does not always know how to start the conversation in a normal way. She actively pursues the social avenues that are available to her to meet others, including social media platforms and any windows of opportunity to meet others around her in person. Her goals are to expand her network, both personally and professionally, and have meaningful social interactions in her day to day life.

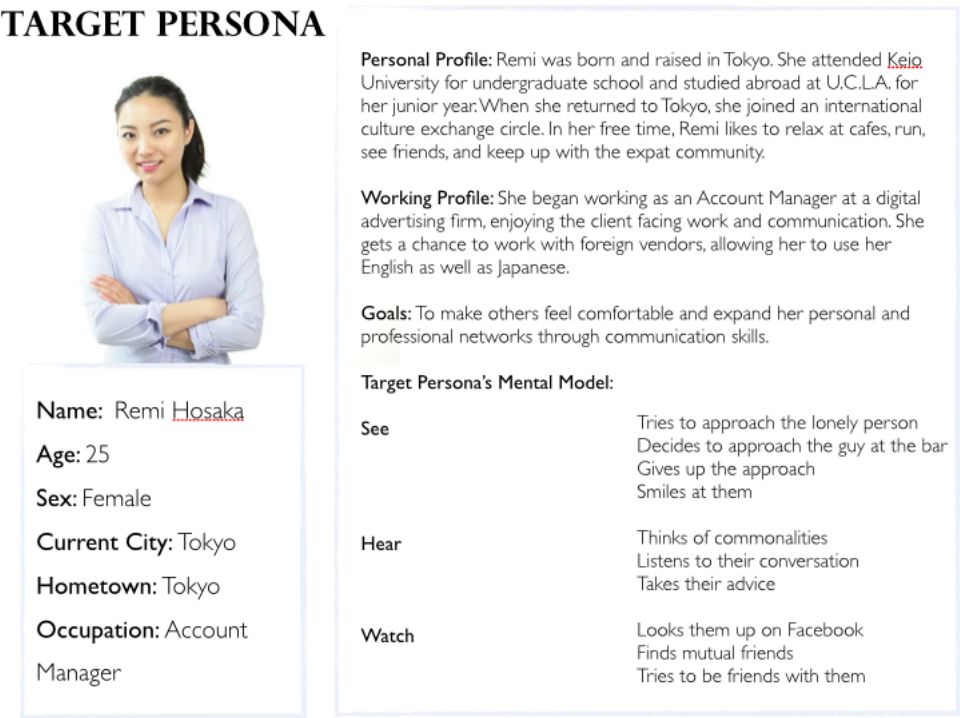


Figure 3.7: Target Persona (Actively Social)

Passively Social Individual

Sean Tanaka is a 27 year old Japanese American male. He moved to Tokyo post college for a job as a Front End Developer for a technology startup. Much of his

work is individual and can be done outside of the office. He reports back to his team for updates and progress reports, but otherwise works alone. He has a close knit group of friends and doesn't necessarily seek out more than who he knows. He is mostly open to meeting others with similar professional interest, or those that are friends of friends and might have similar personal interests. When he sees a crowd, he tries to find a quieter place to be. When he is out with friends, he is okay to follow their lead and interactions with others. He feels most comfortable meeting others when his friends are present, and able to connect him to new people through mutual interests or friends. Once he sees his friends talking, he wants to join the conversation and be involved.

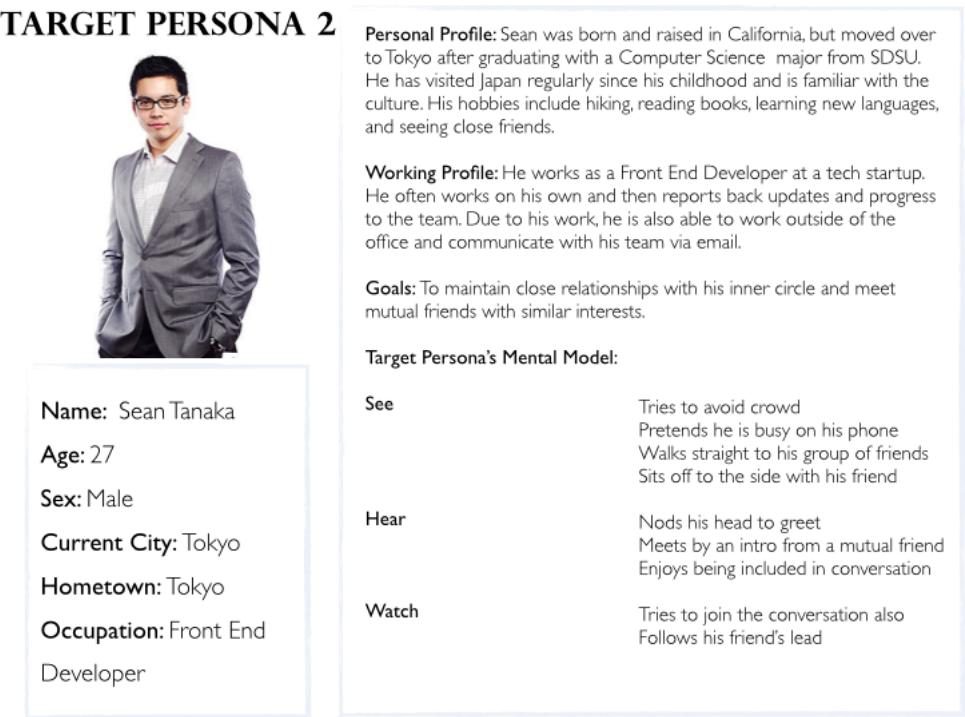


Figure 3.8: Target Persona (Passively Social)

### 3.6 Design Concept

By looking at social interactions through the lens of each target persona, it became easier to understand and predict the potential social norms and interactions

that might occur in a socially motivated community. The concept, Hex, was created to make an invitation for social interaction and encourage connections in a socially motivated physical context. The concept inspiration came from both current virtual social networks and ethnographic observations, which suggested that individuals could benefit from and seek a sense of community, but find it hard to secure a meaningful sense of belonging. Social norms, personal sociability, and existing friend structures were all factors that were seen to affect the approachability of others in the physical context. Virtual social media was seen as a tool that people used to connect with others once the initial introduction and subsequent discussions had occurred; it was used as a supplementary artifact of friendship or connection to the main value of face to face interaction. The goal for Hex is to address the return to and encouragement of physical connections that are both tangible and accessible, as well as create a desirable sense of connection and community to a user's personal physical communities. Hex tries to achieve this through the medium of a mobile phone accessory that attaches to the back of a phone case and features social group number and sociability color in a single display.



Figure 3.9: Concept Elements

## Concept Building

The number display shows a user's current physical network, with two rows of number displays in a four square matrix. The individual can input the number of people in their current company in the top display. The bottom display is a dynamic display that recognizes other users and reflects the number of people

that they met that day in that space. The bottom number increases based on real time interaction, and is set to reflect a new connection after 5 minutes of conversation with another individual user. The color display is the user's chosen social openness, where green indicates actively social and yellow indicates passively social. As the user meets more people, as recognized by the bottom section of the number display, the color display's color will get brighter to show increased sociability.

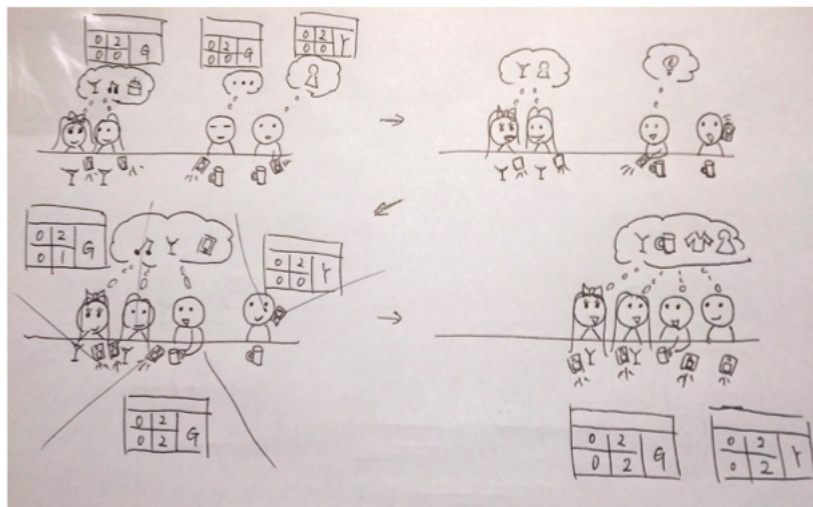


Figure 3.10: Concept Sketch

Both target persona's mental models were taken into account in a concept sketch, as show in , where their actions were driven by their respective social motivations in that context. The potential scenario describes four people in a bar, where two friends, one actively social and the other passively social, are able to connect with two girls sitting at the same counter. When the passively social friend starts to play with his phone, the actively social friend, who notices the two girl's green lights, turns on his own display and starts a discussion with the girls. They discuss the music, the drinks, and the bar in general and become connected. Both the two girls and the actively social guy's network number increases. Meanwhile, the passively social friend, noticing his friend's interactions, turns on his display to yellow. His friend brings the girls over and they all discuss. Both of their network numbers increase to two each, and their colors glow a little brighter to reflect this sociability.

