

Social Medium:

Encouraging Face to Face Interaction Away from The Mobile Phone

by Leon Lu

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Social Medium: Encouraging Face to Face Interaction away from the Mobile Phone

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In response to the socio-cultural impact of Internet connected devices, this research project seeks to create opportunities for real world, face to face interaction between two people by discouraging the use of mobile phones. I attempt to augment user behaviour in two social scenarios; when two individuals sit down to share a meal and when two individuals sit and play a board game. My theoretical framework is based on BJ Fogg's Behavioural Model and his concept of Persuasive Design. The goal of this research is to create interventions through physical objects that are designed to limit certain user behaviours while also encouraging other types of behaviour. I create two objects, one: a dining table that invites the user to hide their phone before sharing a meal and two: a chess board that cannot be used until both players put their phones away. I analyze my findings by comparing the effectiveness of each design to inform future work.

Keywords:

Internet Connected Devices, Persuasive Design, Triggers, Motivation and Ability, Socio-Cultural Impact, Mobile Phone Use, Face to Face Interaction, Tangible User Interfaces, Enchanted Objects.

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Introduction

Almost half a century ago, Stanley Milgram, an American social psychologist, studied urbanites to understand the psychological impact of living in large cities. He discussed the concept of “overload” borrowed from system analysis, as a means of describing the inability of urbanites to process and cope with an over stimulus of information which resulted from living in large cities (1974). He postulates that urbanites conserved their “psychic energy”, a term coined by Georg Simmel (1950), by developing coping mechanisms to deal with this over stimulus. Milgram states that people spent less time paying attention to each stimuli, they disregarded information that they deemed less important and even blocked themselves completely from engaging with other people when entering a congested social setting. In comparison, metropolitan cities of the 21st century provide unprecedented access to information and seemingly unlimited opportunities to connect with the world at large through devices which can fit in the palm of the hand. This has nurtured new forms of engagement, new means of communication and an entirely new set of social norms to govern our everyday life, both in the physical and in the digital world. This has also led to a new form of sensory overload that Shalini Misra et al. called “Cyber Based Overload” (2012).

Understanding the social and cultural impact of mobile phones is the starting point of my research project. Sherry Turkle, a noted psychologist, author and social scientist at MIT, talks about how “psychologically powerful” mobile phones are. She states that mobile phones have the ability to not only change what we do but also change who we are as people. She hypothesizes that the emergence of the mobile phone has led us to a point where we prefer to text one another rather than talk in person and this has in turn led us to having fewer actual conversations. Turkle says that this shift in behaviour is important to understand because only through unprocessed and unfiltered conversation do we allow ourselves to be vulnerable. This vulnerability creates opportunities for us to connect with one another and form deep, meaningful relationships with other people. She encourages us to create “sacred spaces” in our homes and in our work places, which should be assigned for conversation without the distraction of the mobile phone (2012). This is a key concept in my research and I explore this further as part of my prototypes.

Tristan Harris, a former design ethicist at Google preaches the importance of designing products and experiences based on “deeper human values”. He argues that as designers we can set design goals that go beyond the functionality of the product and be based on helping people achieve the goals they find important. He advocates a shift from an “all or nothing relationship with technology” to one that gives choice back to people (2014). Through the website

www.timewellspent.io, Harris presents open ended questions to the community of designers and entrepreneurs asking them to consider the impact their design might have on how people behave. He asks this community to be more conscious of people's time, protect focus and not crave a persons' attention.

The goal of this research project is to create objects that facilitate real world social interaction and reflect on the design decisions made for each prototype. I minimize the use of the mobile phone by altering the dynamics of behaviour using BJ Fogg's Behavioural Model (FBM) by making environmental changes that create opportunities for real world, face to face interaction. My intention is to inform and inspire the creation of future projects in this space for myself and for others through this exploration. The research questions I address through this projects are the following:

1. How might the design of objects limit the use of mobile phones to create opportunities for real world social interaction between two people?
2. How might Fogg's Behavioural Model be implemented to affect changes in behaviour while interacting with the mobile phone?

In the first chapter, I examine the impact of Internet connected devices through the scholarly work of psychologists: Sherry Turkle, Kenneth J. Gergen and Gloria Mark; linguist: Naomi Baron; scholars: James E. Katz and Mark

Aakhus; design thinker: Tristan Harris and others. I explore the allure of mobile phones and their impact on relationships and productivity, and also highlight the emergence of the Apparatchik: a set of simultaneous social and cultural trends noticed across the world because of the mobile phone.

In the next chapter, I discuss Research Methods, applying Research as Prototype as my methodology where the act of designing and making is the central research activity. I first discuss my preliminary research that consists of semi-structured journal entries where fellow students are asked to record their thoughts when disconnected from their mobile phone for twenty four hours. I analyze the findings and categorize them into thematic groups through a semi-quantitative approach that is then used to generate insight and inform the design of two objects: The Tete-a-Tete Table and The Your Turn Chess Board. In addition, I learn about the use and intended functionality of these objects through observations and informal interviews.

The following chapter examines the theoretical framework of Persuasive Design. I begin by studying user behaviour through the concept of triggers, ability and motivation and apply Fogg's Behavioural Model to inform my design process. I further discuss the influence of David Rose and his concept of 'Enchantment' as well as refer to the works of Hiroshi Ishii and Brygg Ullmer to further develop my understanding of Tangible User Interfaces.

The second to last chapter of this research project describes the concepts, behavioural frameworks, interaction cycles, iterations and design choices made for the two objects. The first takes the form of a dining table called The Tete-a-Tete Table that encourages two users to hide their phones before sharing a meal together (Figure 1).



Figure 1. The Tete-a-Tete Table. Lu L. , 2016

The second device takes the form of a game board called The Your Turn Chess Board that dissuades users from checking their phone during gameplay (Figure 2).



Figure 2. The Your Turn Chess Board. Lu L. , 2016

I also discuss the idea of “sacred spaces” as explained by Sherry Turkle to situate my work into particular social scenarios.

The final chapter of this research project highlights the insights gained while designing and making The Tete-a-Tete Table and The Your Turn Chess Board. I observe users interacting with both objects and reflect on the use and effectiveness of the design choices made. I further also discuss future research that I intend to continue beyond the scope of this project.

Social and Cultural Context

People living in modern metropolitan cities utilize the mobile phone as their primary means of obtaining information and as their primary mode of communication. The mobile phone has become so pervasive in modern society that it has become extremely difficult for people to go about their daily life without one. This section explores the socio-cultural impact of mobile phones on the lives and psyches of individuals. I discuss its impact on people's ability to empathize with one another and the effect it can have on productivity and focus of the individual.

The Floating World

Kenneth J. Gergen, a noted psychologist, extensively studied the societal implications of networked technology and uses the metaphor of a "Floating World" to explain a new form of communal life made possible by the introduction of the mobile phone. The phrase 'floating world' is borrowed from a descriptive phrase used to depict communal life in 19th century Edo, Japan. This was a society that existed outside the control of the military and the government, people were allowed to freely speak on matters great and small without the fear of being

prosecuted. Gergen views the 'floating world' of the 21st century to be free from societal boundaries and not limited by the geography of any one location (2010).

Gergen states that the majority of 20th century technologies functioned corrosively towards engaging traditional, face to face communities. Traditional communities that were geographically situated in one location, characterized by their high degree of stability and shared common beliefs. He states that the radio, the automobile, the television and the Internet in particular placed traditional communities in jeopardy. However, the introduction of the mobile phone led to a new form of communal restoration. One that brings traditional, face to face communities together through instantaneous reconnection in the digital world. This new form of community acts as a source of support, social structure and reaffirmation of belief systems (2001).

Sherry Turkle, a revered author, psychologist and thought leader has comprehensively studied the impact of human-computer interactions on the psychology of the individual. She states that people live with 'always on/always on us' communication devices that allow us to be 'tethered' to other people through the digital world. Turkle calls this phenomenon the "Tethered Self" (2008). She discusses how the presence of the mobile phone allows her to rapidly move between different states and allows her to perform the role of a mother even in the presence of her professional colleagues by text messaging

her daughter with the help of her mobile phone. She calls this rapid movement between the physical and the digital as a form of 'cycling through' which creates a sense of 'continual co presence' (1995). These digital connections are ephemeral as they are in a state of constant potential and only brought into focus when two or more people are in conversation.

By understanding the positive effect of the 'floating world' proposed by Gergen and the concept of 'continual co presence' introduced by Turkle, It becomes clear to me that completely removing the mobile phone from every social moment cannot be a solution to facilitate real world, face to face interaction. Instead I focus my research on identifying scenarios where real world social interactions have been adversely affected by the presence of the mobile phone and attempt to create interventions in that environment.

Gratifying Fantasies and The Goldilocks Effect

Turkle asserts that mobile phones are 'psychologically powerful' and have the ability to change what we do as well as change who we are. She says, "Technology is seductive when its affordances meet our human vulnerabilities" (2012). To further engage this argument I highlight the influence of design in technology to create products and services that are compulsive and seductive when devised on the understanding of human needs.

Gergen states that as part of a rapidly moving, high tech society, people have access to immediate information as well as the means to garner instant support, social acceptance and advice from a community of peers. In addition, we also have the ability to disengage and disappear when we like as the mobile phone provides us with an infinite number of options and opportunities to do so (2010). Turkle discusses four 'gratifying fantasies' that the mobile phone represents. She states that through the mobile phone we are given the ability to jump in and out of conversation, focus our attention wherever we deem fit, have access to people who would always care about what we say and never have the feeling of being alone. In addition, people are also given the ability to portray a filtered version of themselves by editing and perfecting what they say and how they look. She calls this ability to connect with others as 'fantasy' because in the rush to flee from solitude, people lose the ability to separate themselves and

gather their thoughts. Turkle states that by lacking the capacity for solitude, people turn to others as 'spare parts to support an increasingly fragile sense of self' (2012).

We are part of a generation which in itself represents paradoxical thinking. People want to always be connected but also want the option to disappear. Sherry Turkle calls this "The Goldilocks Effect - Not too close, not too far, just right". She says that we would like the illusion of companionship but not want the responsibility of friendship. Instant messaging and email provide the affordances of asynchronous communication with the ability to manipulate a conversation or avoid communication all together without the other person being privy to the scenario (2008). In studying mobile phone usage in American Colleges, Naomi Baron, a linguist and an academic found that the attributes students liked most about the mobile phone was the ability of being in constant contact with others but ironically also found that being accessible to others was the attribute that was most disliked (Baron and Ling, 2007).

During my own initial research, users described moments during the day when they chose to check their phone without looking for anything in particular. Users did this in instances when they wanted to disengage from the real world and focus their attention on their screens. In that instance, the phone represents a source of unlimited potential for communication, entertainment and information.

It provides users with the ability to disengage from their physical reality and dive into a digital world. I called these instances “Empty Time”. This disengagement from the real world can be in the form of a momentary glance towards the mobile phone or could last for a much larger time period like when engaged in a text conversation or while reading an article. This behaviour was usually triggered by the conditions of the real world. I.e. When a person is in transit and does not feel the need to be social or when a person feels awkward around other people that they might not know or when a person would like to appear busy to avoid conversation. This behaviour was also noted when people felt the need to distract themselves in between completing tasks. I further discuss how this repetitive almost involuntary behaviour influences social interaction with other people and through my prototypes, I encourage users to be more comfortable in moments of “Empty Time”. Both objects are designed to persuade two individuals to be completely present. I also encourage users to disengage from the mobile phone and create opportunities for interaction with the person in front of them.

Communication, Conversation and Relationships

In the Phaedrus, Socrates criticized the written word because he felt that it would not allow for the reciprocity needed for “true love” (Peters, 1999). In contemporary times, email has been scrutinized for its limited ability to establish a sense of presence due to the lack of non-verbal cues (Trevino, Lengel, and Daft, 1987). Mediated communication in the 21st century through mobile devices has created a new set of affordances and limitations which I try and explore in this section.

John Durham Peters, a media historian, social theorist and professor at Yale University proposes the idea of “pure conversation” as described by the teachings of Socrates, who advocates face to face dialogue as the epitome of communication as it offers “the best chance for the souls to be intertwined in reciprocity”. ‘Pure conversation’ can be regarded as the merging of the self and the other in an attempt to establish a perfect social connection (1999). Scott Campbell by contrast argues that ‘pure conversation’ closely resonates with certain expressive uses of the mobile phone (2008). He states that the user of the mobile phone can exchange thoughts and feelings with others through an unobstructed social connection and further illustrates his findings while discussing the results of observing participant who were recovering from Alcoholism. He found that 67% of all mobile phone use was for recovery related

interactions and were key in helping participants recover (Campbell and Kelley, 2006). While analyzing the work of Peters and Campbell in relation to my own research, I believe that the mobile phone can be a source for reaffirmation of ideas and as a source of support. However, the presence of the mobile phone can also act as an obstruction when attempting to connect with people in the real world. Creating opportunities for real world, face to face interaction is the central goal of this research project.

Communication through mobile phones are seldom lengthy and messages are usually to the point and brief. Gergen states that people stay away from 'deep feelings' and complex ideas to communicate easily understood matters and superficial thoughts. He goes on to say that due to the lack of embodiment, conversations over the mobile phone are limited and highly nuanced feelings and ideas cannot be conveyed effectively. He suggests the emergence of relationships that are superficial and shallow due to communication through mobile phones. These relationships do not require time, effort or attention calling this a form of "Horizontal Relationships" (2010). Turkle echoes a similar idea stating "Sound-Byte Relationships" rarely support exploration of deep ideas or deep feelings (Gergen, 2003; Turkle, 2012). In contrast, Rich Ling, a media scholar and author, together with Birgitte Yttri, a cultural anthropologist found that adolescents were more expressive when using mobile phones to demonstrate social network membership (Johnsen 2003, Ling

and Yttri 1999, 2002). Christian Licoppe, a professor of sociology and communication technologies says that teens frequently make short calls and send brief text messages that on the surface seem meaningless but in reality carry symbolically meaningful messages of social fellowship (Johnsen 2003, Licope 2003). Leopoldina Fortunati, an author and theorist calls mobile phones a “strong booster of intimacy among those within the social network of the user” (2002). It is abundantly clear that the impact of the mobile phone on relationships is highly complex and attempting to make a definitive conclusion by equating benefits and drawbacks of the introduction of this device into our lives would be reductive. My research is focused on the conversation that happens outside of the mobile phone and not within it. However by understanding the types of relationships formed through the mobile phone I get a sense of what the device might signify to the user.

I also reflected on the work of photographer Eric Pickersgill who created a series called “Removed”. He photographed people in their everyday surroundings while they stared at their phones. Later he removed the image of the phone itself from the photograph highlighting a very real reflection of how mobile phones can affect the relationship of people with the ones closest to them (Figure 3, 4, 5).



