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by

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Design for Reflective Behavioral Change

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Design for Reflective Behavioral Change

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Report

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This report is dedicated to my dearest parents.

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Abstract

Design for Reflective Behavioral Change

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This report is concerned with using design to encourage reflective behavioral change through the use of everyday objects. Many designers have studied behavioral change in the context of sustainability and social interaction through information technology in the field of industrial design. While lacking of enough philosophical depth, those designs are mainly adopting symptom-focused approaches, which does not lead to a meaningful experience for users. The goal of the report is to create a reflective experience for behavioral change. My approach is to create a sense of situatedness, which is a holistic experience revolving around a product where designed artifacts recursively derive their meaning and is simultaneously the object of interpretation. This text will illustrate how the strategy of “playful disruption” can be applied to achieve the sense of situatedness in its three different levels: Action, Environment and Nostalgia. If the outcomes are intended to achieve reflective behavioral change, I contest that both playfulness and disruption are necessary; the strategy of “playful disruption” is most effective when applied in a subtle way. While studies of behavior change tend to focus on technology use, this research suggests that behavior change can be initiated in the

physical environment through redesign of everyday objects and that subtly disrupt everyday routines.

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Introduction

As the world has become more complex, massive overconsumption and globalization have caused intricate social issues that impact our lives. Because social issues usually involve behaviors that play a significant role in initiating a desired change, the power of design -as an intentional means to change people's behavior has gained increasing interest. Designers are then increasingly motivated to bring changes to our everyday life for a better society.¹

Products that are designed to change a user's behavior have been developed over the past decade. For example, Fogg² introduced the term "persuasive technology" in 2003 in the field of software related design which aims to change people's behavior through persuasion. Lockton, Harrison, and Stanton³ have created a tool called Design with Intent Toolkit which provides an overview of strategies that can be used to sculpt behavior through design. Chapman explains, "the mainstream has become technocentric, incorporating contemporary technologies within archaic product typologies."⁴ However, "these sustainable design methodologies lack philosophical depth, adopting a symptom-focused approach comparable to that of Western medicine."⁵ In other words, these strategies focus more on what influences a user's decision-making process instead of creating a more meaningful experience of using products. I believe that because of

¹ Tromp, Nynke , Paul Hekkert, and Peter-Paul Verbeek. "Design for Socially Responsible Behavior: A Classification of Influence Based on Intended User Experience." *Design Issues* 27, no. 3 (2011): 4.

² Fogg, B. J.. *Persuasive computing: technologies designed to change attitudes and behaviors*. San Francisco, Calif.: Morgan Kaufmann ;, 2003.

³ Lockton, Dan, David Harrison, and Neville A. Stanton. "The design with intent method: a design tool for influencing user behavior." *Applied Ergonomics* 41 (2009): 382-92. Print.

⁴ Chapman, Jonathan. "Chapter One: The Progress Illusion." In *Emotionally durable design objects, experiences and empathy*, 25. London: Earthscan, 2005.

⁵ Ibid.

current practices of overconsumption, the experience of using a product should be richer and more influential to the users.

My goal is to create a using experience that facilitates reflective behavioral change through everyday objects. In other words, the interaction with everyday objects will help to sculpt people's behavior and also create self- reflection on users' behavioral change. In this report, I define three characteristics of this experience leading to reflective behavioral change, which I also call "situatedness"⁶ . Through both literature and practice review, along with my own experimental practice, I develop a strategy of "playful disruption" to achieve situatedness. I then present a framework that explains different levels of situatedness along with my three design practices to clarify when and how to apply this particular strategy.

⁶ Laurel, Brenda. "People." Design research: methods and perspectives. Cambridge, Mass.: MIT Press, 2003. 30-38. Print.

Chapter 1: Literature Review

OBJECTS THAT INFLUENCE BEHAVIOR

The idea that objects can sculpt people's behavior is not new; it has been studied by many psychologists and sociologists. Latour⁷ approached the implications of objects in terms of influencing behavior with the concept of "scription". "Latour distinguished 'inscription', which refer to the effects on a user's action that are intended by the designer, from 'prescription', which concerns the actions a product allows the user, and 'subscription', which explain how users interpret these prescriptions."⁸ Latour used the example of the speed bump to explain that the designer inscribed the message of "drive slowly" in the speed bump through the form, which leads to the prescription to slow down. The user then interprets this message and will slow down their vehicle. Latour concluded that "a society as complex as ours requires that the entity with which we deal in our daily lives script simplifying behavioral routines for us."⁹ We can see from the speed bump example that in the context of speeding issues, the speed bump embedded with "slow down" script is a powerful solution to change people's behavior.