A more detailed use case was made to outline the specific actions occurring in

detail. The actively social friend, the passively social friend, and the community itself are all key stakeholders in this system. As shown in , each person chooses to input their level of sociability and color. The community or physical context also plays an important role in providing a space that encourages sociability, trust, and common interests to approach others. As people become more comfortable networking and making connections, the community’s collective color will be a visual indication of the social atmosphere in the room.

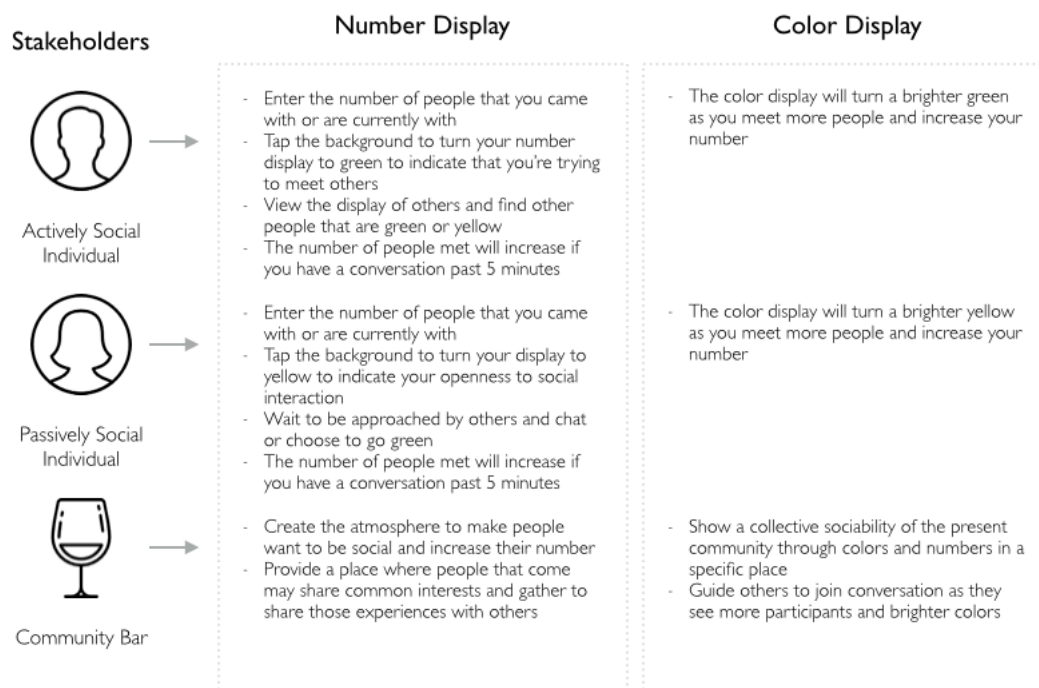


Figure 3.11: Use Case

To build on the concept, a story was imagined to apply Hex with the target persona’s in a social context. This story was set at a casual networking event, where Remi and Sean went to enjoy and make personal and professional connections. The story envisions a scene where both actively and passively social cues were used to meet others in a positive and comfortable way. The key path in refers to the most important interaction enabled by Hex, where Sean indicates his yellow light, or passive social cue, which catches the attention of Remy, who is actively social in that space. Remy, seeing someone off to the side and alone, decides to approach Sean and bring him into her current group. Though being

actively social and having the skills to do so might only need an invitation to act, a passively social option can help those feel comfortable meeting through the mediation of their friends or the invitation to be approached directly. Hex tries to address sociability in a way that can address the limitations of social norms, but can fit to multiple personalities in social situations. The only prerequisite for use is for people to want to be social and have social interactions.

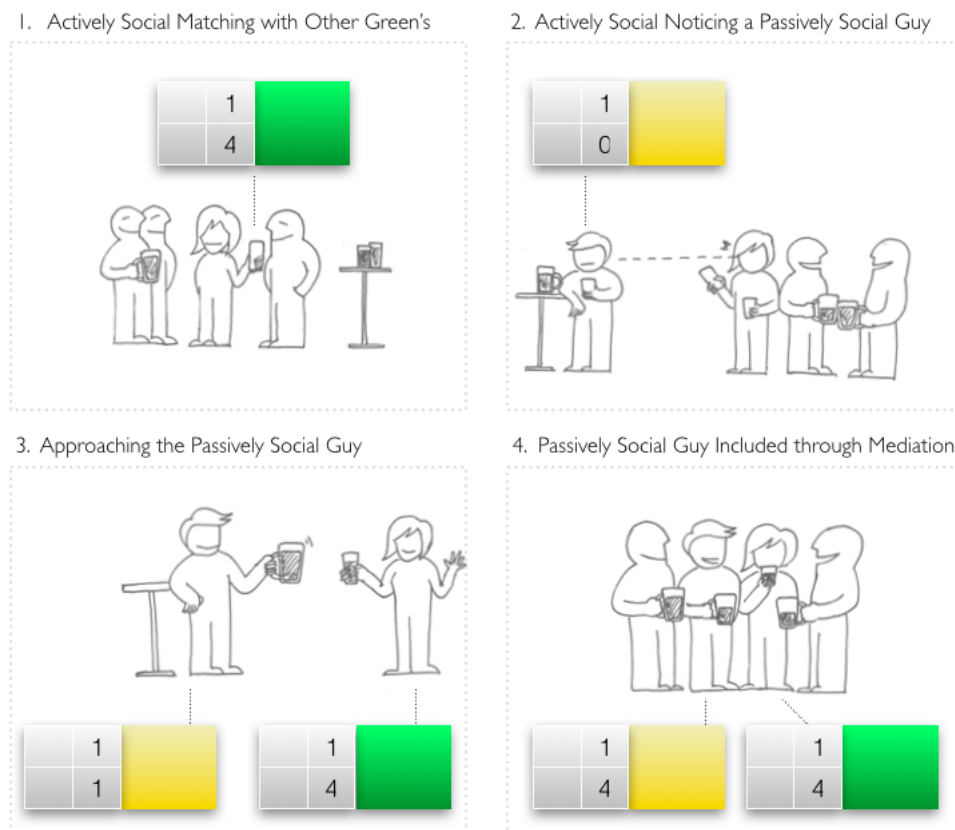


Figure 3.12: Key Path

The concept drawing, shown in , imagines the form of Hex as a physical prototype. The prototype aims to provide the experience of sociability through a direct visual display of an individual's social group number and sociability color in a third place setting. The form of a phone case was chosen due to observations during the fieldwork process, where cell phones were pervasive in social environments and were used as a means for supplementary social connection. A cell

phone's physical, mobile, and personal form allows for constant use throughout the day, especially in social interactions. Cell phone's were observed as serving a dual function of escaping from or building social situations. For example, cell phones were used as a way of escaping certain social situations or appear busy to others through the use of phone, which tended to remove users from their physical environment and interactions. On the other hand, they were also used as a way to connect users together or even find other users in the physical space through a virtual social medium. Through this dual nature, cell phones were identified as an important artifact in expressing sociability in a vague or secondary way.

As a result of the user's current social interactions with the phone, and its constant presence in social situations, it could be used to integrate a different layer of social experience to users and any pre-existing social norms surrounding its usage. The back of the phone faces outward into the physical space, which is often visible to other users and the owner as well. In fact, phones are often used as artifacts of personal expression, where people choose personalized phone cases with imagery, design, or texture that can give clues to their personal preferences or interests. In addition, as familiar tools of social interaction, cell phones users might already associate cell phones with sociability and a medium to connect with others. With the displays designed to attach to the back of a phone case, the concept's goal is to build on virtual sociability that is already present on cell phone use by adding a physical and outwardly visible sociability feature.

The initial display design tries to mimic the look of a window. The window is used to act as a metaphor for a means to social transparency, suggesting both active and passive visibility from the inside and outside. The lefthand side is the number display and the righthand side is the color display. The displays aim to visually notify others about the physical network in a quantitative and visual way. This contextual cue acts as an invitation of sociability through a means of common identity in social group number and a welcoming color of openness.

In a socially motivated third place setting, people are more likely to share a reason to be in that environment and have similar interests that can engage groups once they have started talking. Instead of matching with people that are already friends, or have calculated matching interests, Hex aims to push people towards sociability with their like minded peers, further encouraged by existing physical communities and the atmospheres that they create. Colocation bonds people together through physicality and contextual cues and can be a motivational factor to be social with others.