Figure 3.
Angie_and_Me_Removed.social_B
y_Eric_Pickersgill. Pickersgill, E.
(2017). Eric Pickersgill. Removed
— Eric Pickersgill. Retrieved from
[http://www.ericpickersgill.com/
removed](http://www.ericpickersgill.com/removed)



Figure 4. grant. Pickersgill, E.
(2017). Eric Pickersgill. Removed
— Eric Pickersgill. Retrieved from
[http://www.ericpickersgill.com/
removed](http://www.ericpickersgill.com/removed) 13



Figure 5. wendy_brian_kids.
Pickersgill, E. (2017). Eric
Pickersgill. Removed — Eric
Pickersgill. Retrieved from <http://www.ericpickersgill.com/> removed

Sherry Turkle references a question she was asked by television host, Stephen Colbert. “Do all the minuscule sips of tweets, texts and messages amounted to a large gulp of meaningful conversation?”. Her response was a strong no. She states that communication in sips might work for gathering and providing discrete bits of information but is inadequate for deep meaningful conversation (2012). Turkle goes on to state that the capacity to empathize and connect with people is vitally important and is a cornerstone for development of the individual (Turkle, 2011). Gergen further goes on to speak about the repercussions of this increasingly pervasive social structure and postulates the existence of “micro-segmentation of society”. He posits that the dissolving of traditional face to face communities has led to a new ‘insularity’ where small

social nuclei are linked by continuous communication. The implications of these continuously connected social circles is described by Gergen to be 'socially destructive', as the affects of surrounding yourself with a community of people who share the same thoughts and ideas leads to the 'crystallization of a new reality and new values' thus transforming locally fashioned assumptions into 'obvious truths' (2010). This has also led to the process of 'circular affirmation' where people continuously affirm each others' views and values (Gergen, 2010) or as Turkle describes it, a cycle of self-validation which leads to shared views being re-circulated and creating largely unchallenged thoughts and realities (2008). These views are further echoed by the works of author Kakuko Miyata who studied the social effects of "Keitai" (Internet connected phones) on the youth of Japan. His work suggests that diverse ties which connects people from different backgrounds provide exposure to new ideas and a deeper understanding of the world. The author fears that 'Keitai' dependant future generations would lead insular lives and remain unaware of the different perspectives brought about by people from different social strata (2008).

The Apparatchgeist

James E. Katz, a communication scholar and Mark A. Aakhus, associate dean of research in communication at Rutgers University advanced the theory of the “Apparatchgeist” to make sense of consistencies in the effect and use of mobile phones in a very disparate culture. Apparatchgeist literally means “spirit of the machine” and refers to a common human orientation towards perpetual contact technologies and coherent trends in adoption, use and social transformations.

Apparatchgeist was conceived when Katz and Aakhus observed parallel shifts in communication habits that came out of mobile phone adoption in Finland, Israel, Italy, Korea, The US, France, Netherlands and Bulgaria. These trends appeared in the coordination of everyday activities, configuration of social networks, private use of public spaces, new forms of connections to the workplace and many other areas of the social landscape (2002a).

Apparatchgeist refers to the common trend that is based on common logic that “informs the judgement people make about the utility or value of the technologies in their environment... and predictions scientists and technology producers might have about personal technologies”. This is the logic of perpetual contact. The authors call this “socio-logic”.

Turkle echoes the thoughts of Katz and Aakhus by discussing the concept of 'a new sociality' where people increasingly expect public spaces to give them opportunity to be private with their mobile phones (2008). The train station is no longer a communal space but a place of social collection where connected individuals congregate but do not speak with one another. Each person is more likely to be communicating with someone miles away as compared to speaking with a person in physical proximity to them. There is a redefinition of the private space which now expands into conventionally public surroundings. People feel like they can sustain their sense of intimacy because the people around them are anonymous.

She further highlights her research findings as young people tell her about the concept of "Phubbing" where they are able to look away from their phones and still continue to text someone far away giving the pretence of attention to the people immediately around them. Turkle goes on to discuss the unwritten "rule of three" which involves being in a conversation with three or more individuals while having the ability to disengage from conversation when deemed fit. This unwritten rule states that when three faces are looking up and paying attention to the speaker you implicitly allow yourself to look down and check your phone. This results in a conversation that proceeds forward without any deep thought or insight thus allowing any individual to slip in and out of the conversation without losing track of what has been said. One young person tells Turkle that, "our

texting is fine, it's what our texting is doing to our conversations in person that is the problem". She states that mobile phones are "taking us to places that we don't want to go" and advocates for a better relationship with our devices (2011). Turkle also refers to a study conducted in the University of Virginia where students were asked to sit away from their mobile phone and given the option of administering a small shock to themselves if they chose to do so. Initially, all students outrightly refused to shock themselves, however after only six minutes of being alone, startlingly students started shocking themselves (2012). This inability to be alone can be seen everywhere in our daily lives and I identify this phenomenon in my own research where participants note feeling uneasy and anxiety when they are not able to access their phone for extended periods of time. I further discuss the concept of "Empty Time" in my initial research section below.

Mobile Mediated Rituals

Ling discusses the impact of the mobile phone on everyday rituals. He states that real world rituals are the locus of social interaction however this state might change because of the growth of mobile phone related 'mediated rituals' (2008). Mizuko Ito, a Japanese cultural anthropologist studied the impact of mobile phones on the youth of Japan and states that mediated rituals allow people to set the scene before the actual interaction and are able to continue to draw out the interaction even after leaving. The example she offers is of a Japanese youth en route to a social engagement who uses mobile text messages to interact with their significant other before meeting in real life and also texts them after meeting to draw out the same interaction (2005). However Erving Goffman, a Canadian-American sociologist and writer argues that 'highly imbued rituals' such as funerals or marriage cannot be conducted through the mediated presence of the mobile phone as there would be a lack of feedback from the experience and would limit the 'effervescence of the situation' (2009). Ling however agrees with Ito and states that physical co-presence is not always necessary for well-developed social interactions. He argues that mediated interaction has the potential to enhance social ritual before the subsequent co-present interaction. Mediated social interaction with its elements of mutual focus, collective engrossment, sense of solidarity, symbolic imbuelement and group revitalization can help support and maintain social interaction (2008). The

emergence of the mobile phone has led to a new set of social norms and significantly different expectations from our surroundings and from each other. Sherry Turkle states that 'because we have grown up with technology, we assume that technology is itself grown up' (2012). The focus of this research is to further explore and create new forms of ritual that facilitate face to face interaction by augmenting everyday behaviour such as sharing a meal and playing a game.

Multitasking and Interrupted Work

In June of 2010, Steve Jobs, the founder of Apple introduced 'Multitasking' on the iPhone to the world. Suddenly people had the ability to check their email while listening to their favourite music and also flipping between playing games and browsing the Internet. When we apply the same concept of multitasking to the real world in the presence of mobile phones however, there is a strain on our cognitive faculty which leads to higher stress levels and increased chances of human error as per the research of psychologist and author Gloria Mark (2008).

Naomi Baron discusses two types of multitasking: cognitive multitasking, which involves performing two or more tasks that are primarily cognitive in nature and social multitasking, where the tasks involve social interactivity such as alternating between face to face communication and instant messaging (2008). Baron conducted a survey at an American University in the fall of 2004 and the spring of 2005 where she asked 158 subjects to share their multitasking behaviour through an online questionnaire. They were asked to pass on this questionnaire through their buddy lists so every participant was at least involved in one IM conversation at the same time of completing the survey. She found that participants often were involved in multiple conversations while performing the same activity, like having three or more instant messenger conversations open at

the same time. Through her research, Baron postulates that users cannot engage in multiple IM conversations at the same time. Through further focus group discussions she determined that students used IM synchronously and asynchronously where they jumped from one conversation to another based on the interest of the topic. One of the students described IM conversations as “language under the radar” which resides in the background of other online or offline endeavours (2005).

Glenn Wilson, a psychiatrist at the University of London conducted an IQ test on ninety subjects in the UK. When the same task was performed in the presence of communication distractors such as a ringing phone, average performance dropped by ten points which is the equivalent of missing an entire nights sleep (Hewlett Packard, 2005). Helene Hembrooke, associate director of the HCI group at Cornell University and Geri Gay, professor of communication at Cornell University reported degraded memory of classroom lectures when students listened to lectures while having access to the Internet (2003). Research has also been conducted to understand the cognitive effects of interrupting a person’s workflow. Findings suggest the timing and form of interruption is critical in determining how disruptive an interruption might be (Adamczyk and Bailey, 2004; Cutrell, Czerwinski and Horvitz, 2001).

Further research conducted by Gloria Mark explored the cost of interrupted work. Her interest was in measuring the “Disruption Cost” of interruptions. She discusses the cognitive strain required to reorient yourself back to the task you were trying to complete before being interrupted. One of the surprising results of the research showed that interrupted work might be performed faster however, Mark suggests that when people are constantly interrupted, they develop a mode of working faster to compensate for the time they know they will lose by being interrupted. Working faster with interruptions has its cost and people in the interrupted state experienced more stress, higher frustration, more time pressure and required effort to accomplish the same task. She goes on to predict that interruptions lead people to change not only work rhythms but also strategies and mental states (2008).

There is evidence to suggest that multitasking, distraction and interruption are directly related to the presence of mobile phones. This can lead to higher levels of stress, more cognitive load and degraded memory.

What is interesting and counter intuitive to the research above is the emergence of mobile apps such as “Freedom” and “Moment” that have been designed to promote productivity by providing users with the option of blocking, monitoring and limiting their own mobile phone use (Figure 6 and 7). These apps promise to manage distractions by blocking access to websites and tracking

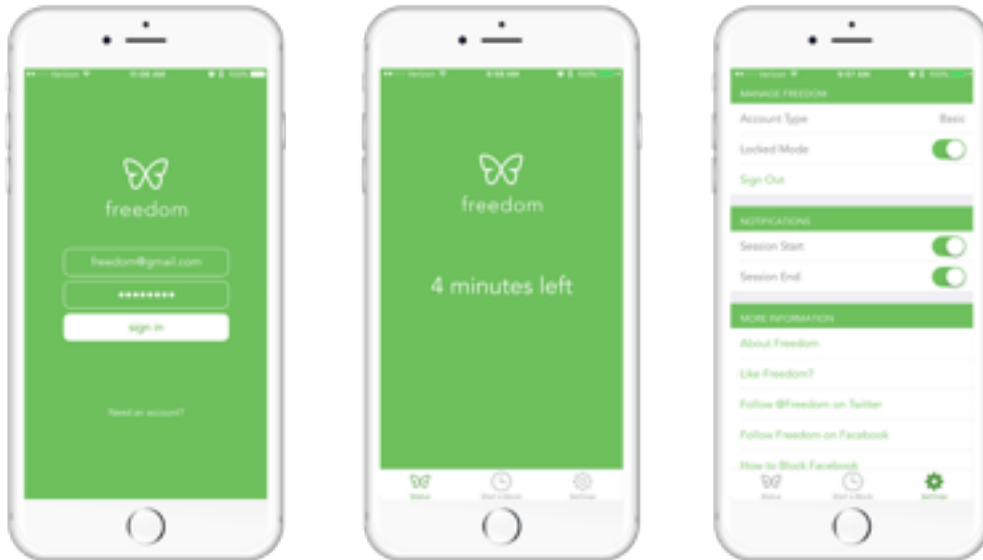


Figure 6. UI of Freedom App. (2011). Freedom: Internet, App and Website Blocker . Freedom: Internet, App and Website Blocker . Retrieved from <http://>



Figure 7. UI of Moment App. (2011). Holesh, K. (n.d.). Moment – Automatically track your and your family's daily iPhone and iPad use. Moment – Automatically track your and your family's daily iPhone and iPad use. Retrieved from <http://inthemoment.io/freedom.to/>

mobile phone usage to give users more control. I believe that the shortcomings of such apps lie not in its development or user interaction but with the concept of having an app on your phone to block your phone usage itself. The physical form of the phone has the capacity to cause users to be distracted and thus be less productive.

In comparison, my approach to this issue is based on designing objects that conceal the presence of the mobile phone in an attempt to remove distraction and encourage interaction in the real world while focussing on face to face interaction rather than productivity. The Tete-a-Tete Table and The Your Turn Chess Board are designed based on this idea as they encourage users to keep their phones away before beginning the social interaction.

The New Self

The Finns call mobile phones “Kännykkä” which translates to “an extension of the hand” (Mäenpää, 2000; Oksman and Rautiainen 2003). The mobile device is not only an object that represents connection to the outside world but also represents an extension of the self into the virtual.

Approximately two decades ago, Turkle wrote a book called, “Life on a Screen” where she spoke about how the advent of the internet was going to allow people to learn more about themselves in the virtual world and apply that learning to their physical self. She called the internet “an identity workshop” (1995). However, Turkle has since gone on to advocate for a more considered approach to the use of technology and proposed the existence of the “Tethered Self”. She highlights the importance of fostering a capacity to be alone in order to gather ones’ thoughts and advocates for the creation of “sacred spaces” meant for meaningful conversation away from the mobile phone.

Being always connected through the mobile phone allows people to be omnipresent in multiple locations at any given time. They are in essence always connected to the people that they would like to be in touch with. Mobile connectivity has allowed people to leave the physical world and go to all of the places that they have available through this digital medium.

Howard Rheingold, a critic, writer and thought leader in the cultural implication of modern communication media, began thinking about the tools that allow him to be always on and he asked himself “What kind of person am I becoming as a result of all this stuff” (1999). His answer led him to Lancaster, Pennsylvania, for a series of conversations with the Amish, a group of traditional church fellowships known for their simple living, plain dress sense and reluctance to adopt modern technologies. For more than a century, the Amish struggled with the question of whether they should adopt modern technology or not? (Umble 1996). The adoption of technology however is not as simple as one might assume. Today, the Amish have disposable diapers, gas barbecue grills and even diesel powered machinery but the question they always ask themselves before adoption of any new technology is “Does it bring us together, or draw us apart?”. During an interview, one Amish man tells Rheingold that they do not want to be the kind of people who interrupt conversation at home to answer a telephone. He goes on to say that the use of technology by itself is not the only concern but moreover it is the influence that technology might have on the type of person that you become because of it.

Kevin Kelly, the former executive editor of *Wired* magazine claims that many mobile-savvy people are making conscious choices about which technology to employ like the Amish. Referring to such individuals as “neo-

amish", Kelly suggests that a number of "would be" power users are laying down social ground rules to control their use of technology (Vargas, 2006). Grant McCracken, a cultural anthropologist, offers his views stating that we are in a process of balancing out the benefits of technology to the cost of technology. At the time of writing, Kelly himself did not own a BlackBerry but did own a mobile phone whose number was only known by his wife.

Sherry Turkle writes about a "flight from conversation" (2012) where she states that human relationships are messy, rich and demanding and people try to quantify and "clean them up" with technology. People end up sacrificing conversation for mere connection and short change themselves in the process. She posits that this shift from real world conversation to surface level interactions through mobile phones might work for gathering discrete bits of information but does not help in getting to know other people. She talks about her findings which show a 40% decline in the capacity of college students to empathize with one other (2011). She states that we live in a world where our connected selves are not given the time or opportunity to think and ponder. She says that people "ramp up the volume of communication" and expect fast answers, which leads to asking simpler questions and thus dumb down the depth of communication.

Turkle states that technology appeals to people when they are most vulnerable. People would like the illusion of companionship without the demands

of friendship (2012). She states that the moment people are alone, they panic, fidget and reach for their phones as if being alone was a problem that needed to be solved. This brings me to an important understanding of the self which Turkle calls, "I share, therefore I am". She posits a shift in the way we communicate from, "I have a feeling, I want to make a call" to "I want to have a feeling, I need to send a text". When we do not have the capacity for solitude we turn to others to feel less anxious or to feel alive. When we do this, we are not appreciating who they are but instead using them as 'spare parts' to support our fragile sense of self. We slip into the trap of thinking that always being connected is going to make us feel less lonely while the opposite is actually true. Turkle states, "If we don't teach our children to be alone, they will only know how to be lonely" (2012)

I consider the importance of my research project as an extrapolation of the work of Sherry Turkle and others in creating opportunities for real world interaction between two individuals through designed social scenarios. Through the design of The Tete-a-Tete Table and The Your Turn Chess Board, I attempt to create momentary 'sacred spaces' which limit people's interaction with mobile phones and facilitates face to face interaction during particular moments.