Figure 3.13: Concept Drawing

## Prototype Process

Prototyping began with ideation on the best form, features, and interactions that would best fit the target users, who were actively social and passively social patrons of a socially motivated physical context, and the proposed target community, a user's personal third place. The prototype aimed to include the following features to define the experience:

- User initiated sociability color indication through green or yellow color)
- User initiated input for the number of people in present company
- Dynamic number display that shows the number of increased connections
- Dynamic color display that reflects the user's increase of connections

The above features try to encourage approachability and social interaction by allowing user's to choose participation in the visual physical community. The

dynamic or system based features are used to update user's on their new connections, as defined by 5 minute conversations, as well as share their current social status with others. Initial prototyping started with the use of LED stickers that were attached to a circuit. A touch sensor enabled the color indication, allowing user initiation of sociability. As seen in and , a touch sensor and a battery controlled circuit LED were used to realize the look of the concept drawing in a paper prototype. Though the circuit stickers were a good fit for the convenient physical form and flexibility, they were limited in possible light and number interactions that were important for the concept.

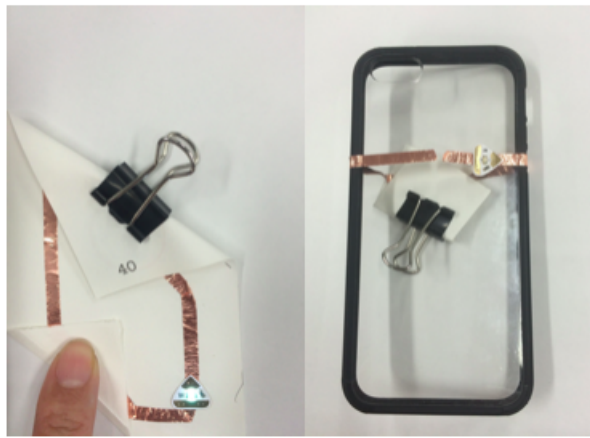


Figure 3.14: Circuit Sticker Prototype

The next round of prototyping was done through an online prototyping tool that allowed for screen based interaction. This was the most flexible solution as it allowed for user initiated decisions of color and number, as well as a way to reflect the brightness increase based on an increase in the number of connections. The screen based prototype enabled the user to indicate their openness through color and their current social group number. This prototype also allowed them to see increased physical connections reflected through the color and number.

The screen based prototype was modeled on the initial concept drawing of the sociability display, which aims to focus on the information displayed through the simple window design. This prototype was also easiest to scale in terms of user testing. As the prototype was stored on the cloud, it was accessible through any phone device. The screen prototype's accessibility was important as it made it easier to simulate the experience with groups of participants to test the concept.

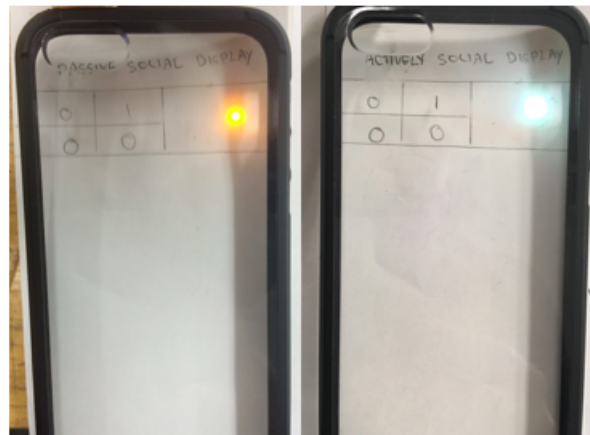


Figure 3.15: Circuit Sticker Prototype

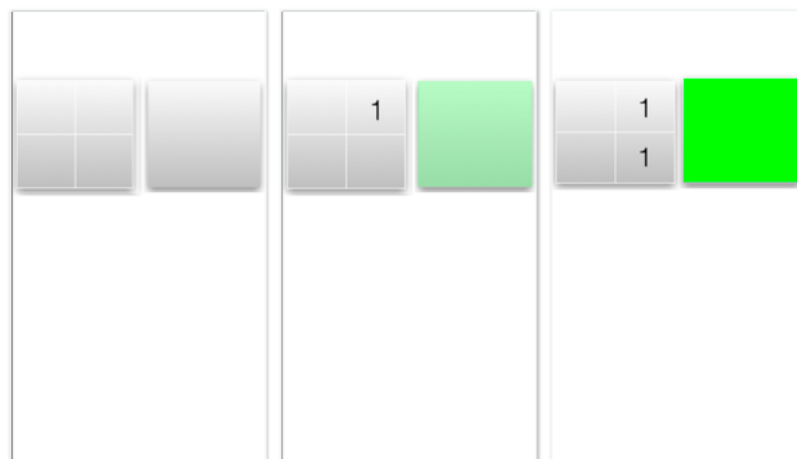


Figure 3.16: Screen Based Prototype: Actively Social

## 3.7 Concept Evaluation

Qualitative interviews and surveys were carried out in various locations in Tokyo, Japan, and targeted social patrons and their respective personal and physical communities. Evaluation was first carried out in a small and private bar in Nishi-Azabu, Tokyo, where both regular and first time patrons were present. Tests were carried out from 9pm to 12pm, where patrons at the bar were invited to participate in a qualitative survey and try the screen based prototype. This test

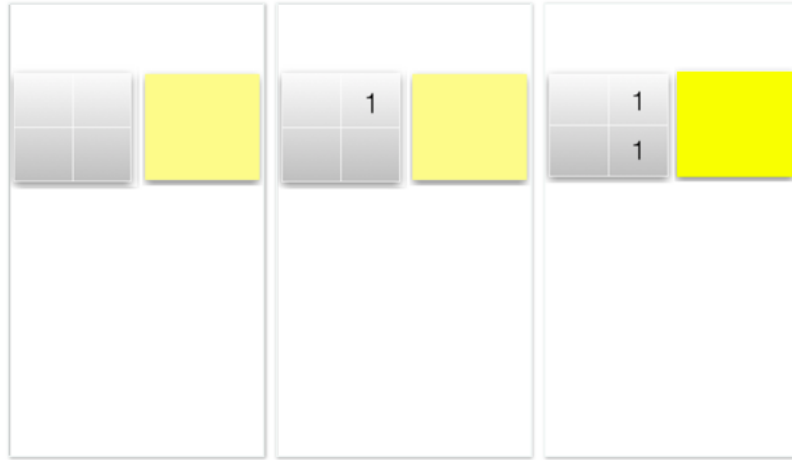


Figure 3.17: Screen Based Prototype: Passively Social

was carried out to understand the potential usage for Hex in an existing third place community and its members. Five patrons of various ages and professions were asked to participate in the survey. Three additional individuals were interviewed in different locations outside of the bar to explore the concept in other contexts. Identified target users included people that had actively social or passively social mindsets and self-reported as members of third place communities in their personal lives. The focus of the evaluation was based on the following two perspectives:

- Perception of their self disclosed visual sociability
- Perception of the collective visual sociability

By focusing on the user's self perception of their own choices and other's choices, it was possible to understand their ideal interactions and goals with Hex as a medium for sociability. Evaluation of the user initiated versus system driven display was also tested to see a user's satisfaction with the information that they input and received back. This feedback would be collected to understand the effectiveness of the content and concept in encouraging social interaction for the users. Three sets of surveys were used to evaluate each user, which included a Pretest, an Interaction Test, and a Post-test.

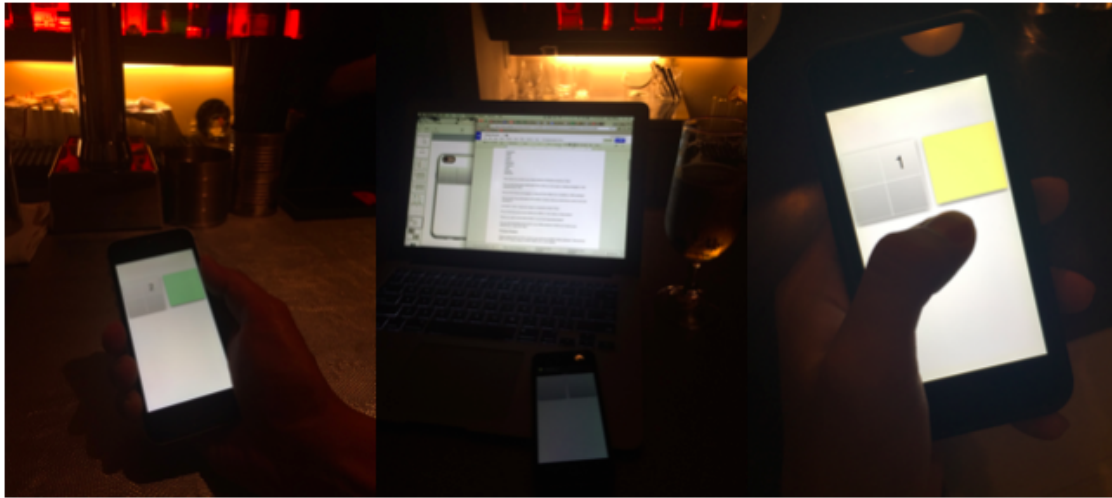


Figure 3.18: User Testing

## Pretest

The pre-test was used to determine the participant's usage and attitudes towards social media and communication technologies and how this usage might relate to their physical social relationships and environments. All participants used at least three communication technologies or more and described a range of perceived closeness per platform. When questioned about their perceived closeness to their online connections on their various social platforms, all participants responded that their online networks were not considered as close friends. Instead, many turned to solely chatting apps for communication with their closest connections.

Despite having these social networks online, most did not feel that close to their connections. In contrast, the participants expressed stronger connection to their physical and personal communities, which they felt were valuable and were often frequented by close friends, friends of friends, or people that had mutual interests. Despite an expression of perceived personal closeness or fulfillment from these communities, the 6 out of 8 participants felt that it could be hard to approach or meet others in their respective personal communities. According to the participants, existing small groups and approaching others for the first time were barriers to sociability with others in their communities.

## Interaction Survey

The Interaction Test was used to gain insight into the participants' respective understanding of the design concept and their perceived value of the functions relative to their wants and needs. The questions focused on the user's willingness to share their current friends and social openness through colors and numbers, as well as their perception of the collective physical community's colors and numbers. This interaction was user-initiated; an emotional map was created to outline the user's experience during this test.

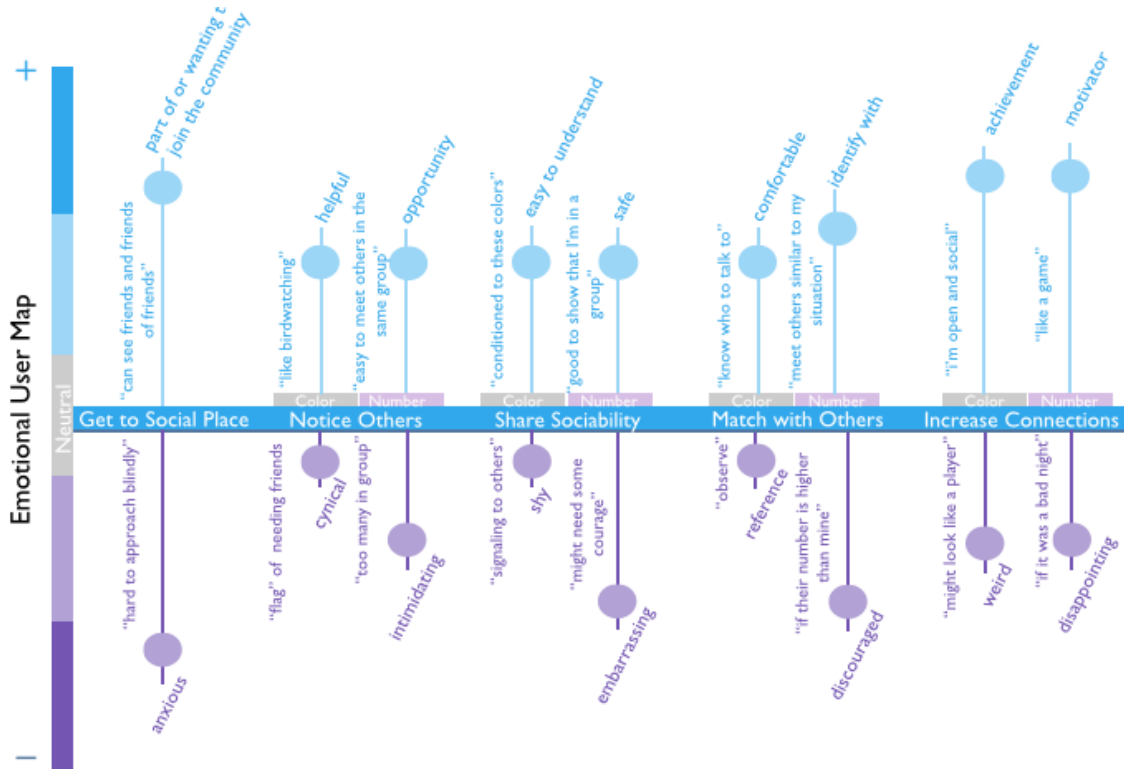


Figure 3.19: User's Emotional Map

The emotional map displays both negative and positive feedback of the user's experience with the interactions to show possible concerns and opportunities for improvement. This map was based on the collective responses of the participants and their reactions to each function. As seen in the , the user journey starts at the user's decision to attend a social event and follows them through their social process of making connections. The interaction survey covers the user initiated

interaction and action of the display. Users felt that seeing other sociability displayed was helpful, and an opportunity to identify groups that they could join or people that they could talk to. The chosen colors were easy to understand and seeing others number of friends made the users identify with similar numbered groups. The lowest points, where users indicated shyness or embarrassment, were regarding the number display. Users felt that sharing the number of people in their current party could be embarrassing, seeing others with really high numbers could be discouraging.

## Post-Test Survey

The Post-Test survey was conducted as an intervention to show the system and the way the displayed information changed dynamically. The number of connections increased, and the color was brightened to inform users of the system and how it would work on it's own for the user. The results of the post-test were included in the Emotional Map under the increased connections section of the emotional map. The highest point of emotional map was where users could increase their connections and see these new connections displayed in both number and color. The brighter color felt like an achievement, and projected a positive image to others in their physical proximity. The increase in number of connections made users feel motivated to be social and appear more social to others. On the other hand, though achieving a higher number of connections could be a motivator, seeing a low number of connections could be disappointing.

## 3.8 Discussion

Through this user testing, it was possible to receive insights into the motivations and behaviors of sociability and the influence that Hex could have on individuals and their respective personal and physical communities. In the context of a personal and physical community that users identified with and wanted to participate in actively, users were more likely to have motivation to meet others and connect with them in person. Through the removal of initial social barriers that might occur in these places, especially for first time guests or visitors, Hex could be used as a tool to aid and encourage social interaction of groups and individuals. Key insights from this evaluation consisted of the following:

- Seeing others sociability in the physical context was a positive experience

- Sharing personal sociability with others could be difficult
- Visualizing an increase of physical connections was effective

Through the ability to see other's sociability choices, users felt comfortable and able to approach others with more confidence. In combination with the number of people in others groups, people felt that they could identify with and find others that they felt were similar in situation. This also gave users a sense of common ground that they could use to start conversation with others. Additionally, it gave members of the community a way to people watch and observe social interactions and behaviors based on their display of sociability. Many of the negative experiences that were first reported in the pre-test in regards to approaching others, such as small groups and existing friendship circles, could now be avoided through this display.

By giving users a way to personally show how many friends they were with, they felt comfortable to show others that they were with friends. However, it was harder to show this number when they were alone. Though some users indicated that they would want to project openness and willingness for sociability in these context and signal this openness to others, most users expressed hesitation at showing the number one, or that the user was alone. By displaying that the user was alone, users seemed to feel more vulnerable to judgment and social stigma. The use of the number was also too straightforward in this situation, where the number one seemed to be associated with negative sociability traits. Showing the color green or yellow for sociability was less polarizing, and was easy to understand in terms of who to project personal sociability to others. Users expressed that they would likely choose green, but would show yellow when they were busy or wanted to have a more serious or one on one conversation. One participant liked being able to show that he was busy without having to tell others directly, but could still be open to being approached.

The most effective user interaction was the dynamic increase of connections and the color reflecting this number through a change of brightness. Users felt that by seeing a change in their sociability through real time interactions, they would feel a sense of achievement as well as motivation to be social in their physical context. Being able to track their physical social interactions also meant that they could show others their openness and willingness to have conversations, which in turn could encourage others to participate.



## Updated Form

Based on user testing and feedback, the concept was revisited to address pain points in the initial physical prototype. The evaluation of the concept revealed that sharing sociability and seeing other's sociability through color and number could be helpful to personal and collective sociability. However, sharing the number and color so directly, especially when alone, was found to be uncomfortable. Evaluation participants tended to have negative perceptions of the number one as a representation of their current social group, despite feeling that showing or knowing this about others would help them identify with others that were similar to them. In order to motivate people to share and feel comfortable doing so, the concept was adjusted to display the same information in an abstracted way.