Optimism

Turkle states that because we have grown up with technology, we believe that technology is itself grown up (2012). The relationship we have with technology and more specifically with mobile phones is not necessarily the relationship we will continue to have in the future. A recent study of preteens in an outdoor camp without access to mobile phones showed that within a matter of five days, preteens were more empathetic to nonverbal emotional cues (Uhls et al, 2014). Tristan Harris, a former design ethicist at Google, advocates for this change by redefining design goals while building technology of the future. He advocates the importance of design based on real human needs which go beyond functionality (2014). Naomi Baron states that the question we must ask ourselves is what is really unique about two people meeting and talking face to face? And how important that might be to preserve? (2008)

Based on my literature review and my initial findings, I discuss the importance of fostering the ability to empathize with other people to build deeper, lasting relationships in work and in our personal lives. I highlight the importance of face to face interactions as a means of understanding subtle non verbal cues that may be misinterpreted or lost through mobile phone mediated communication. Through my own work, I attempt to further advance this conversation and provide direction through design and functionality of existing

technology in an attempt to facilitate real world interactions away from the distractions of the mobile phone. Both objects attempt to limit the use of mobile phones and thus can be initially perceived as having a less intuitive user interface as the objects take the form of a table and a game board which conventionally do not have any correlation with the mobile phone thus the user interface of both devices can be confusing. Also since both objects attempt to alter user behaviour, this can also be perceived as counter intuitive to what the user expects from the device. I further discuss this while reflecting on both objects after asking participants to interact with the devices.

Research Methods

I employ Christopher Frayling's concept of "Research through Design" (2003) as a means of explaining a process of knowledge generation through a non-linear approach. Design is considered the central activity of research and this approach often results in a physical representation of borrowed theories and assumptions. Knowledge is acquired as the designers engage in the process of design and later through reflection. Researchers create prototypes with the intent of visually summarizing their own ideas in a specific situation. John Zimmerman advanced this concept of 'research through design' into a model for interaction design research to benefit HCI research (2007). Zimmerman states that research through design is a "creative way of investigating what a potential future might be" (2010). I approach my research through the methodology of Research Through Design as a means of investigation and reflection.

My main research question is 'How might the design of objects affect the use of mobile phones to create opportunities for real world social interaction between two people?'. To answer this I first conduct primary research into the subject of interaction with the mobile phone. I do this by switching off my own mobile phone for three days and recording my thoughts and feelings through a semi structured journal entry process. I repeat this experiment with five peers who are part of the millennial generation and extensively use mobile phones. I

further discuss my process and findings in the following section. In addition, I also conduct a literature review focusing on the concept of Persuasive Design as proposed by BJ Fogg as my primary theoretical framework for analysis of behaviour and also consider the design philosophies of Enchanted Objects and Tangible User Interfaces to inform my design choices.

My secondary research question is 'How might Fogg's Behavioural Model be implemented to affect changes in behaviour while interacting with the mobile phone?' I answer this question by asking participants to interact with The Tete-a-Tete Table and The Your Turn Game Board. I observe and reflect on their interactions with the objects. I also conduct semi structured interviews after the interaction with the objects.

Research Through Design involves a level of subjectivity where the researcher makes design choices that can seem arbitrary and based on the beliefs and intentions of the researcher. Designing alone cannot constitute for effective research and thus I couple design with user feedback through interviews and observation to provide insight into the design of the object and the behaviour created by the interventions.

Primary Research

I first conducted a short self driven study to understand my own relationship with the mobile phone through a semi structured journal entry process where I switch my phone off for three entire days and limit the use of the Internet to only work emails when necessary. I also recorded my thoughts and feelings throughout this process using a diary (Figure 8).

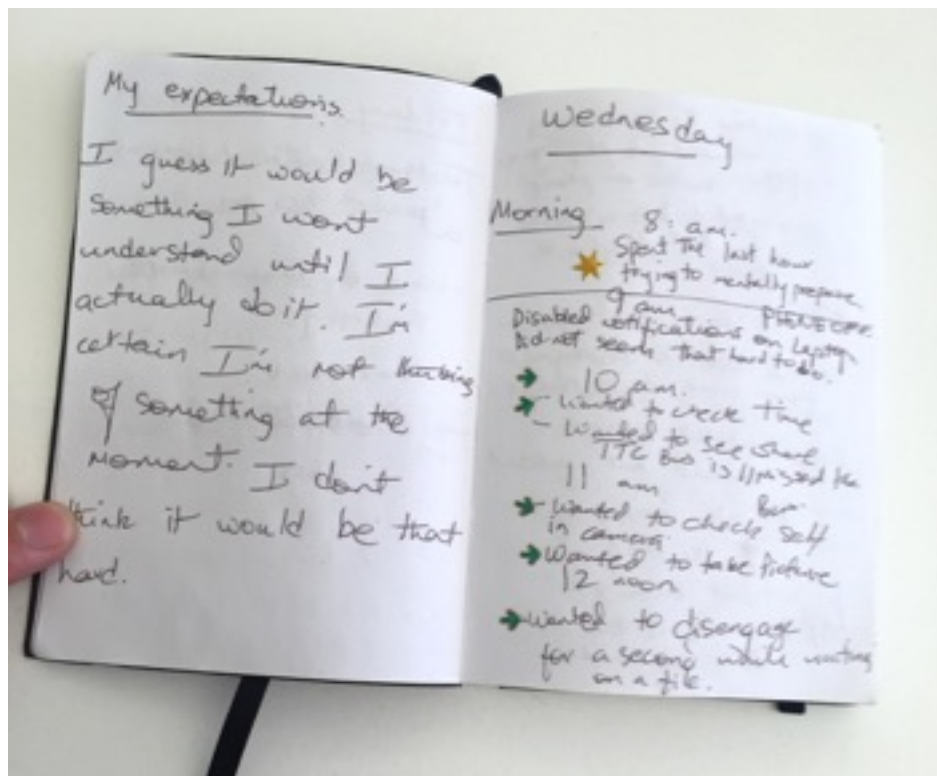


Figure 8. Daily journal where I recorded my thoughts. Lu L., 2016

I used this pilot to better design a second round of testing where I asked five peers to go switch off their phones for one entire day and record their own

findings through a similar semi structured journal entry process. Participants were asked to choose when they would like to conduct this activity and were also asked to limit their Internet usage to emails when necessary for work. The candidates for this study were users who extensively used mobile phones for work, communication and entertainment. They are part of a millennial generation who have grown up with mobile phones and have been accustomed to always having access to the Internet (Figure 9).



Figure 9. Journal of five peers. Lu L., 2016

The primary goal of conducting this first hand research was to better identify the relationship people have with mobile phones. I do this by completely removing the phone from the participants environment and reflect on what the participants said. I also identify common themes that arose through the journal entries that would inform the design choices made for both objects.

Journal entry structure

I provided each participant with a journal that had been filled with rules for the experiment, questions that had to be answered before the start of the twenty four hours when they would go offline as well as questions that they had to answer at the end of this experiment. I further gave each participant instructions to fill the journal as best they could when they felt the need to reach for their mobile phone. To create more interest in this exercise and provide more freedom to the participant, I also provided a sticker booklet of mnemonics that they could use to create their own signifiers while making entries. I chose to add stickers as a way of giving the participants more options for expressing their views as well as analyze the type of grouping they made from their own comments (Figure 10).



Figure 10. Journal pages showing the rules, user generated legends and journal entries made. Lu L., 2016

Findings from the journals

Through the journals that I collected, I started noticing common themes. I had asked each participant to document how they prepared for the twenty four hours that would be spent without their mobile phone as well as how they might feel during the course of the experience. More than one peer spoke about how they use their mobile phones as an alarm clock and thus they chose to start this exercise once they had already woken up and not the night before. One participant even said, "I'm worried about the clock, I don't use watches and use my phone as an alarm". This insight further validated my hypothesis that the mobile phone cannot be completely removed from every social setting to facilitate real world interaction instead I identify specific social scenarios that can be designed to create opportunities for engagement.

An insight that I found was how much value we attach to what the mobile phone represents to us in relation to the people we are closest to. One participant said, “It’s weird that I told my parents and sister that I’ll be off my phone. I realized how much I like knowing that they are there”. This insight relates back to what I read while understanding the relationships made through mobile phones.

Another participant said, “My aunt says that I’m usually very distracted and don’t pay attention to important conversations with her because of my phone”. This was valuable to my own work as it also further validated the assumption of being distracted by the presence of mobile phones when speaking with people close to you.

The most fascinating insight that this study showed me was the confusing relationship we have with our mobile phones. Many of the participants were excited and even anxious to switch their phones back on to see what messages they had missed during the course of the day but the same people also felt more empowered and relaxed when they were disconnected. One participant said, “There’s a big difference between switching off and staying off and if I can stay off my phone, maybe I can control other things in my life such as things I eat”. Another participant said, “I was less anxious and more focused on this day”.

Analysis of the journals

I attempted to quantify the journal entry logs into a manner that would help me identify common patterns. I decided to place each quote into a thematic bucket and then named these buckets based on the quotes collected. The themes that emerged were Empty Time, Realizations, Annoyance, Usefulness, Preparation, Uneasiness and Loss of Control (Figure 11).

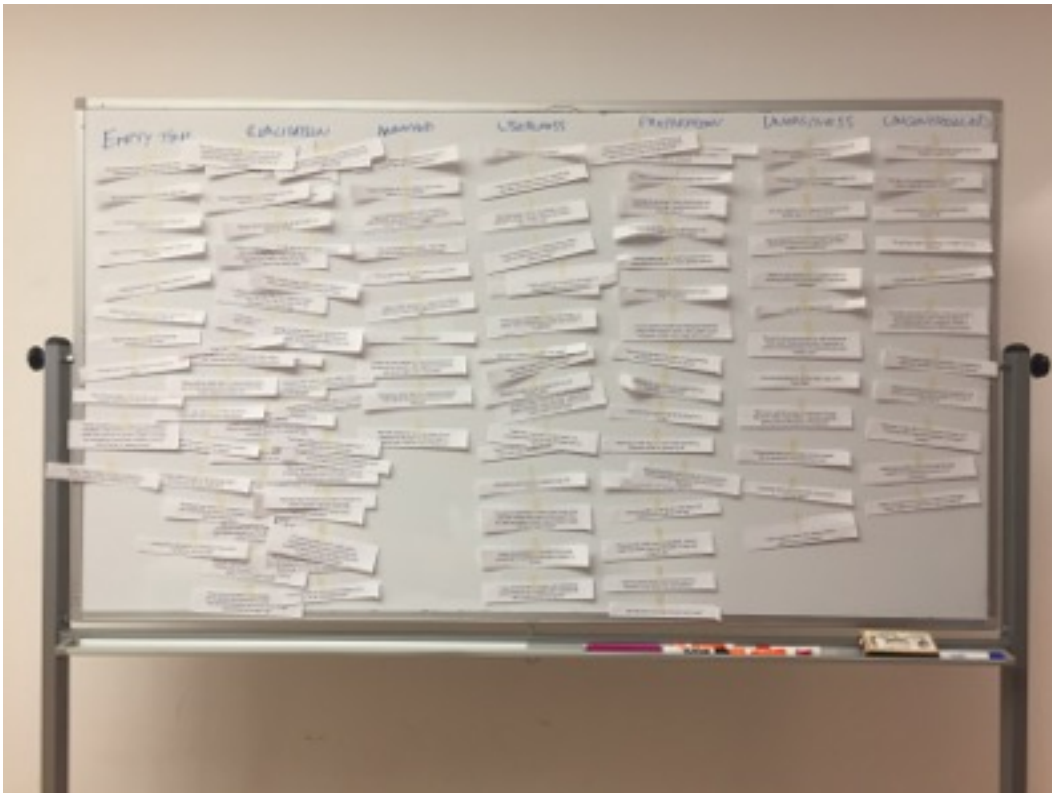


Figure 11. Analysis of Quotes. Lu L., 2016

Based on the initial themes that surfaced from the diary entries. I identify three clear takeaways:

- This exercise made people more aware of their own mobile phone use and made their interactions with the mobile phone more explicit to themselves.
- The mobile phone represents emotional support for users and when they did not have access to the phone, this led to moments of annoyance, uneasiness and a feeling of being out of control.
- The mobile phone is used extensively for everyday work, to plan one's day and to coordinate with others.

I further decided to explore the actions that were made explicit through this exercise and categorize them into further thematic buckets of information.

(Figure 12)

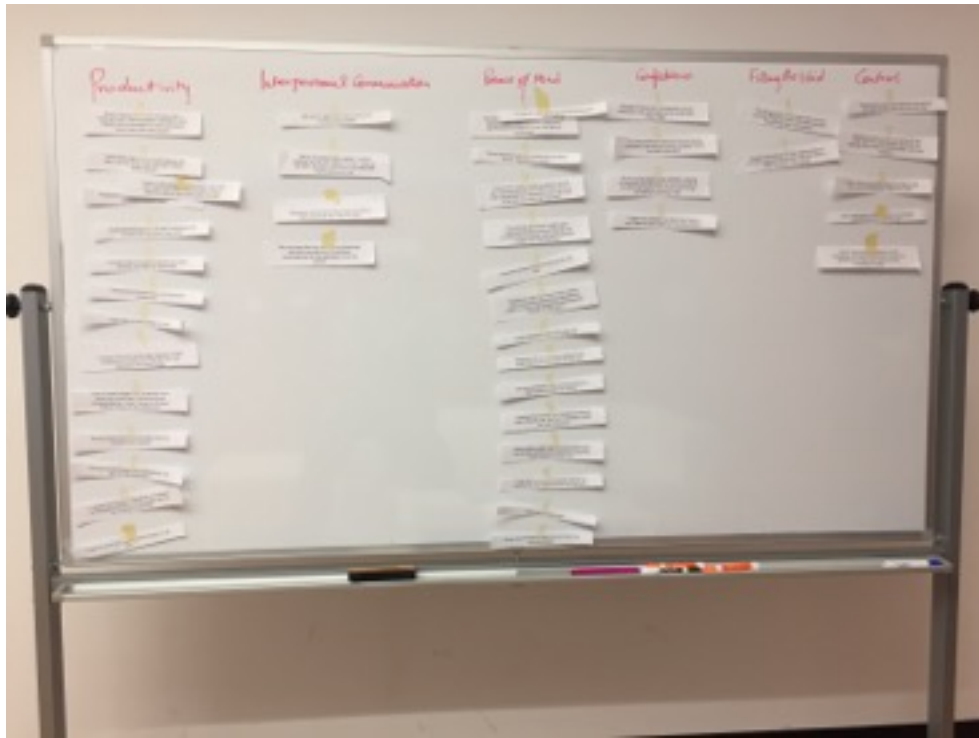


Figure 12. Analysis of Realization quotes. Lu L., 2016

My main takeaways from this study were the following:

- People use phones as alarm clocks which means that from the moment they wake up, they are wired to engage with their phone.
- When users chose to disconnect for one day, they only informed the people closest to them that they would be unreachable. In the case of a few hours, I assume that that number would further reduce to maybe a significant other or someone very important.

- People spent a lot of time not using their phone for any specific purpose but used it to fill an empty space in time.
- People felt empowered when they were disconnected and realized it was easier to do than they initially anticipated.
- People kept phones away from them even when off so as not to be tempted to use it.

For this research project, I decided to focus on creating objects meant for people who either have an intense relationship with their phone or have been affected by having partners or relationships that have been affected by the presence of the mobile phone. I identify people who heavily rely on their phone for support, social acceptance and community and thus degrade their real world relationships which would have conventionally been a source of social support and structure. The findings from my initial research also helped me understand the set of constraints that I had to work with while creating interventions through the design of the two objects.

Theoretical Frameworks

During my initial exploration into this research topic, I realized that it would be vital to situate my prototypes in specific social settings where the potential for real world, face to face interaction had been adversely affected by the presence of the mobile phone. This understanding further helped me identify the medium through which I attempt to create opportunities for real world, face to face interaction.