With the concept's core of personal sociability color, social group number, and visible new connections in mind, alternative ways of visualization were explored. As seen in the first evaluation, the growth of visible connections was identified as a strong visual to encourage and invite social interaction. Consequently, As seen in , the new visual of the display uses a hexagonal pattern in the shape of a flower. The middle hexagon represents the individual, and the number of friends can be shown as darker colors around the middle. As shown in , the colors of green and yellow can still be chosen to share active or passive sociability. As people grow their network, the increased connections will be reflected through added hexagons, or petals, around the center. The shows the potential use case of the new design and how it would work in a one on one conversation.



Figure 3.20: Updated Form: Abstracted Sociability Display

Hexagonal tiling is used to form a flower shape, which symbolizes a dense and close network. Hexagons and the flower shape are also meant to reference the potential for growth and a visual of a growing network of connections. Each

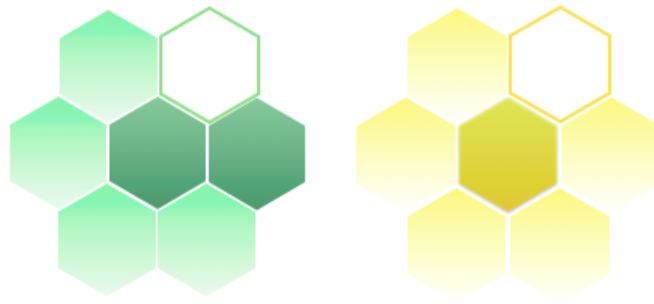


Figure 3.21: Actively and Passively Social Display

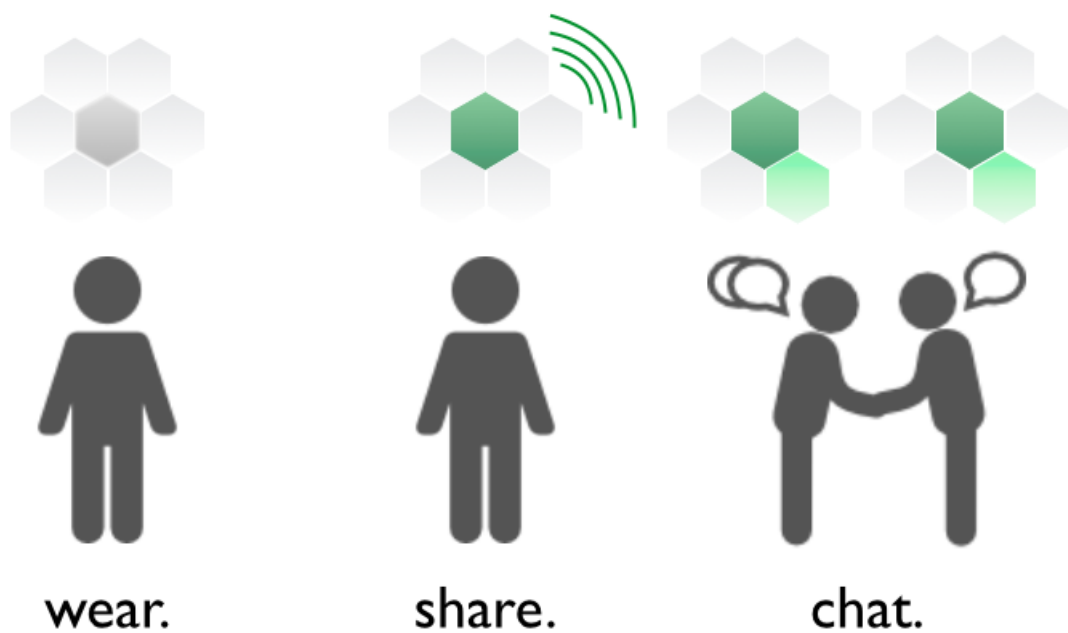


Figure 3.22: Hex Use Case

display will start with the same initial flower shape, which can more subtly express an individual's connections and standardize the visual starting point across all users. As a user's network grows, the hexagonal lattice will continue to grow in a circle around the central flower shape. With each full circle of petals completed, the color will grow brighter in the user's chosen shade of green or yellow to show increasing connections and sociability at that event.

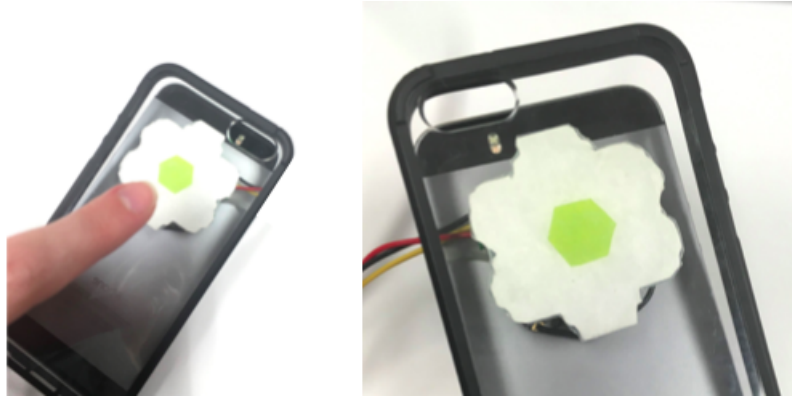


Figure 3.23: Hex Prototype

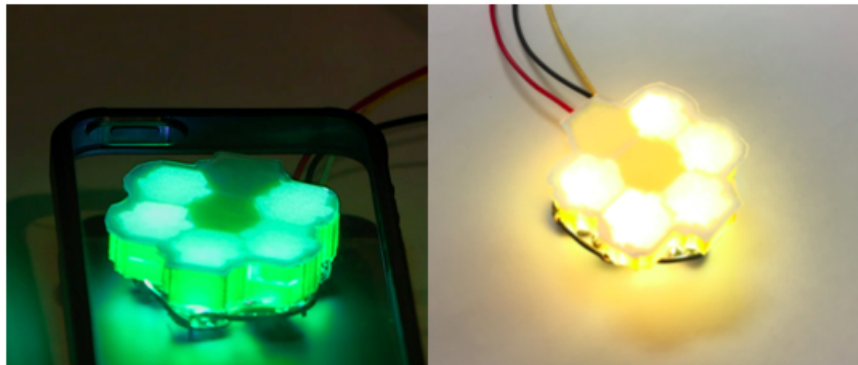


Figure 3.24: Hex Prototype: Light Interaction

# Chapter 4

## Evaluation

Hex, designed as a modular attachment to the phone case, acts as a sociability display to visualize a user's social group number and color to act as a social contextual cue to others in the same space. There are both user initiated and dynamic elements that work in combination to motivate users towards more connections and greater sociability. Initial prototyping and user evaluation focused on the understanding of the concept and its potential value to the user in a socially motivated third place context. The concept elements of social group, sociability color, and visible new connections were found to be effective for participants, but the experience was hindered by the directness of the displayed information. The following round of evaluation focused on testing the new hexagonal form that was designed to abstract the core concept information into a more appealing and comfortable user experience, and see how it compared to the previous user experience.

### 4.1 Concept Evaluation 2

Qualitative and contextual interviews were used to determine if the updated Hex prototype addressed some of the observed pain points in the initial concept evaluation. Five participants in the 20 to 30 year old age range, were interviewed to understand the perception of the concept, potential use cases, and willingness to disclose sociability information using Hex. Users were introduced to the concept through the initial prototype and the updated form and were able to test the Hex prototype. During this evaluation session, feedback was received that "it would be helpful in knowing who to stand next to in a group of people" and that "it would be easier to approach others". In regards to the form, four participants felt more comfortable showing their personal sociability information through the hexagonal display as opposed to the initial prototype display. Another participant

mentioned that having this kind of interactive display would spark conversation, both about what it was and how to use it.