Sherry Turkle calls for “device-free zones” in the home and in the workplace to foster communication and create empathic connections. Building on this idea of “Sacred Spaces” (2015) I create environmental changes that limit the accessibility of mobile phones with the goal of creating specific social moments that are free of external distractions and identified as rituals for conversation.

By looking at the most common social scenarios of a meal shared between two people and the scenario of two players engaged in a board game I create The Tete-a-Tete Table and The Your Turn Chess Board. The goal of each design is to create opportunities for real world conversation using the concept of Persuasive Design and Fogg’s Behavioural Model as a framework to prevent users from being distracted by their phones. I also consider the concepts of

'Enchantment' through the work of David Rose and Tangible User Interfaces as proposed by Hiroshi Ishii and Brygg Ullmer.

Persuasive Design

The Tete-a-Tete Table and The Your Turn Chess Board have been designed to limit certain behaviours and facilitate others which together increase the probability of two people having a real world conversation during a specific social interaction.

BJ Fogg, a behavioural scientist at Stanford University coined the term "Persuasive Design" as a means of explaining the psychology behind habit forming behaviour through a psychological model called "Fogg's Behavioural Model" (FBM). From the perspective of designers and technologists, Fogg states that "Persuasive Technology is fundamentally about learning to automate behaviour change. To effectively encode experiences that change behaviours ... specifically insights into the factors that drive human behaviour" (2009). This has led to a new way of designing products and services which come under the umbrella of 'Captology' or Computer Aided Persuasive Technologies.

Fogg's Behavioural Model is based on the framework of Triggers, Ability and Motivation. The model suggests that a simple target behaviour is likely to

happen when a person is sufficiently motivated, has the ability to perform the task and has been provided with a trigger to do so at the correct moment in time. This relationship of triggers, ability and motivation can be further understood with the help of the graph (Figure 13) where the vertical axis represents motivation and the horizontal axis represents ability. A person who is low on motivation to perform a target behaviour would register low on the vertical axis and conversely a person high on ability to perform a task will register high on the horizontal axis. The FBM implies that motivation and ability are trade-offs

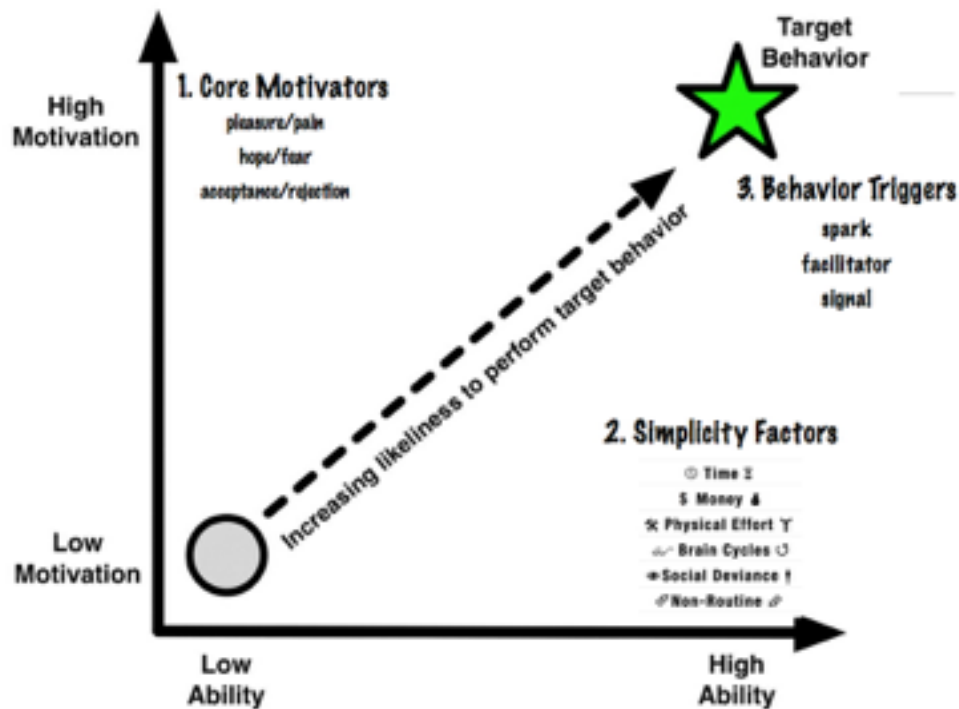


Figure 13. Fogg's Behavioural Model chart. Fogg, B. J. (2009, April). A behaviour model for persuasive design. In Proceedings of the 4th international Conference on Persuasive Technology (p. 40). ACM.

of a sort. People with low motivation may perform a behaviour if it simple enough to accomplish and in turn people may also perform a task which is incredibly hard to perform if they are sufficiently motivated to accomplish it.

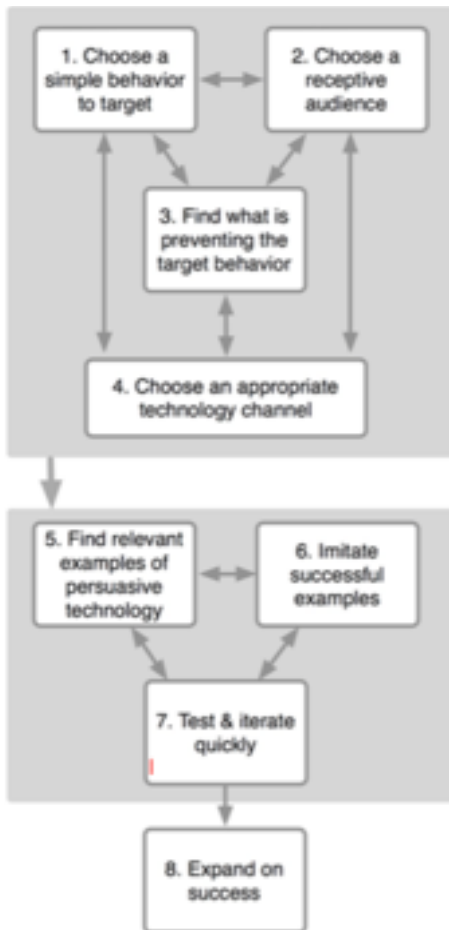


Figure 14. Fogg's eight step design process. Fogg, B. J.

are quite eager to attempt making big behavioural changes like say getting users

Fogg also talks about a “behaviour action threshold” where a person might be sufficiently motivated and have the ability to accomplish a task and still require a timely trigger to take action. He states that a successful trigger is one where the user notices the trigger and associates it with a target behaviour at the opportune moment right before an action might take place.

Fogg provides an eight step design process to help facilitate this exploration for designers and makers new to the field. One of the main pitfalls as identified by Fogg is one of scope. He discusses how due to external pressures, design teams

to quit smoking which is a much harder task to accomplish when the design team is new to the concept of Persuasive Design.

The eight step design process (Figure 14) has been designed to briefly outline the steps that researchers and designers must take to create effective habits. It firstly calls to identify a simple target behaviour that can be altered and actioned and its results repeated. This is important because as per the concept of Persuasive Design, we as designers alter smaller, simpler behaviour in an attempt to change bigger over arching habits. This can be further understood through the same example of trying to quite smoking. If we can get people to not carry a packet of cigarettes with them when they travel, they would be more likely to be able to quit smoking. Step two involves picking an audience that is receptive to the change. Again looking at the example of smoking, a person must want to alter their own behaviour in the first place thus increasing the rate of success. Step three is about analyzing what is preventing this target behaviour from taking place by looking at the triggers, ability and motivation of the target behaviour. There might be a lack of motivation, lack of ability or lack of a timely trigger.

During my conversation with BJ Fogg, he gives examples from his own daily life, saying that we orient our environment in such a way that would make us behave a certain way. He talks about how he likes learning to play the Ukulele

thus having the motivation and ability to do so however he does not play the instrument daily because there is a lack of trigger which tells him to take action. Step four involves choosing an appropriate channel or technology to instigate behavioural change. This is important because once we are able to identify the user group, we pick a technology that is easily understood by them. This also helps situating us in the moment when the behavioural change might occur thus increasing the odds of the target behaviour to happen. Step five involves looking at existing examples of successful persuasive technologies related to the behaviour and user group that we are attempting to alter. Step six is what Fogg calls “the secret sauce” which requires insight and reflection to understand what are the factors that have made the examples successful. He states that the special ingredients to success would not be superficial design choices such as aesthetic and colour but would be based on a psychological understanding of the “persuasive power” of the design. Step seven and eight are quite similar to existing design philosophies of “Agile” where we attempt test and iterate quickly and in small ways to create measurable forms of success that can be replicated and then expanded upon to reach bigger design goals. Due to the scope of this research project, I do not systematically follow every step as identified above however I do attempt to follow a condensed set of actions based on the eight step design process that I discuss during my prototype documentation.

I had the opportunity to speak with BJ Fogg about Persuasive Design and my research in particular, During the interview he spoke about how I was not only attempting to remove the visual trigger of the phone but also altering the environment that people lived in which is a powerful way of altering behaviour. He states that “People naturally design their own environment to enclose their behaviour and if a user group is willing to bring something new into their homes and their workplaces they are very likely to also use it”. He also talks about understanding the two type of users in this scenario, one who wants to alter their own existing behaviour and the other being someone who might not feel the need for change. Fogg talks about his own experience while designing for people who may not be keen on change by citing an example from his own life where he attempted to make his sister regularly exercise by connecting a television set to a bicycle thus creating a scenario where his sister had to peddle the cycle in order to watch the television.

An example that is very similar to The Tete-a-Tete Table has been created by IKEA Taiwan. They created created an interactive table called the “phone-less table” as part of an installation within their store. People were invited to the store for a meal and while being unaware of what the IKEA phone-less table really was. The table itself had a built in heating surface that could be used to heat a hotpot of food that would only work when the diners placed their phones underneath the heating surface (2016). This novel installation encouraged users

to use dinner as a time for conversation and connection with the people around them (Figure 15).



Figure 15. The phoneless table by IKEA Taiwan. (2016,). , I. (2016, January 25). IKEA phoneless table- YouTube. Retrieved from <http://www.youtube.com/watch?v=3qw7Gigsctk>

Enchanted Objects

The idea of “enchantment” as proposed by David Rose in his book “Enchanted Objects” talks about seemingly ordinary objects which are altered and imbued with fantastic power that fulfills our most fundamental human desires. Looking at stories for inspiration, he discusses the concept of ‘Dialectics’, where objects are created based on inspiration that has come before them through stories and fiction. He highlights Frodo’s sword from the book trilogy of Lord of The Rings and says that this fictional object perfectly summed up his idea of ‘enchantment’ as it was designed to perfectly fit Frodo and was imbued with magical power that made the blade glow when orcs or other enemies were close. Inspired by this story, Rose created the smart umbrella handle that glowed when there had been a forecast for rain. Other examples can be found from mythology and history such as Hermes’ sandals from Greek mythology which allowed the wearer the ability to fly across the world which then led to Dorothy’s slippers from the book Wizard of Oz, which allowed Dorothy to go anywhere in the world by simply tapping her shoes which then leads us to the creation of Nike’s Nike+ system which allows people to track where they have been as well as how well they have exercised.

Rose talks about objects from his own upbringing citing an old style brass barometer that was installed in his childhood home that continues to work to this

day. This barometer did not crave the users attention but always remained present and functional when needed.

Rose also talks about the advantages of placing objects in the real world. He invented the GlowCap, a simple internet connected bottle cap that fits on top of a regular medicine bottle that encourages people to take their medicine at the opportune time by glowing as well as informing clinicians when the medication is about to run out and alerting family members when elderly patients forget or refuse to take their medicine. (Figure 16)



Figure 16. The GlowCap. (2016). (n.d.). Vitality-GlowCaps. Vitality-GlowCaps. Retrieved from <http://www.vitality.net/>

Relating the concept of 'enchantment' with the framework of Fogg's Behavioural Model provided me with a vision for the final prototypes that exist outside of the screen, are imbued with magical powers and functioned to create certain types of behaviour. The outcome was the design of The Tete-a-Tete Table and The Your Turn Chess Board.

Tangible User Interface

Tangible interaction is modelled on a system of embodied interaction, tangible manipulation, physical representation of data and embeddedness in real space. Designing these interactions requires not only an understanding of the digital but also of the physical space around it. Tangible user interfaces (TUI) has emerged as a new type of interface which connects the digital and the physical world. In this section, I discuss the conceptual foundations of TUI as well as its application in my own research.

TUI can serve as a direct, tangible representation of data that can be literally grasped. They can augment physical objects by coupling them with digital information and can act as a parallel feedback loop providing users with details about the system as well as the ability to modify the input through physical and haptic feedback (Eva Hornecker and Orit Shaer, 2010). Hornecker and Shaer provide a broad categorization of TUI into a Data Centered view, Expressive

Movement Centered view and a Space Centered view (2006). My research focuses on taking an Expressive Movement Centered view which is a school of thought in product design which focuses more on the design of the interaction rather than the object itself.

Looking at the concepts of 'affordances and constraints' is important for designers so as to take advantage of the human understanding of the physical world to create actions. The notion of affordances was introduced by J.J. Gibson and connected to Human-computer Interaction by Donald Norman (1988). Norman connects properties of objects with actions related to them. For example a handle affords holding and turning while a button affords pressing. He also further categorizes this under 'perceived and real affordances' where perceived would be visually conveyed and subjective while real would be based on form and materiality of the object. Constraints would be the opposite of affordances which restrict certain actions and behaviour based on properties of an object. Together these concepts help designers create a sequence of actions.

During the making of my two prototypes, I use the form of everyday objects that are simply understood by people such as a dining table and a board game. Through the design and build of The Tete-a-Tete Table and The Your Turn Chess Board I reference the concept of Tangible User Interfaces while altering the ability, motivation and trigger for any action to take place thus using the

affordances of physical objects as design elements to create change in behaviour.

I also investigated other real world examples that leveraged physical affordances during interaction to change behaviour. I identified The Manual Reader Project by Ishac Bertran and The Social Mobile Project by Crispin Jones and IDEO as examples to take inspiration from.

The Social Mobile Project

In 2002, mobile phones were starting to become ubiquitous in Britain, and as a consequence, public spaces were being affected by the loud ringing of phones and by the inconsiderate loud talking by their owners. IDEO teamed up with Crispin Jones to come up with five unique modifications to the then understood form of the mobile, as a reaction to the effect it was having on public life. The Social Mobile (SoMo) project was an exploration into designing the future of mobile phones based on socially unacceptable behaviour of people who used mobile phones at the time. One of the devices administered a slight shock to the person talking loudly into the phone while another forced the user to play the phone like a flute to dial a number. These seemingly lighthearted and playful modifications were based on leveraging social norms to facilitate new behaviour.

The administered shock was a way of getting the user to understand that he/she was being obnoxious in a way while the phone that had to be played like a flute asked the user if he/she thought making a phone call was important enough to garner the kind of attention a musical performance would get in a public space (2002) (Figure 17).



Figure 17. The Social Mobile project. (2016). (n.d.). IDEO | A Design and Innovation Consulting Firm. Social Mobiles | IDEO. Retrieved from <http://p-lin-app-df-01.ideo.com/work/social-mobiles/>

I quite like the idea of exponentially highlighting existing social norms as a means of promoting certain behaviour related to mobile phones and I use a similar framework of making actions explicit through The Tete-a-Tete Table and The Your Turn Chess Board.

The Manual Reader

In response to the exponential amount of information we consume on a daily basis, Ishac Bertran, a designer and artist created “The Manual Reader”. He leverages the affordance of the object to force the user to spend time and effort to read something which could have been easily read on a screen. Bertran cites that his objective was to make users more aware of their own digital consumption patterns. The Manual Reader forces users to read tweets one letter at a time by moving a tiny pixel grid across a space while also receiving haptic feedback as they cross each letter (Figure 18).