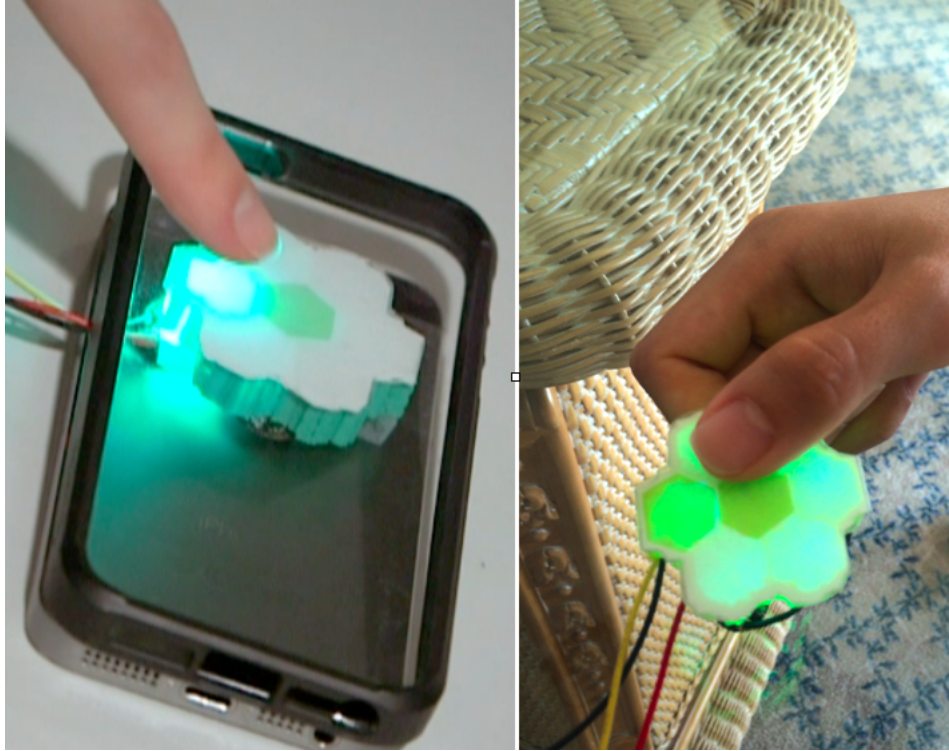


Figure 4.1: Evaluation of Hex Prototype

## Discussion

Through the updated form, users felt more encouraged to share with others than the previous display. Additionally, it seemed that because the information was abstracted into a flower shape, participants felt that it was more interesting as a personal artifact. People felt that they were able to identify with others through the use of color, social group number, and visible social connections. As shown in , Hex effectively provided a way for people to reach out to others through identification in social group number and openness through color. Hex would be most effective in places where people were socially motivated, such as the third place.

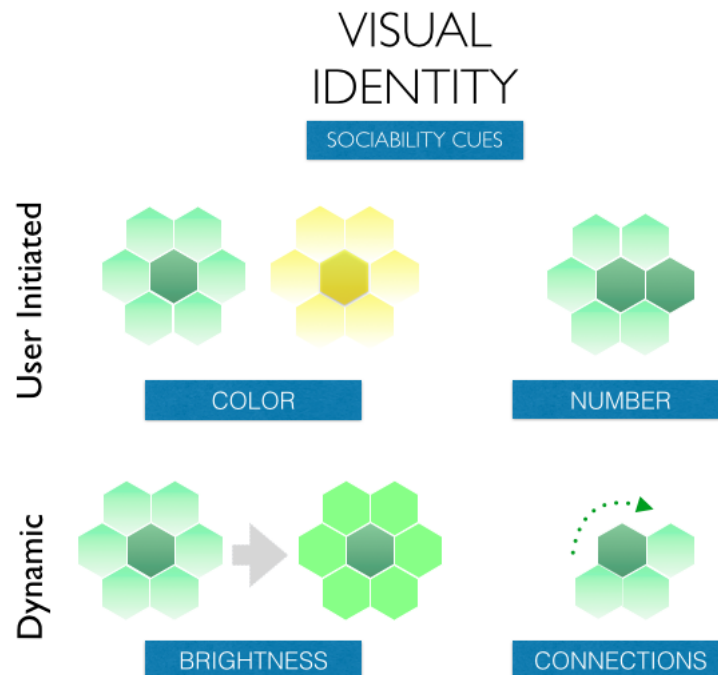


Figure 4.2: Visual Identity through Hex

## Limitations

Throughout the research and design process, there were a few limitations that could be improved upon to gain more significant results. One main limitation was the ability to test the full functionality of the prototype. This included a staged evaluation process for connecting the phone to identify other's unique sociability accessories and change the number and color dynamically based on these unique ID's. Instead of this process, the increase of connection numbers was preset to change after 5 minutes time to an increased number of connections. This process was used to simulate the visual change so that users could understand and see the concept. As a result, it might have affected the intended user experience.

An additional limitation is the scale of the user test and the number of evaluations conducted. The current evaluation is tested on a qualitative basis with deep interviews on a small group of identified target users. However, more significant results could be possible with a larger scale user test in combination with a fully working prototype.

As this research aims to improve an intangible and indirectly measurable

perceived value of sociability, the tests conducted try to gauge effectiveness of this concept through experiential findings and perceived value to the individuals. Though the perceived value is important and insightful to the design opportunities and pain points, extended testing and evaluation of various other qualitative and quantitative methods would help strengthen the conclusions of effectiveness.

# Chapter 5

## Conclusion

### Overview

Many communication technologies are starting to integrate the benefits and experience of physical and face to face relationships to add a greater personalized value to their users. As these technologies integrate the physical experience with virtual advantages, there is growing potential for mediated communication and cooperation through physical social networks. Hex attempts to take these learned and familiar virtual social interactions and apply them back to the physical third place context. Though people have a natural tendency to abide by social norms, especially in public and physical places, their personal third places offer a wealth of social capital and potential network opportunities. In order to access the benefits of this physical social network, a communication technology like Hex can motivate users to share their own openness and in turn, receive the benefits of a visual community and the potential connections that can be made in their physical space.

The contribution of this research is to apply communication technology to the third place to encourage sociability and bring back awareness and interaction in the physical community. For the scope of this research, Hex was found to be effective in creating a sense of identity in the community through the combination of visualized color and number of connections. Through the use of a visualized sociability display, users were able to gain a greater awareness of physical community and become a motivator for increased sociability in the physical context.

The sociability display also motivated people to meet others in their physical community, as well as increased perceived sociability for the individuals in their physical context. Through user initiated participation in comfortable personal communities, people became more aware of other groups and individuals in their surroundings. Users also felt that though this visualized social status, others would perceive them as open and social people in a positive way. The physical context



of the third place to each respective user was shown to be a good starting point for users to open up to others due to the perceived personal common interests within that community.

### **Future Works**

While Hex is currently a sociability display, the display could be used as a way to show mood or other ambiguous personal information in the physical space. If Hex could expand to mood colors, then this device could act as a constant relay of information to others in their physical spaces. Depending on what individuals chose to and felt comfortable projecting to others, this could be another way to easily find common values and groups of like minded individuals in the physical space. As Hex would not be connected to any social media accounts, this would still give individual's privacy in terms of their personal social identities.

The aim would be to give user's a visual community and potential identity at the time that they felt they needed it. For example, a tourist group could now find comfort in locals that signaled their willingness to help guide them. Hex could become a way to provide windows of opportunity to those who are seeking certain experiences or roles in their physical environments but do not have a way to express this to others in an easy way. Hex's expansion to other physical contexts outside of a socially motivated third place could be explored in future works.

As Hex is a cell phone accessory and sociability display, another direction could include a companion mobile application to further display the places a user has frequented and their sociability in those places. A mobile application could be a way for users to check on their past connections in certain places as well as share this information with friends to provide a snapshot of their social activity. A Hex mobile application could visualize physical connections and share personal communities with friends or other interested patrons, which could lead to expansion of the community network.

# References

- Burgoon, Judee K, Joseph A Bonito, Artemio Ramirez, Norah E Dunbar, Karadeen Kam, and Jenna Fischer (2002) “Testing the interactivity principle: Effects of mediation, propinquity, and verbal and nonverbal modalities in interpersonal interaction,” *Journal of communication*, Vol. 52, No. 3, pp. 657–677.
- Cheung, Christy MK, Pui-Yee Chiu, and Matthew KO Lee (2011) “Online social networks: Why do students use facebook?” *Computers in Human Behavior*, Vol. 27, No. 4, pp. 1337–1343.
- Coleman, James S (1988) “Social capital in the creation of human capital,” *American journal of sociology*, pp. S95–S120.
- Dey, Anind K and Ed de Guzman (2006) “From awareness to connectedness: the design and deployment of presence displays,” in *Proceedings of the SIGCHI conference on human factors in computing systems*, pp. 899–908, ACM.
- Dunbar, RIM (2016) “Do online social media cut through the constraints that limit the size of offline social networks?” *Royal Society Open Science*, Vol. 3, No. 1, p. 150292.
- Frith, Jordan (2012) “Splintered space: Hybrid spaces and differential mobility,” *Mobilities*, Vol. 7, No. 1, pp. 131–149.
- Goodman-Deane, Joy, Anna Mieczakowski, Daniel Johnson, Tanya Goldhaber, and P John Clarkson (2016) “The impact of communication technologies on life and relationship satisfaction,” *Computers in Human Behavior*, Vol. 57, pp. 219–229.
- Huhnt, Christian (2014) “The Increasing Importance of Social Capital on Virtual Social Networking Platforms,” *The Information Systems Student Journal*, p. 5.