Figure 18. The Manual Reader. (2016,). Bertran, I. (2015). Ishback. Ishback. Retrieved from <http://ishback.com/reader/index.html>

Through the framework proposed by BJ Fogg’s Behavioural Model I identify simple behaviour that I alter by leveraging the physical affordances of objects that take the form of everyday objects. This leads me to the creation of The Tete-a-Tete Table and The Your Turn Chess Board that I discuss in the following chapter.

The Tete-a-Tete Table



Figure 19. Two participants share a meal and a conversation on The Tete-a-Tete Table. Lu L., 2016

Concept

The phrase “Tete-a-tete” roughly translates to a private heart to heart conversation between two individuals. Using the form of a dining table, I design the “Tete-a-Tete Table” that encourages two users to keep their phones away before sharing a meal. The focus of this prototype is to understand the interaction between two individuals when they are forced to hide their phones before eating food in the presence of another person.

The Tete-a-Tete Table is made up of a table top surface that is constantly moving vertically up and down. This constant motion discourages users from placing items such as food, cutlery or crockery on top of it as items placed on its surface would topple over and fall due to the constant movement of the surface. However, when both users plug their phones into the table via 3.5mm stereo jacks and hide their phones in a sleeve under its surface, the table recognizes this, stops moving and flattens to allow users to place food on the surface and thus share a meal together away from their phones. My interest in building this prototype lies not on the interaction with the device but in the resulting interactions between two people.

Behaviour Framework

By analyzing the social action of eating food in the presence of another person while having access to a mobile phone through BJ Fogg's Behavioural Model, I identify two simple behaviours that would together influence the probability of two individuals having real world conversation without being distracted by their phones. One: I remove the visual trigger of the phone from the scenario to discourage people from checking their phones and two: I increase the ability of a person to keep their phone away.

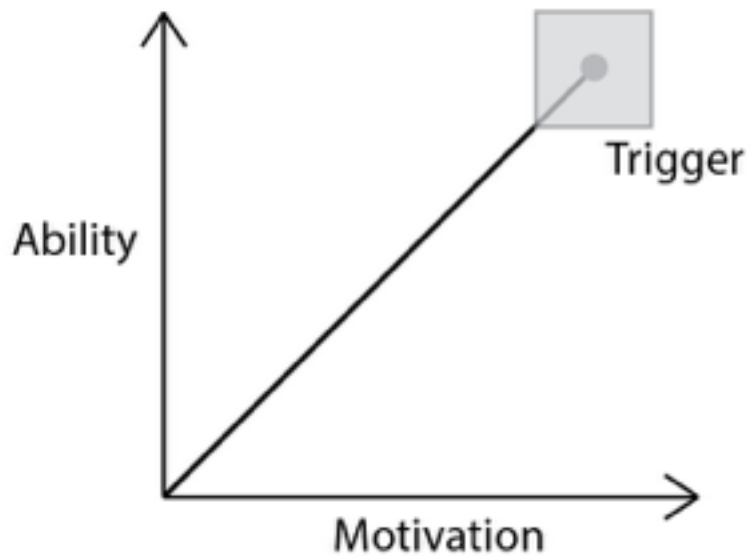


Figure 20. Hiding the visual trigger of the phone to discourage people from checking their phone . Lu L., 2016

To lower the chances of a person checking their phone while sharing a meal, I removed the visual trigger of the phone itself from the scenario (Figure 20). I do so by creating a hidden pocket under the table's surface where the phone must be placed for a person to be able to make use of the table top surface. Thus by removing the visual trigger of the phone itself, I reduce the probability of a person checking their phone while sitting on this table.

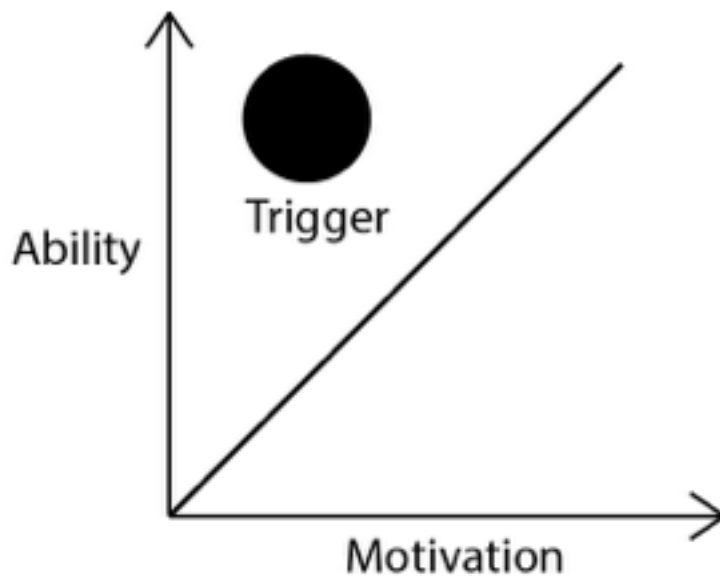


Figure 21. Increasing the ability of people to keep their phones away and providing them with a visual trigger of the augmented table top. Lu L., 2016

I also look to increase the probability of people keeping their phones away so they can focus on the person in front of them. The subtly moving table acts as a visual trigger which has been designed to signify a different means of interaction from a regular dining table (Figure 21). This decision was further echoed by BJ Fogg himself who discussed my project and said, “What you are doing here is removing the visual trigger (of the mobile phone) and also changing the environment itself, this is a powerful way to change behaviour”. Further by building a sleeve into the table, I increase the ability of the user to keep their phone away from visual line of sight without having to place the phone in another room or in their carry bag. Through the design of The Tete-a-Tete Table my intent

is to increase the overall probability of a motivated user keeping their phone away by increasing the ability and by providing a visual trigger that exists in the environment itself.

Interaction Cycle

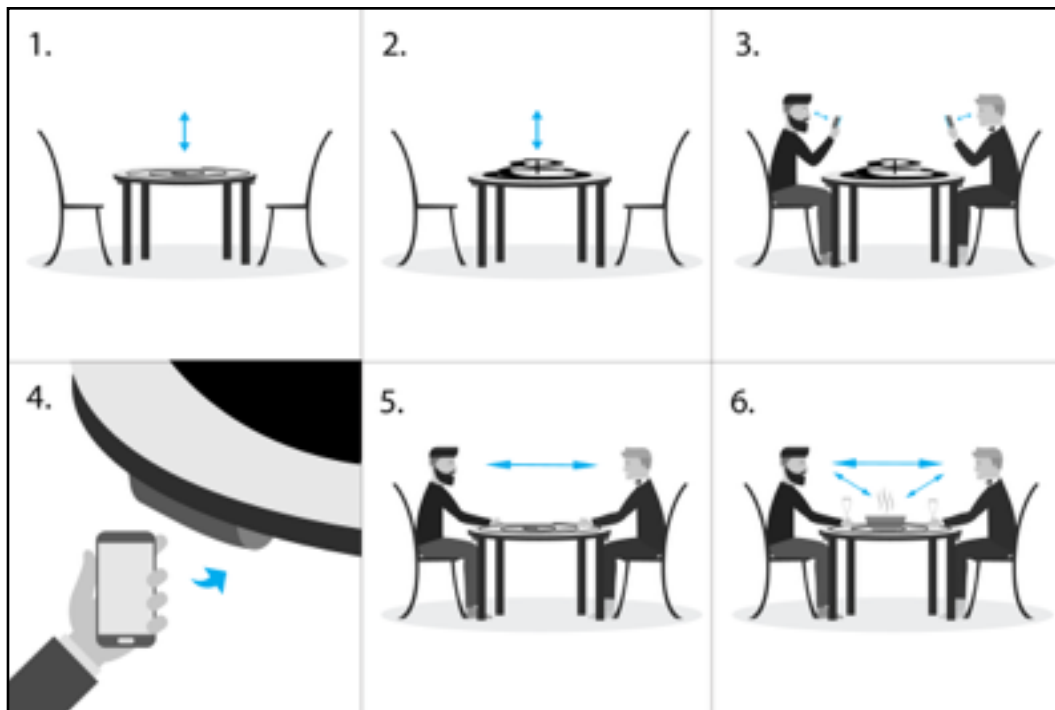


Figure 22. Illustrative example of the interaction cycle while using The Tete-a-Tete Table for a meal and for conversation. Lu L., 2016

The Tete-a-Tete Table is meant to be part of someone's home or to be placed in a restaurant or coffeeshop. The surface of the table slowly moves up

and down in a uniform motion while pulsing on and off through lights built into its surface mimicking the pattern of human breathing. Both users approach the table and place their phones in the hidden sleeves under the table's surface while connecting their phones to the hidden 3.5mm headphone jacks.

The table recognizes the connected phones and slowly moves down until completely flat. Users can now place food, cutlery and crockery on top of the surface of the table as long as their phones remain plugged in the table (Figure 22).

In the scenario when one of the plugged in phones start to ring or vibrate, the user is faced with a choice to either unplug their phone from the table and potentially have their meal ruined or to ignore the notification and continue to enjoy the meal with the person in front of them. If one of the users does choose to unplug their phone from the system in the middle of the meal, the table provides a countdown of sorts through the built in light patterns to indicate that it will start moving up and down again if the phone is not plugged back in to the table.

After the meal, both users can remove the empty plates and dishes from the surface of the table and finally unplug their phones which would then inform the table to start moving up and down once again.

Proof of Concept

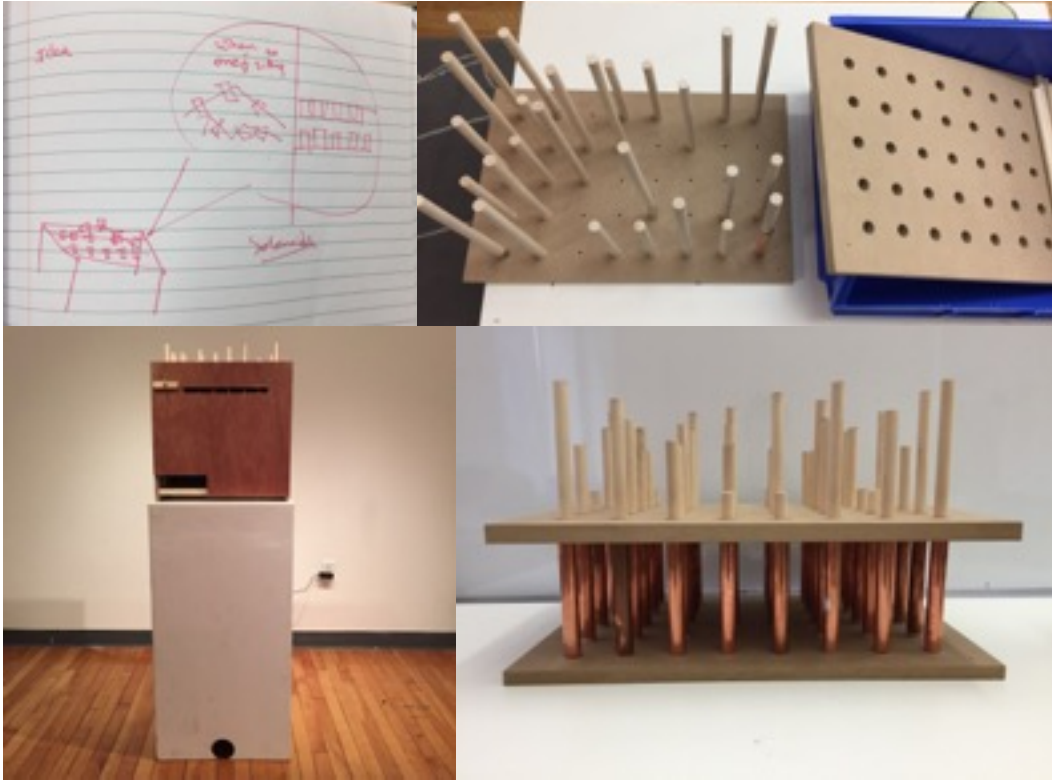


Figure 23. (From top left, clockwise) a. Early sketch of concept for uneven table top design, b. Uneven pegs screwed onto wooden surface, c. Side view of top uneven surface, d. Final proof of concept prototype. Lu L., 2016

For my early prototype, I focused on creating a surface that would be able to change shape and move from being an uneven surface to one which is rigid and flat. The surface of my early prototype was lined with equally spaced holes and wooden pegs of different lengths that fit in to these holes creating an uneven top surface. Using IR sensors, servo motors and an Arduino micro-controller, I was able to control the movement of the pegs to move in and out of the holes on

the surface when any object such as a mobile phone is placed on top of the IR sensor. Thus creating a surface that would be uneven and unusable as a table top in its default state but also flat and usable when actuated (Figure 23).

By making this proof of concept, I was able to determine few key limitations of the design which I then analyzed and altered in the final design of The Tete-a-Tete Table. The mechanism for moving the top surface required a large amount of power from servo motors needed to be constantly powered in order to keep the surface raised which lead to over heating of the servo motors. The surface itself was heavy and not flexible enough to facilitate fluid motion. I address these design flaws in the following section and also discuss other design decisions made for The Tete-a-Tete Table.

Design Choices

For the design of the table top, I looked at the double spiral architectural form of *La Maison Des Fondateurs* made by *Bjarke Ingels Group* located in Le Brassus, Switzerland (Figure 24a). It was vital to create a surface that was flexible enough to move vertically up and down while also possessing the ability to compress onto itself and become flat and rigid.

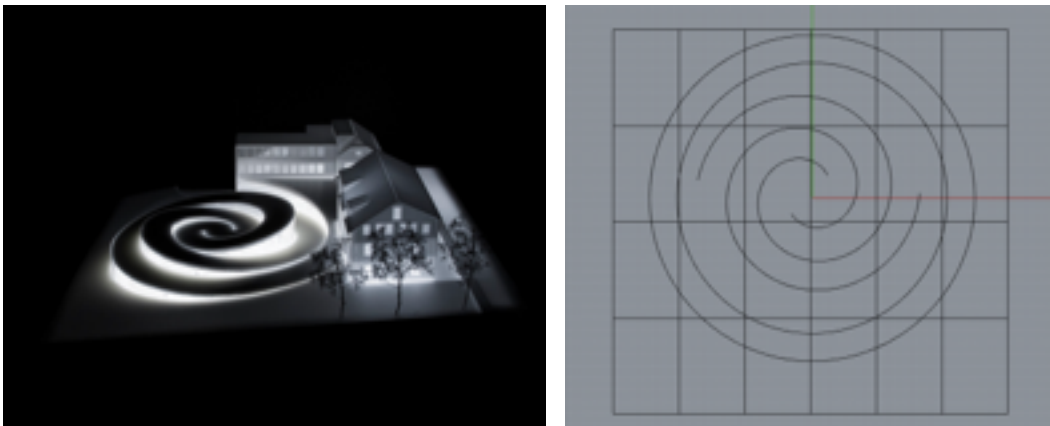


Figure 24. (From left to right) a. Conceptual render of the double spiral architectural form of *La Maison Des Fondateurs*, b. Rhino3D file used for CNC cutting of ABS material. Lu L., 2016

The material choice for the table top surface was equally important as the material needed to be flexible enough to bend when pushed upwards while sturdy enough to hold its shape when flat. It was also important to pick a material that would be durable and could resist unplanned spillage of food and liquids on its surface. Using a 1/32 inch thick ABS thermoplastic sheet satisfied this criteria

and using a CNC router, I was able to cut the sheet into the precise shape that I wanted (Figure 25).



Figure 25. Documentation of CNC drill of ABS material. Lu L., 2016

For the form of the table itself, the size of the table informs the number of people that can sit around it so picking a table that only allowed two people to sit comfortably around it was important. I sourced an IKEA BJURSNAS table which has a diameter of 37 inches thus providing ample space for two people to sit across from one another and also space for plates of food on its surface. The table top was then passed through a CNC router to drill an inlay for the ABS top surface as well as a further inlay for the white light strips. The middle of the table was cut right through to provide a hole for the linear actuator to move the ABS sheet on top.