## REFERENCES

---

- Johansson, Fredrik (2008) “Extending mobile social software with contextual information,” *Umeå University, Sweden*.
- Licoppe, Christian and Yoriko Inada (2012) “‘Timid encounters’: a case study in the use of proximity-based mobile technologies,” in *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, pp. 2759–2768, ACM.
- Mayer, John D, Maria DiPaolo, and Peter Salovey (1990) “Perceiving affective content in ambiguous visual stimuli: A component of emotional intelligence,” *Journal of personality assessment*, Vol. 54, No. 3-4, pp. 772–781.
- Nardi, Bonnie A (2005) “Beyond bandwidth: Dimensions of connection in interpersonal communication,” *Computer Supported Cooperative Work (CSCW)*, Vol. 14, No. 2, pp. 91–130.
- Pollet, Thomas V, Sam GB Roberts, and Robin IM Dunbar (2011) “Use of social network sites and instant messaging does not lead to increased offline social network size, or to emotionally closer relationships with offline network members,” *Cyberpsychology, Behavior, and Social Networking*, Vol. 14, No. 4, pp. 253–258.
- Quan-Haase, Anabel and Alyson L Young (2010) “Uses and gratifications of social media: A comparison of Facebook and instant messaging,” *Bulletin of Science, Technology & Society*, Vol. 30, No. 5, pp. 350–361.
- Schiffrin, Holly, Anna Edelman, Melissa Falkenstern, and Cassandra Stewart (2010) “The associations among computer-mediated communication, relationships, and well-being,” *Cyberpsychology, Behavior, and Social Networking*, Vol. 13, No. 3, pp. 299–306.
- Schrock, Andrew Richard (2012) “Mobile Interface Theory: Location-Aware Mobile Devices in Urban Environments,” *International Journal of Communication*, Vol. 6, p. 8.
- Sheer, Vivian C and Ling Chen (2004) “Improving Media Richness Theory A Study of Interaction Goals, Message Valence, and Task Complexity in Manager-Subordinate Communication,” *Management Communication Quarterly*, Vol. 18, No. 1, pp. 76–93.

## REFERENCES

---

- e Silva, Adriana de Souza (2006) “From cyber to hybrid mobile technologies as interfaces of hybrid spaces,” *Space and culture*, Vol. 9, No. 3, pp. 261–278.
- Taddei, Stefano and Bastianina Contena (2013) “Privacy, trust and control: Which relationships with online self-disclosure?” *Computers in Human Behavior*, Vol. 29, No. 3, pp. 821–826.
- Trepte, Sabine, Tobias Dienlin, and Leonard Reinecke (2015) “Influence of social support received in online and offline contexts on satisfaction with social support and satisfaction with life: A longitudinal study,” *Media Psychology*, Vol. 18, No. 1, pp. 74–105.
- Trepte, Sabine and Leonard Reinecke (2013) “The reciprocal effects of social network site use and the disposition for self-disclosure: A longitudinal study,” *Computers in Human Behavior*, Vol. 29, No. 3, pp. 1102–1112.
- Weiser, Mark (1999) “The Computer for the 21st Century,” *SIGMOBILE Mob. Comput. Commun. Rev.*, Vol. 3, No. 3, pp. 3–11.

# Appendices

# Appendix A

## Design Process

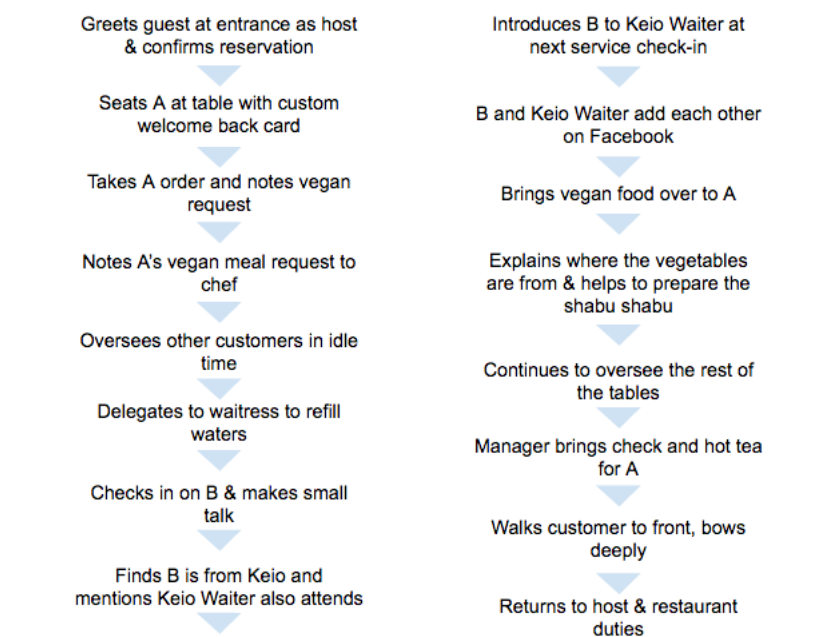


Figure A.1: Sequence Model

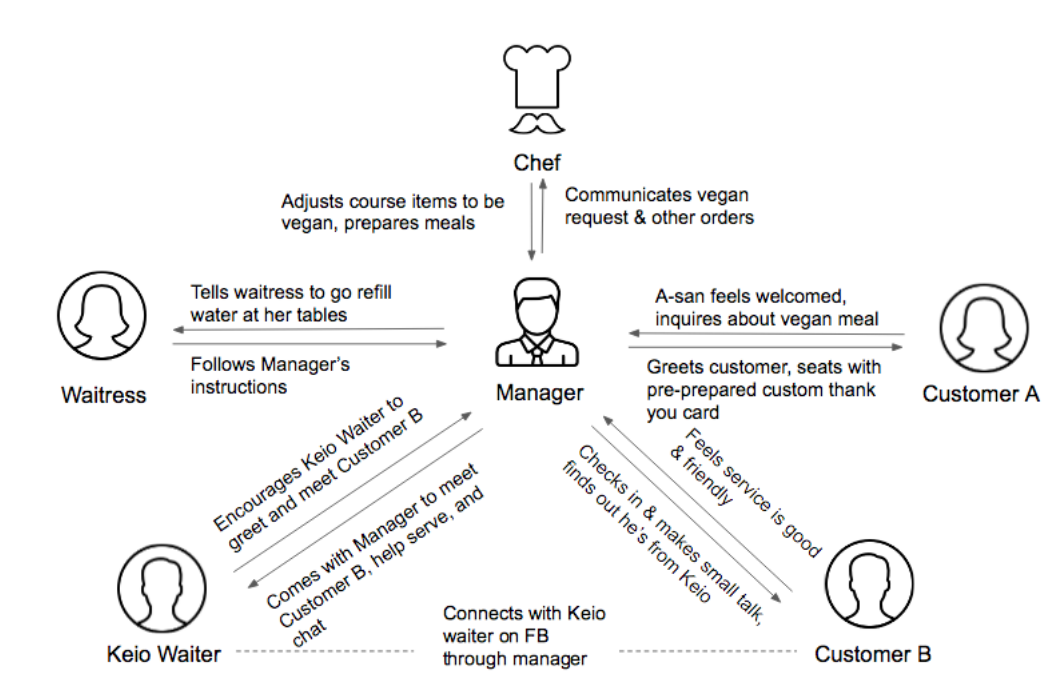


Figure A.2: Flow Model



Figure A.3: Artifact Model

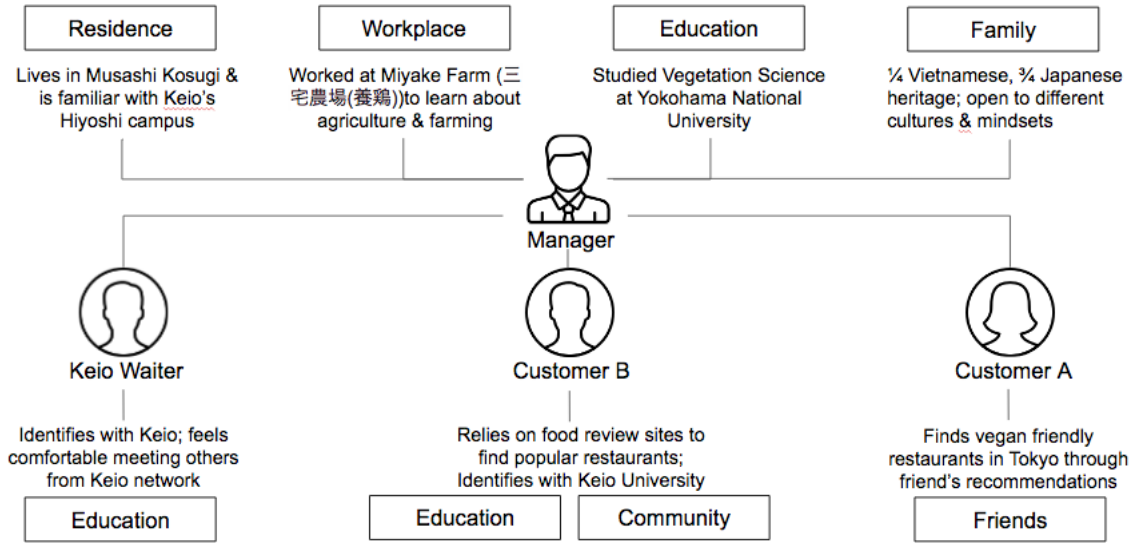


Figure A.4: Cultural Model

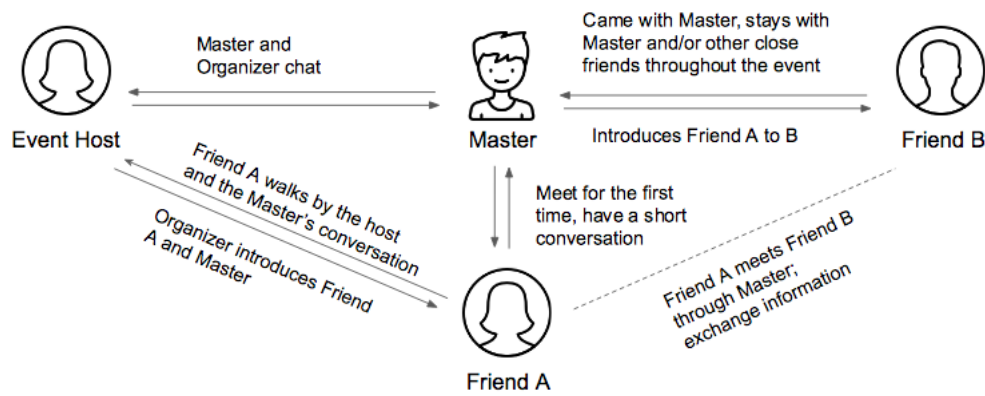


Figure A.5: Flow Model



Figure A.6: Artifact Model



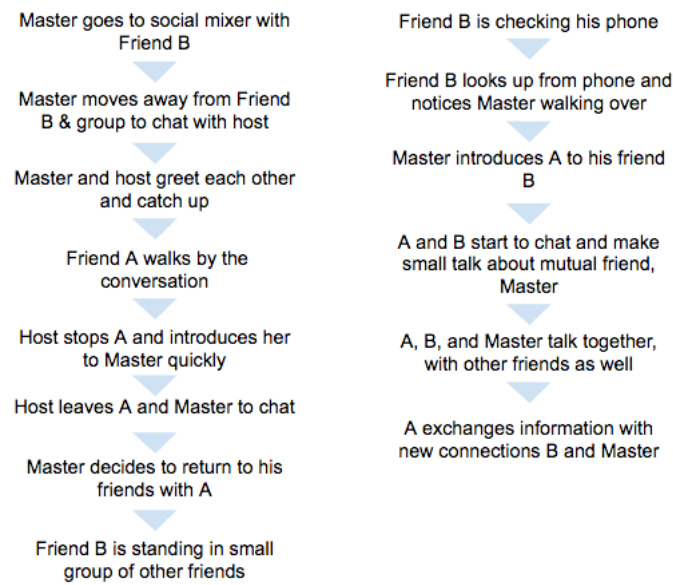


Figure A.7: Sequence Model

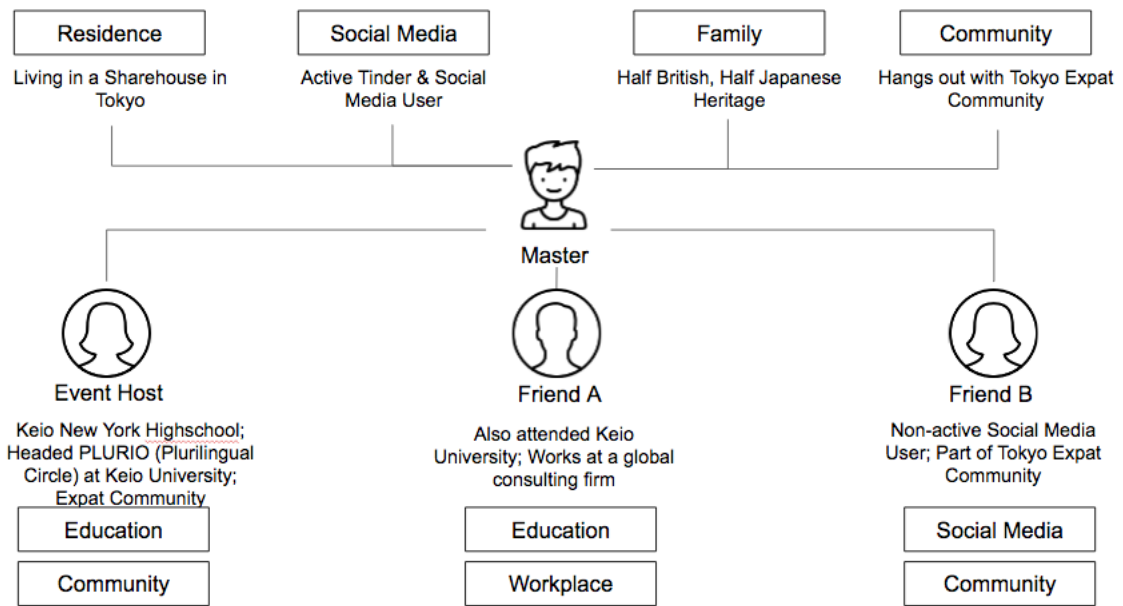


Figure A.8: Cultural Model

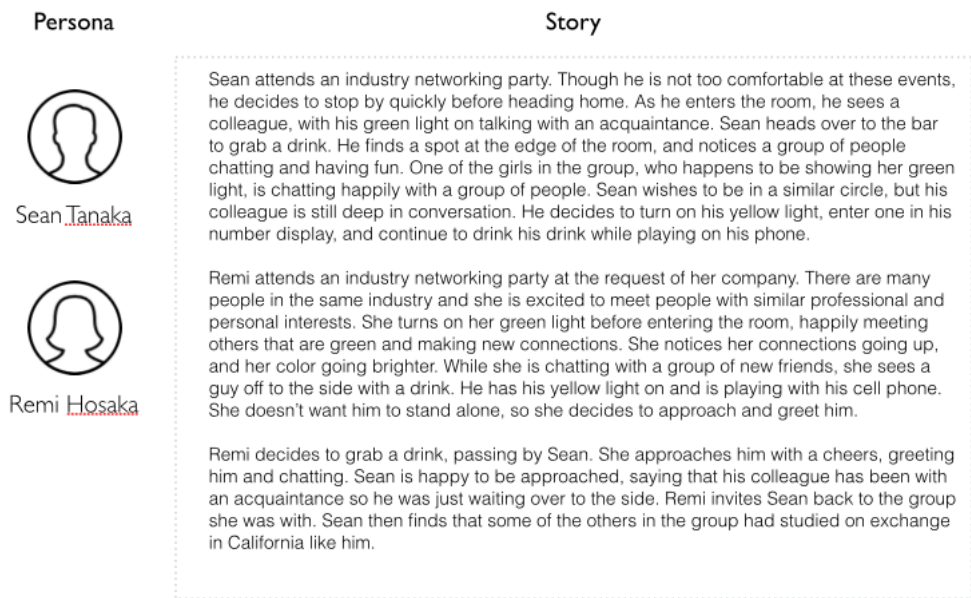


Figure A.9: Story

# Appendix B

## Surveys

### Pretest

- Age
- Sex
- Current Marital Status
- Occupation
- Which social media platforms and/or communication technologies are you currently using?
- How close do you feel to your online network of friends and connections on these platforms? Why?
- Do you think that being a social media/communication technology user has made you more open to meeting strangers or new acquaintances in an offline setting?
- Are there any physical communities that you are currently a part or want to join more actively? What are they?
- Is it hard to meet or approach others in these places? Why?
- Do you feel that social norms can hinder your social interaction in these places?

### Intervention Survey

- Do you feel happy to see the display increase the number of connections you've made?

- Do you feel more social when you see your colors go brighter based on the number of your new connections?
- Any additional comments?

### **Post Test**

- How did you feel about sharing your social openness through color?
- How did you feel about seeing other's sociability display choices through color?
- Do you identify with others based on their color choice?
- How did you feel about sharing the number of people in your current party with others?
- How did you feel about seeing other people's current party in numbers?
- Did you feel encouraged to meet others when seeing their number? How?
- Do you identify with others based on their number choice?