I learnt from making my early prototype that it was important to use an actuator that allowed for smooth controlled vertical movement while also being able to displace a large distance to facilitate the movement I wanted to replicate. I



Figure 26. (From left to right) a. Picture of IKEA BJURSNAS TABLE, b. Documentation of white LED lights embedded into table top. Lu L., 2016

used an 8 inch heavy duty linear actuator to create the controlled vertical motion, it works by connecting a DC motor to a vertical gear shaft. This was important as unlike a servo motor, the linear actuator does not require constant power to hold a certain position thus making it less likely to overheat and more durable. I tested the functionality of the linear actuator and design of the double spiral table top through low fidelity actual size paper prototype to understand the limitations and functionality of the design (Figure 27a).



Figure 27. (From left to right) a. Picture of Mahsa Karimi and I testing movement of the design using actual size cardboard cut out of table top b. Picture of linear actuator used to drive movement. Lu L., 2016

Using a translucent mylar sheet to cover the inlay of LEDs allowed for even dissipation of light as well as a second later of protection for the built in circuitry in case of spillage of liquids (Figure 28).

Lastly, I chose to use stereo jacks as a form of detection of mobile phones as it worked in identifying a mobile phone while also having the desired affect of switching many phones to a mute mode when connected to the system.

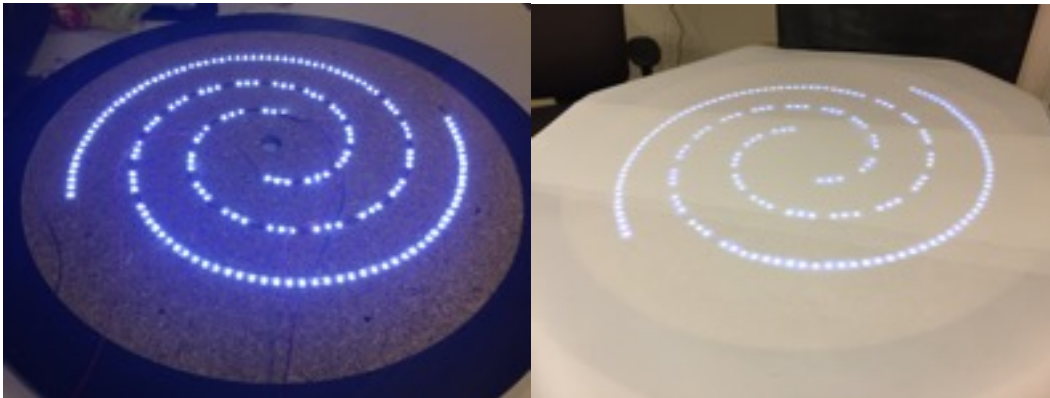


Figure 28. Covering the LED lights with Mylar paper to dissipate the light evenly. Lu L., 2016

The system is controlled using a Particle Photon micro controller that can be connected to the internet via a wifi connection thus allowing for future development of the Tete-a-Tete table into an Internet of Things device that provides feedback to users about important information such as emails or voice messages through user friendly services such as IFTTT (Figure 29).

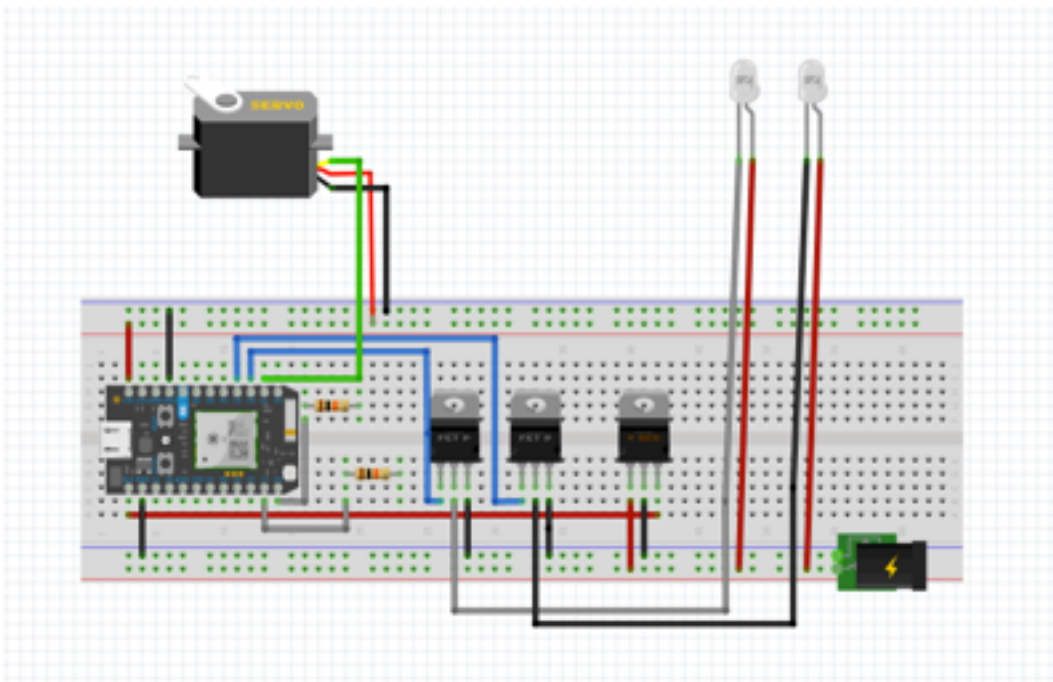


Figure 29. Fritzing diagram of circuit. Lu L., 2016

Observations

The Tete-a-Tete Table was designed to create opportunities for two people to interact while sharing a meal together. I invited three groups of two people to sit around the Tete-a-Tete Table and enjoy a meal in each other's company. I observed how comfortable they appeared to be around one another and if at any moment they felt the need to reach for their phone.

I also conduct a semi-structured interview after the meal to understand if the design and use of the Tete-a-Tete Table is intuitively understood by participants. I also discuss the impact of this forced social experiment on interactions between the two participants. I asked participants to talk about their relationship with one other and if this experience had changed what they knew about each other. I also asked participant to describe the other person based on their conversation during the meal and encouraged participants to reflect on this experience and imagine the long term impact of using this device with people they are closest to. Referring back to Fogg's Behavioural Model, I also wanted to understand the impact of removing the visual trigger of the mobile phone from this particular social scenario.

Group 1:



Figure 30. Documentation of two individuals sharing a meal on The Tete-a-Tete Table. Lu L., 2016

This group consisted of two individuals who identified one another as classmates and knew each other well enough to have topics in common to discuss over a meal. I refer to them as Participant one and Participant two. They both described themselves as slightly introverted but also said that the nature of their conversation had been personal and in depth. They identified common traits that they both shared during the meal and discussed plans for their futures and spoke about the people closest to them.

Participant one said that she used her phone for work and thus was central to her life. Her concern was that this system might cause a 'glitch' in her

phone. Participant two then echoed a similar concern and asked what would happen if his phone had run out of battery during the meal?

The participants felt that the pulsing lights on the table were initially inviting but also agreed that the brightness of the lights was too much when they were attempting to share food. Participant two suggested switching the lights off completely during the meal and only turning it back on to indicate the start of the movement of the table top surface.

Both participants agreed that the food itself helped in instigating social interaction but also identified moments of awkward silence that they felt the need to fill with conversation. This was similar to what I had observed during my initial exploration of the topic while conducting journal entries. I had called these instances 'Empty Time' as they felt like moments that were empty and needed to be filled. Participant two said that in moments of awkward silence he usually checks his phone but in this specific instance he felt more compelled to talk because he did not have the option of checking his phone. Participant one in response said that during the hour or more time that it takes to share a meal, she had run out of things to talk about as they had exhausted their usual topics of discussion.

The participants agreed that if this forced social situation had been conducted with people they were extremely close to, they would not feel compelled to fill gaps in conversation and would just have focused on eating. Participant one said that this experience is really healthy as speaking with another person is always a good use of time. She states that when she does get the undivided attention of her husband, she notices a shift in conversation which leads to topics that are more in depth and personal.

In conclusion, I asked both participants to imagine where this table might exist in the real world. Participant two said that he would not want to have this table in his home as it was for a very specific use and saw it as a form of therapy that he might not feel the need for. Participant one said that she could see this being used in schools and offices for meetings and collaboration as you do not expect a table to instigate conversation which is nice.

Group 2:



Figure 31. Documentation of two individuals sharing a meal on The Tete-a-Tete Table. Lu L., 2016

This group consisted of two individuals who identified each other as close friends. They regularly call each other over for food and know each other well. They are comfortable spending time in each other's company and seem talkative and relaxed. I refer to them as Participant three and Participant four.

Participant three was expecting a phone call from her mother during this exercise as she had known that her mother had been sick. In this scenario, she was particularly motivated to check her phone for a specific purpose and attempted to do so on multiple occasions during the course of the meal. Both

participants worked together to counter the forced social experiment by devising a strategy of eating as well as interaction with the table. Both participants decided to first consume all the liquid based items on the table to avoid a scenario of water or soup falling on the surface when they attempted to check their phones. Participant four also decided to eat directly from the serving plate rather than taking food on his own plate to avoid spreading of falling food in case the table did move again.

Participant three said that she attempted to quickly check her phone for messages from her mother and was immediately notified by the table as it started pulsing. The next time she attempted to check her phone, she calculated the amount of time she had and quickly pulled her phone out and placed it back inside. This interaction was particularly interesting to me as both participants engaged with each other to work against the system. Participant four said that this was not only a meal between two people but a meal between two people and a table.

Participant four said that he felt awkward and fidgety at times as he is used to holding his phone with his right hand to read articles while eating with his left hand. Participant three said that she loved the material used for the surface of the table and felt comfortable enough to use the surface like a regular table without being worried.

Participant three felt that this interaction was not rushed and felt like she had more time to talk to the person in front of her. Participant four echoed a similar sentiment and said that he felt that they made more eye contact during this meal. He also stated that in the everyday scenario of sharing a meal with another person, he would have been listening to what the other person was saying but might have been looking at his phone while doing so. Participant three interjected by saying that in that scenario she would have felt that the other person was not paying attention to what she had to say because the other person was not looking at her. She tells Participant four that by not looking at her during conversation she felt that he might be physically present but mentally somewhere else.

Group 3:



Figure 32. Documentation of two individuals sharing a meal on The Tete-a-Tete Table. Lu L., 2016

This group consisted of two participants who consider each other as colleagues and also share a common background as they both come from the same country. They appear to be comfortable with another and could also silently enjoy their meal without necessarily speaking with one another all the time. I refer to them as Participant five and Participant six.

Participant five says that he usually watches videos on his phone during meals but felt more at peace during this engagement as he could focus on just one thing. He goes on to say that he initially felt awkward but soon forgot about that feeling when they started talking.

Participant six said that she also usually moves from one screen to another while eating but could easily forget about her phone and her laptop in this scenario because of the other person in front of her. She states that it would be much harder to do this activity without the presence of the person in front. Looking at this statement through Fogg's behavioural model is interesting as the motivation of the user has been altered and elevated due to the presence of the other person.

Participant five stated that he at times felt his phone vibrating and felt the urge to check his phone but then consciously chose not to do and be completely present in the moment. He also stated that during the moments when he thought his phone might be ringing, he chose to ignore that impulse because he was very much aware of the implications of checking his phone as it would lead to Participant four not being able to eat their meal. This was really interesting to me as it made the consequences of action explicit and created a feedback loop to encourage empathy between two individuals.

Reflection and Limitations

There were a number of observations made when participants interacted with the table and with each other. I further discuss the limitations, the practical considerations and the potential future improvements of the device in this section.

While asking participants to interact with the table it became clear that the design of the table was not intuitive and users were not aware of what they must do to use the table for a meal. The stereo cables were hidden under the surface of the table which made it difficult for users to first identify what they needed to do and also made it difficult to accomplish the task of plugging their phones into the system. The sleeve also is hidden and thus I observed repeatedly users bending down to see where they needed to slide their phone into. During the showcase of the device, one participant also raised a concern about not knowing if any information was being taken from his phone when it was being connected into the system. While the length of the stereo cable allowed users to plug their phone into the table while still being able to access it.

The current design of the table also limits its use to mobile phones which have headphone jacks and thus cannot be used by newer phones such as the latest iPhone models. The surface of the table is relatively robust and can be

easily cleaned as any regular table as the material used does not spoil easily even if liquids are spilled over it, however for one to clean the table, one would need to again plug their phones into the table

Based on conversations had with participants, observers and through critical feedback of the object, I concluded that the design of The Tete-a-Tete table in its current form is not as intuitive as it could be and users are not clear what the purpose of the object is if not explicitly explained to them. The movement of the surface is welcoming and subtle but the correlation of the movement with the change in light needs to be more interlinked and cohesive.

The introduction of food on the table makes the experience very real and quickly makes the user believe that this is very much a regular dining experience with another person. The type of social interaction between the two individuals was based on how comfortable they were with one another and the design of the object forced both users to be explicitly aware of the consequences of their actions. This played into what I found during my initial research into the topic where the process of reflection through journal entries made the participants more aware of their interactions with the mobile phone. Through the simple action of making food fall off the table by checking your phone, it created a direct sense of consequence of user actions. I was also surprised to see individuals attempting to work together to beat the system and quickly check their phones.

This was not a thought about user interaction of the device but also encouraged users to work with one another to achieve a common goal as well as have mutual consent while checking their phones. Lastly, users also spoke about employing strategies to eat their food which relates to the stakes involved of what might fall over based on the type of food on the table. So a sandwich on a paper plate would not be as compelling as compared to water in a glass jar.

While observing participants interact with the device, I also reflected on the subset of people who this object might be meant for. Based on BJ Fogg's Behavioural Model, it is important to have at least one of the two users to want to have an unobstructed conversation and thus this object would be meant for couples who feel they are not being able to spend time with one another because of the mobile phone specially if situated in a restaurant which is themed around creating private time for people. The concept of the object can also be extended to office spaces and board rooms where meetings can be conducted only when participants keep their phones away and focus on the discussion at hand.

The Your Turn Chess Board



Figure 33. The Your Turn Chess Board. Lu L., 2016

Concept

'Your Turn' is a phrase commonly used by people playing board games to pull another player's attention back to the game when it is their turn. I decided to explore the social situation of play between two players as a time for conversation and interaction in real life through the collective act of playing board games. Using the form of a chess board, I design "The Your Turn Chess Board", a chess board that has the ability to appear and disappear. The design of the

board encourages both players to place their phones in slots built into the board, which then activates the board and causes the chequered tiles of the chess board to appear. If either player pulls their phone out of the slot at any time, the chequered tiles disappear again leaving a black empty canvas. Through this prototype, I dissuade users from checking their phones during the act of play.

The Your Turn Chess Board is inspired by “Marauder’s Map” from the popular storybook series of ‘Harry Potter’. In the storybooks, ‘Marauder’s Map’ was a magical scroll that had the ability to appear and disappear depending on who interacted with it. Similarly The Your Turn Chess Board consists of chequered tiles that are covered with black thermochromic ink which has the ability to appear and disappear based on the change in temperature. For one player to play his or her turn, the other player must also refrain from checking their phone and thus focus on the game and interact with the person in front of them. The focus of this prototype is to understand how altering the motivations of users impacts their behaviour while still having access their phone and still being able to see their phone.

Behaviour framework

The Your Turn Chess Board forces two players to keep their mobile phones in a slot in front of them to play a game of chess. One again using Fogg's Behavioural Model I identify two simple behaviours that would increase the probability of two players playing the board game without checking their phones at any time. I encourage the behaviour of a user to let go of their phone before beginning the act of play (Figure 34) and discourage the behaviour of a user checking their phone during play (Figure 35).

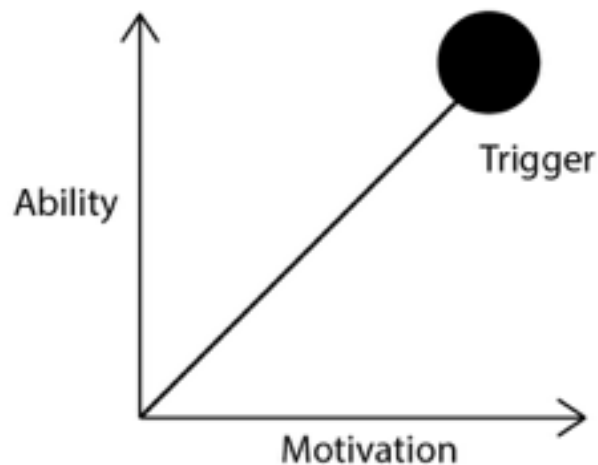


Figure 34. Providing a visual trigger in the form of the augmented board game design to facilitate a behaviour. Lu L., 2016

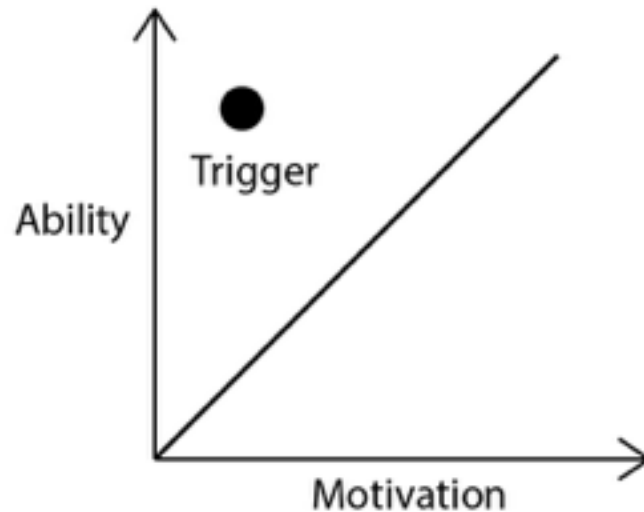


Figure 35. Reducing the motivation of the user to check their phone by making the impact explicit and cause the other player to react to this action. Lu L., 2016

To increase the chances of a user putting away their phone before engaging in play, I built in slots into the board game which would act as a visual trigger for the users to take action at the moment before playing the board game. Since the slot is easily accessible by the user, it would require very little physical effort for them to take action and thus result in an increased ability to place their phone in the slot provided. Thus by increasing the ability of the user to take action and by providing a visual trigger that is present in the environment and is in focus right before the act of play, users are more likely to accomplish this behaviour.

During the act of play, I discourage users from checking their phone by reducing their motivation to do so by adding a social dimension of acceptance and rejection. By creating a chess board that disappears when either player checks their phone I make the impact of checking one's phone explicit and thus reduce the motivation of the user to take action. Unlike The Tete-a-Tete Table however, I do not completely remove the visual trigger of the phone itself and do not alter the ability of the user to take action.

Interaction Cycle

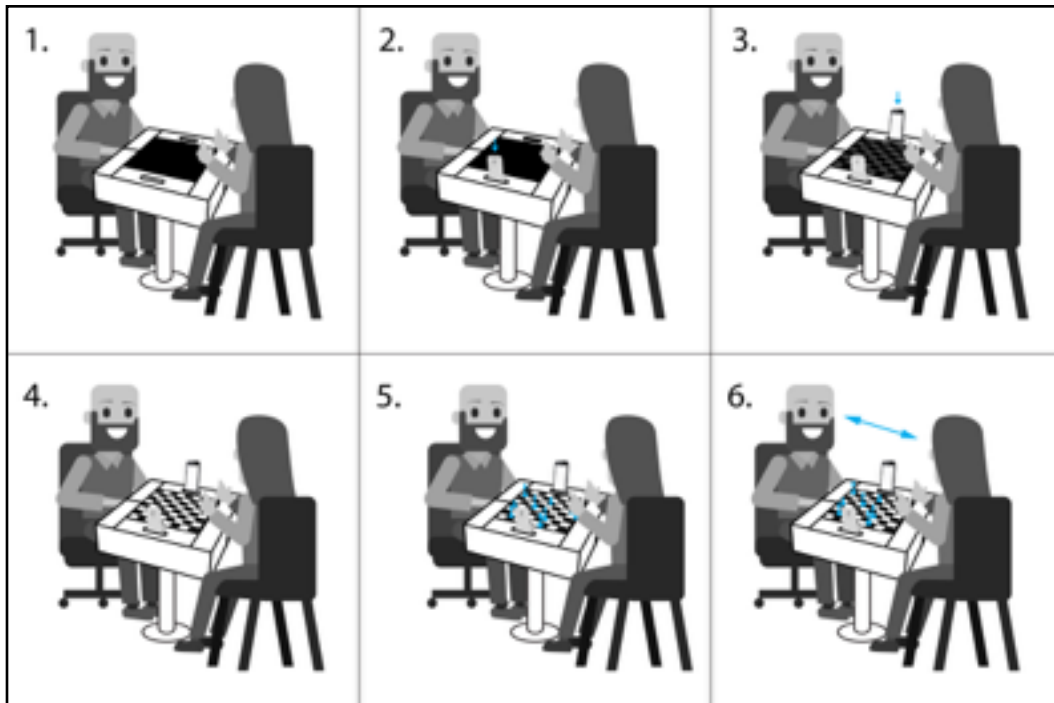


Figure 36. Illustrative example of the interaction cycle while using The Your Turn Game Board for play. Lu L., 2016

The Your Turn board is meant to be placed in a home or a coffee shop and be engaged with by two players. The surface of the chess board is made of canvas that has been screen printed with chequered tiles and covered with black thermochromic ink. To the players approaching the game board, the surface appears completely black and unusable for play. When both players slide their phones into slots built into the board, the board game recognizes this and warms the surface of the canvas making the thermochromic ink disappear and revealing

the chequered tiles. Both players can now engage the surface of the chess board and play a game of chess.

In the scenario when one of the phones start to ring or vibrate, the player is faced with a choice to either pick up their phone and disrupt the other player as well or ignore the notification and continue to play the game. By making the impact of this choice explicit with immediate consequences, the player who would like to check their phone must do so by informing the other player that they choose to interrupt the game to check their phone. At the end of the game, both users can remove their phones from the board which will then turn the surface of the board game black and unusable once again.

Proof of concept

For my proof of concept, I wanted to create a mechanism that would allow me to heat and cool a painted surface quickly and consistently while also being able to observe the colour change of black thermochromic pigment. I used a transparent glue solution mixed with black thermochromic pigment painted onto a heating pad to test the quickness of colour change at different temperatures (Figure 37). I used a digital temperature sensor connected to an Arduino board to control the system that would allow me to consistently change colour and monitor the temperature of the heating pads. Using simple conditional statements built into the code, I modulated the switching on and switching off of the heating pad to create a consistent way of regulating temperature that would cause colour change without becoming too hot or too cold.

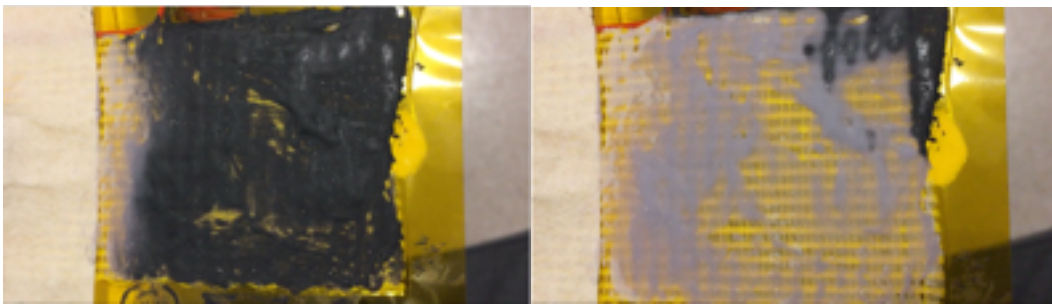


Figure 37. Testing thermochromic in pigment mixed with translucent glue on a heating pad. Lu L., 2016



Figure 38. (From top left, clockwise) a. Early tests of material and colour mixture of thermochromic ink and white acrylic paint, b. Thermochromic ink testing, c. Wiring of ten heating pads connected to an Arduino and external power source. Lu L., 2016

Further I tested different ways of generating and dissipating heat evenly. I tested sheets of metal of varied thicknesses wrapped with insulated nichrome wire to generate heat and also mixed the thermochromic pigment with different liquids such as water, white acrylic paint and a mixture of water and acrylic paint and applied it onto paper as well as canvas.

Based on these tests, I decided to use canvas as the base material for the chess board which would be screen printed with chequered squares and then covered with a layer of black thermochromic pigment mixed with a clear gel medium. The heat will be generated via multiple heating pads that will be controlled by an Arduino and monitored by a digital temperature sensor.

Design choices

The design of the Your Turn board was inspired by the works of David Rose and his definition of ‘enchantment’. I wanted to create a board game that existed outside of screens, that felt real and had a mix of functionality and novelty. I also looked at a project called “Electromagnetic Tracker” by Alexandre Echasseriau (Figure 39a). Echasseriau experimented with creating subtle changes on a surface using thermochromic ink to visualize electromagnetic waves given out by everyday devices.

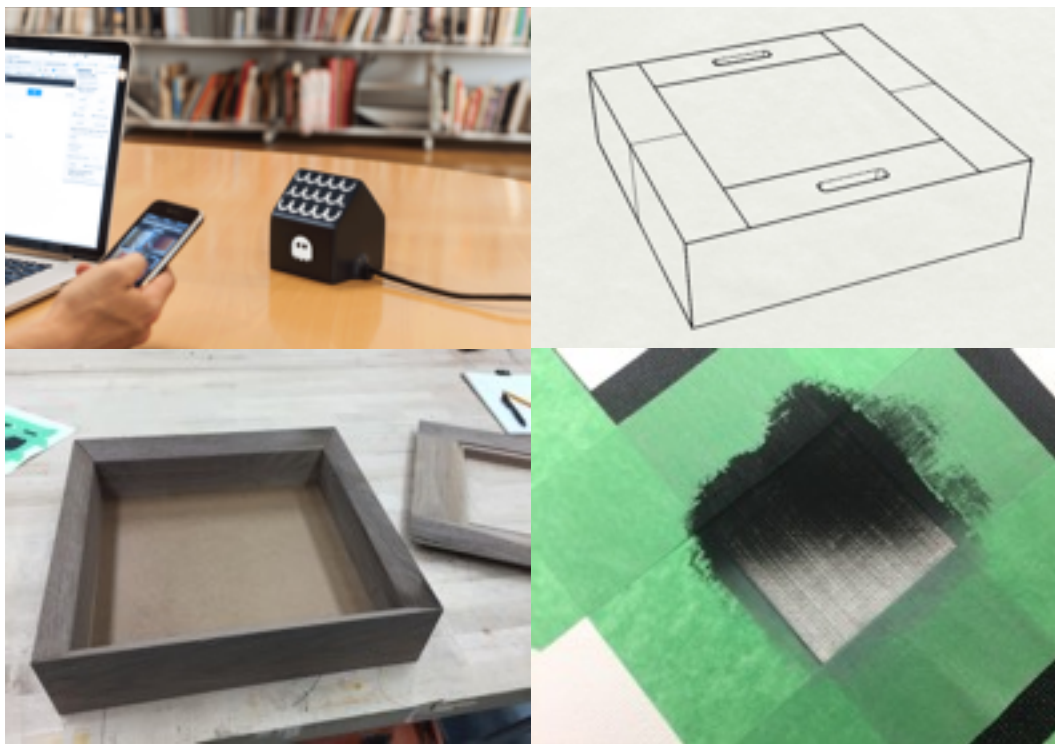


Figure 39. (From top left, clockwise) a. Electromagnetic Tracker by Alexandre Echasseriau, b. Rhino3D sketch of final box, c. Testing clarity of painted thermochromic ink, d. Construction of board game box. Lu L., 2016

Using canvas as the base material for for chequered tiles allowed for durability while being heated to a temperature of 35 degrees or more without impacting the material itself. I also chose to make the game box out of a solid walnut wood to compliment the black colour of the thermochromic ink and the black and white chequered pattern.

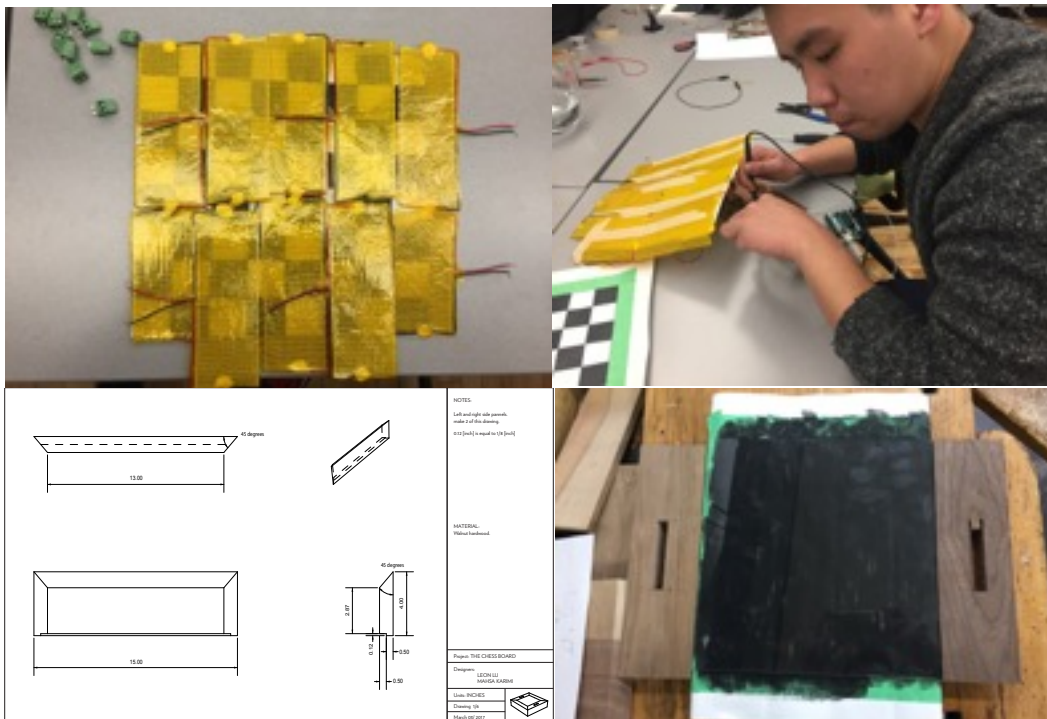


Figure 40. (From top left, clockwise) a. heating pads aligned onto chess board surface, b. Testing connections of each heating pad, c. Documentation of making of Chess board, d. Orthographic sketches for build of chess board. Lu L., 2016

Ten heating pads were then arranged on top of a board that would be also used as the rigid base to hold the printed canvas in place. The temperature of the heating pads was controlled by an Arduino micro controller connected to a digital temperature sensor.

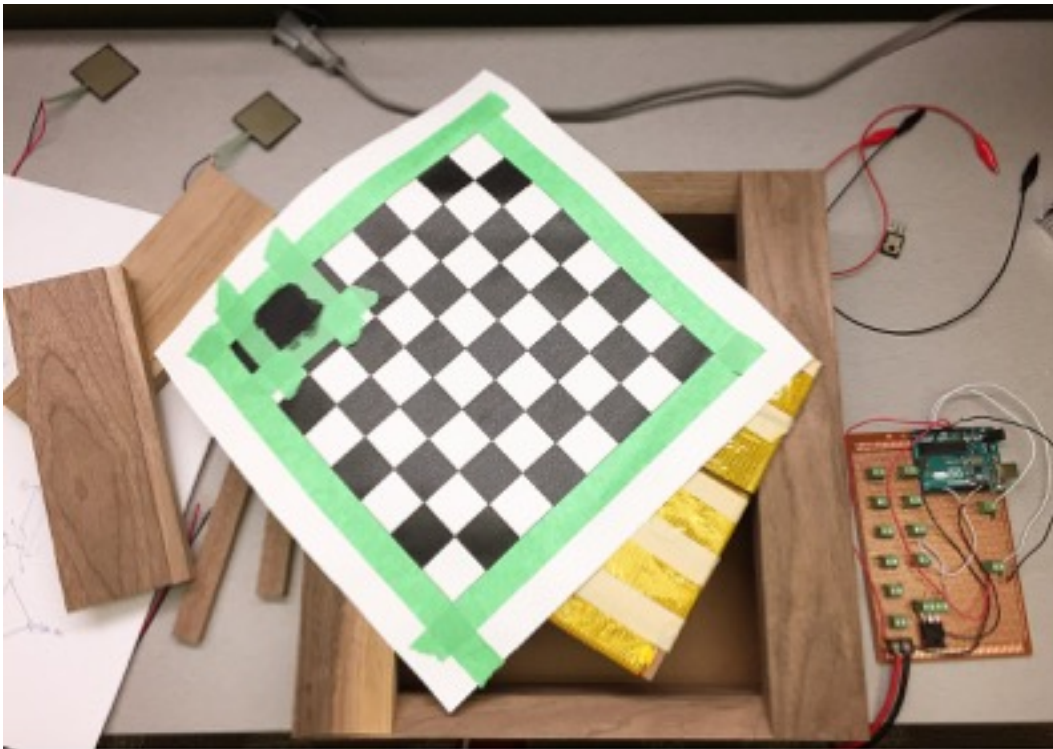


Figure 41. Documentation of Chess Board while being constructed. Lu L., 2016

Lastly I use force sensing resistors which are calibrated to identify the weight of a mobile phone as my source of input. When a user slides his or her phone into a slot, the end sits on the sensor and thus detects the device based on its weight. When both phones are placed in the two slots, the Arduino activates the heating pads to turn on and heat up to a temperature that changes the colour of the thermochromic pigment from black to clear, revealing the chess board.

Observations

The Your Turn Chess Board was designed to create opportunities for two people to interact with one another while playing a game of chess away from their mobile phones. I invited three groups of two people to an informal game of chess on the Your Turn Chess Board and observed their interactions with each other. I later conducted an informal interview with both participants to understand further what they felt about the experience.

While speaking with the participants, I asked them about what their relationship with mobile phones was and if they felt like they needed to create systems to control their own usage of phones. I asked them if they played board games and asked them if this experience was any different from their previous experience playing chess. The participants did mention that the object seemed robust and thus they were not concerned about placing their phone into the slot. A couple of the participants stated that the raised surface of the object made it feel like a stage and that the game itself felt more like an event because of the raised surface. However the experience of playing chess on this object was mostly noted to be quite similar to a regular game of chess and participants did not feel the need to check their phone during this engagement (Figure 42).



Figure 42. Documentation of Chess Board being used. Lu L., 2016

Reflection and Limitations

There were a number of observations made when participants interacted with the object and with each other. I further discuss the limitations, the practical considerations and the potential future improvements of the device in this section.

While observing the interaction of participants with the device, it was not clear to the participants if the phones had to be placed in the system in a particular orientation, i.e. sitting up or sitting down, facing towards the other person or facing towards themselves. Since the change on the surface was subtle and slow, the participants were not clear if the system had clearly identified their phone. The size of the slit also limited the use of the object to phones that were of a certain size and prevented phones of different sizes to be placed into the system. Similar to The Tete-a-Tete Table, this object did not have a very intuitive user interface and thus participants had to be informed of what they needed to do and what would then happen when they completed a certain action.

Having the ability to see the top of the phone meant that participants were still privy to notifications that might appear on their phone but the instinct to check their phone was subdued because they were aware of the explicit nature of what would happen if they did check their phone. This however would not be clear to

individuals if they had not been informed of the interaction. Also the current design of the object meant that the surface of the chess board slowly appeared and slowly disappeared thus allowing users to continue playing the game of chess even if the phone is taken out of the system for a short period of time.

This object requires a power source to be connected to the system and thus can only be used in a location with access to a power supply, I believe that unlike the Tete-a-Tete Table, this object can be used in a less intimate setting as the interaction with the device feels very close to how a regular chess board might be. Also the premise of playing a game engages both participants and asks them to focus on the task at hand without having to search for topics of discussion that The Tete-a-Tete Table engages users to do.

Reflective Summary

The Tete-a-Tete Table and The Your Turn Chess Board were designed to create opportunities for real world, face to face interaction between two individuals. Both objects are meant to be placed in a specific setting whose social nature has been altered due to the presence of the mobile phone. The objects encourage users to keep their phones away to create opportunities for interactions between two individuals.

My initial research showed that when individuals kept their phones away for one entire day, they only informed a handful of people that were closest to them without feeling the need to inform their larger community. The two objects in relation only ask the user to keep their phone away for the duration of the social activity which lasts for approximately one hour or less. The assumption made is that they would not necessarily need to inform people of their inaccessibility unless they were expecting to be contacted for a specific purpose.

Participants also repeatedly spoke about how their mobile phone related behaviour had become so habitual that their actions were almost involuntary. In response, both objects are designed to make mobile phone related behaviour explicit. When one user checks their phone, it affects the ability of the other user

to interact with the system. Thus creating a more obvious feedback loop and encouraging both users to be empathetic towards each other.

Another insight that surfaced from the user study was the urge to check one's phone between tasks and during moments of awkwardness and boredom. The objects respond to this behaviour by prodding users to be more comfortable with during these awkward pauses between activities that I call 'Empty Time'.

Through observations, informal interviews and critical feedback of both objects, I reflect on key differences between two objects. The interaction of The Tete-a-Tete Table is based on placing the phone away from visual line of sight to stop the surface of the table from moving thus as an action of stopping the system while The Your Turn Board acts in the opposite way where it asks the users to keep their phones away to make the surface of the board appear or in essence to activate the system. The context of both objects is quite different, the table is meant for a meal between two people where the activity of conversation and sharing a meal is central while the central activity of the game board is play and thus conversation may or may not occur during the social interaction. This also means that the types of people who would use the two objects would be quite different and the relationships that they had with one another would also differ. Two individuals who do not know each other very well could engage in a

game of chess but would not necessarily share a meal together as they would not know what to talk about.

Both objects also address the concept of 'Empty Time' in different ways. The table forces users to be more comfortable with the pauses in conversation and thus be more comfortable with moments of *empty time* while the game board does not explicitly create that confrontation with awkward moments as both users are engaged through a set of rules and through competition which allows both participants to ignore any break in conversation to focus on the move they are about to make.

The time commitment and proximity of interaction for both objects is also different. A meal between two people usually lasts about 45 minutes to an hour long while an average game of chess that I observed lasted for 30 minutes or less. This meant that the participants were engaged with each other for differing amounts of time and thus the opportunity for interaction with one another also differed. The table is relatively large which allows users to place multiple dishes of food on the surface while the game board is much smaller and thus both users must sit in closer proximity to each other while playing the game. I believe that the physical proximity afforded by the game accompanied by the rules of the chess made The Your Turn Board more engaging and thus users did not feel the urge to check their phone during the engagement.

Conclusion

With the advent of Internet of Things (IoT) into our everyday life and the increased dependence of millennials on social media for validation and community, this research project advocates for alternative routes for technological advancement. I create objects which push back against optimization and functionality to create time for individuals to spend with one another. This project encourages individuals to be comfortable with one another in the real world by creating constraints that force individuals to speak with one another. The two objects are designed to encourage face to face interaction between people without the distraction of mobile phones. I used the framework of Fogg's Behavioural Model to identify and alter behaviour to facilitate social interaction away from the mobile phone. My two research questions state:

1. How might the design of objects affect the use of mobile phones to create opportunities for real world social interaction between two people?
2. How might altering behaviour through Fogg's Behavioural Model impact social interaction?

My exploration of this research topic began with reflecting on my own relationship with the mobile phone by disconnecting myself from the outside

world and switching my phone off completely for three days. This exercise forced me be more aware of my own use of the mobile phone while also reflecting on the lure of what the phone has come to represent. By repeating the exercise with a handful of participants I was able to validate and qualify my initial ideas while forming my specific research question. I followed this reflection with a literature review to understand the broader implications of mobile phones on the psyche of the individual and on society and culture. I was introduced to the idea of 'sacred spaces' which must be created for conversation through the work of Sherry Turkle during this research. I expanded on this idea and decided to pick common social scenarios that had been changed because of the mobile phone. The social scenarios of a meal between two people and a game played between two players was identified as everyday social moments that had become less social because of the mobile phone.

By focusing in on a particular social scenario, I was able to determine the mode of intervention that took the form of physical objects that were central to the social activity. Using Fogg's Behavioural Model as a framework, I followed a condensed eight step process as suggested by Fogg to design a system that identified simple target behaviour and altered the probability of action by changing the triggers, ability and motivation of that specific action. By designing and making two different objects: The Tete-a-Tete Table and The Your Turn Chess Board, I compare two different approaches to facilitate social interaction.

The Tete-a-Tete Table encourages the user to remove the visual trigger of the phone from the scenario while The Your Turn Chess Board is designed to reduce the motivation of players by making their actions explicit and leveraging social acceptance or rejection as the driving force behind the target behaviour.

I also chose to focus my intervention outside of the mobile phone itself by limiting the interaction with the physical form of the device by hiding it away and attaching new social norms around its use. This choice was made based on the technological limitations of the project as well as based on the work of Shalini Misra et al. who conducted field experiments in the social setting of a coffee shop to understand the affects of having a mobile phone that had been turned off in the peripheral sight of individuals (2016). As discussed before, her findings showed that the conversation had between individuals were adversely affected by the presence of the physical form of the phone even when switched off.

I believe that The Tete-a-Tete Table and The Your Turn Chess Board are not meant to be released into the real world as the interaction with the objects is not intuitive and the context for use needs to be explored further. I do however believe that the insight gained in building and observing participants interact with the objects will further inform the design of future projects as well as help designers and technologists imagine future interactions with technology that are

not screen based while also being more aware of the unplanned ramifications of being always connected.

Future Research

Both devices were always meant to alter the way people interacted with the mobile phone. I am interested in conducting real world testing of both objects to understand the rituals that might emerge from extended use of the two devices in different social scenarios.

I am also interested in finding technological and design solutions that would give people more control of their mobile phone usage as well as provide them with a means of filtering information in the form of notifications by defining what might be more important to them in different social scenarios. I.e. Is a work related email important to a person when having a meal with their partner or is a Facebook notification important while spending time with one's family. At the moment, users do not have the ability to identify what might be important and what might be a frivolous distraction that comes from the mobile phone until they actually check their phone. As a designer, I would like to give users the ability to make these choices and set their own parameters for what might be important and thus be able to define the importance of signals coming from the phone. Based on the findings of the initial user interactions with the objects, I am also

interested in creating systems that encourage users to take permission from one another to check their phones during social engagements.

This research project attempts to bring concepts of design and behavioural sciences together to create new ways of interaction in the real world to facilitate social behaviour. I believe that this exploration is very much at a nascent stage of development and the overall vision of this project beyond this paper is to build on knowledge that would inform the design and development of commercial products and services that facilitate real world social interaction between individuals.

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Appendix A

Quotes collected from journal entries

- I told my boyfriend as we usually talk everyday
- Told me close friends and family that they should not worry about my unavailability
- Told my parents and my sister that I'll be offline as they are in another country
- Usually use phone as an alarm or to check the time.
- I use my phone as an alarm so I started the test after waking up with the phone alarm
- I had to switch on my phone and put it into airplane mode so I could use it as an alarm
- Haven't felt the need to put a wall clock in my room until today, wanted to check the time
- Having the phone visible acts as a trigger to check it.
- it's okay, I'm not anxious but when I see my phone, I want to check it
- Everytime I saw my phone, I thought I should check it

- I usually move around when I'm working and when I came into the room with my phone, I immediately felt that I needed to check it without even thinking and I didn't have control
- When I'm bored from work, I usually check Instagram
- While everything was being put on the table for breakfast, I had a moment to spare but couldn't check my phone for a random update
- Everyone was checking their phones on the subway and I was sketching them as they checked their phones
- As long as they can get in touch in case of emergency, users were willing to do this exercise for a longer period of time.
- I think I could do this for even a week as long as there was a way that in case of emergency, my family could get in touch with me
- I don't miss FB or whatever but think it would be hard not to talk to my family
- I tried doing things that I'd usually do without my phone like playing the Ukulele
- Glad I can nap in bed as I'd usually be checking my phone instead
- I don't want to wash the dishes without listening to my podcasts
- Being connected through smartphones gives the user a sense of control.
- Feels weird leaving home without my phone as if something is missing

- I don't speak with my parents everyday but knowing that they are there makes a big difference
- I may feel isolated at times
- My aunt said that I am usually very distracted and don't pay attention to important conversations because I'm on the phone
- I tend to get easily distracted when I'm tired with work even after short periods of time
- Counting down the clock until I can use the phone again
- When it was almost time, I couldn't think of anything else and I only wanted to check those messages

Appendix B

Transcript of conversation with BJ Fogg

I think the problem you've picked is a really good one, in fact I've had 3 or 4 calls from journalists including one from Forbes and they are asking me about the problem with technology and I'm saying well the fact when I'm at a family event or at dinner and people are being distracted by their phone, the problem is a real one.

I think that if people were to purchase this and put it in their home, they would probably use it. This looks special and they would use it.

What you are doing here is removing the visual trigger and you also changing the environment and that is a powerful way to change behaviour.

If you have a person willing to change their environment, you've got a pretty willing user group to change behaviour.

I thought this is a restaurant product,
If you watch carefully at a restaurant, even if someone else picks up their phone at another table, that seems to trigger other people to pick up their phones as well.

Getting the phones out of site

You're changing the attitude and the atmosphere of the restaurant and that's pretty valuable.

People naturally design their own environment to enclose their behaviour and we do that all the time. There's something on the kitchen counter that I'm suppose to read so when I walk over there I'll pick it up. There are some packages that I need to open so I put them on the counter so I'll open them.

But what if I don't want to move my phone or if I don't want to exercise how would I do that.

A long time ago, in 1992 I had a bicycle built for my sister who was living with me and the tv would not turn on unless she was peddling the cycle and so that was a deliberate action.

It was my home and if she wanted to live

The distinguishing point is if people are doing it to change their own behaviour or are people doing it change other people's behaviour. And how does that work or doesn't work.

I can imagine someone buying this table but teenagers not liking it and it's attempting to change someone else's behaviour.

Appendix C

Questions asked during interview

Table Interview questions:

1. Tell me about your relationship with the person you had lunch with?
2. Based on today's conversation, describe the person you had lunch with?
3. Did you learn something new about the other person? What did you learn?
4. Were you distracted by the sound and movement around you?

Game Interview questions:

1. Do you play board games often? What is the best part of playing board games?
2. Do you feel like you need your phone to be on you at all times?
3. Have you ever spent time having your phone out of sight or off for extended periods of time?
4. What were your initial impressions of the object?
5. How was your experience playing chess on this board?
6. How did it feel not having your phone during the game?
7. Is this experience different from when you play board games with friends on a regular board?
8. In terms of engagement levels and focus, was this experience any different from other games of chess?