While Latour explains artifacts as having the designer's intentional implication, Verbeek explores how design can influence behavior more implicitly and unintentionally. "Verbeek says that a product is not a neutral intermediary but a device that actively mediates the relation between a user and his or her environment."¹⁰ He uses the example of the microwave to explain how design can guide our behavior without determining it.

⁷ Bruno Latour, "Where Are the Missing Masses? The Sociology of a Few Mundane Artifacts," in *Shaping Technology/Building Society: Studies in Sociotechnical Change*, ed. W.E. Bijker and J. Laws (Cambridge, MA: MIT Press, 1992).

⁸ Tromp, Nynke, Paul Hekkert, and Peter-Paul Verbeek. "Design for Socially Responsible Behavior: A Classification of Influence Based on Intended User Experience." *Design Issues* 27, no. 3 (2011): 4.

⁹ Ibid.

¹⁰ Ibid.

Since microwave makes it so quick and easy to make individual portions of food, families might have fewer dinners together than they did before.

These two examples show different ways in which design affects behavior, whether it is intended or unintended by the designer. However, until recently few have taken into account for how the user might experience the object and how this experience could change his or her behavior and thought process. This is important because it is where conscious self- reflection could happen. When people interact with an object, the experience reaches far beyond the object's functions. By questioning what the experience is and how could it be, we can then understand how an object can sculpt users' behavior in a more meaningful way.

EXPERIENCE OF USING AN OBJECT

To Jean Piaget, a meaningful experience with an object is to provide users with knowledge. In his article Genetic Epistemology,¹¹ Piaget explains that to know an object is to act upon it. During interaction with an object, the logical knowledge is not abstracted from the object that is acted upon, but from the user's action itself.

Piaget's idea implies that a user's reflection on the action upon the object is more important than the response to the object itself in terms of to gain knowledge from the situation. This reflection helps to generate a more holistic experience of use, which Neils Diffrient¹² talks about as "the aesthetics of the whole situation", by this he means "the holistic experience revolving a product", which includes people, a product and awareness

¹¹ Jean Piaget, "Genetic Epistemology," in *Evocative Objects: Things We Think With*, ed. Sherry Turkle (Cambridge, MA: MIT Press, 2007)

¹² "Niels Diffrient rethinks the way we sit down | Video on TED.com." TED: Ideas worth spreading. N.p., n.d. Web. 24 Apr. 2012.

<http://www.ted.com/talks/lang/en/niels_diffrient_rethinks_the_way_we_sit_at_work.html>.

of a series of interactions with the product. In this way, the user, the object and the reflection on the interactions between them creates a sense of situatedness- through which the object recursively derives its meaning and is simultaneously the object of interpretation.”¹³

Many products that are aimed to change people’s behavior towards sustainability nowadays are adopting symptom-focused approaches. This will possibly lead to a worse massive overconsumption situation because of a user’s limited emotional response to the experience. This new approach of creating a more meaningful experience of use will not only make the products themselves more sustainable, but also it offers an opportunity to create a more meaningful behavior change: by letting people reflect on their behaviors.

¹³ Laurel, Brenda. "People." Design research: methods and perspectives. Cambridge, Mass.: MIT Press, 2003. 30-38. Print.

Chapter 2: A Practical Approach to Define Situatedness

In order to define what situatedness is and how it can lead to users' reflective behavioral change, I will describe a project where I researched recycling bins to explore characteristics of situatedness.

The recycling bin research project was done on the campus of University of Texas at Austin. After identifying several problems of the existing recycling bin system by making an inventory of all recycling receptacles, the goal of the project was to redesign the recycling bin system that would lead to a reflective behavioral change on recycling.

The problem of the existing bins (Figure 1) is that some people throw everything into the trash can whether it is recyclable or not. So the goal is to encourage people to think about what is in their hands as not just trash, but as useful and recyclable things.



Figure 1: The Recycling Problem on UT Campus

The beginning iterations of concepts (Figure 2) are based on two questions: how can a designer improve the communication of the recycling bins and how can a bin improve people's motivation to recycle? The first concept, called "letter bins," turns the usual two dimensional graphic way of communication into a three dimensional message. It creates a more dynamic experience by looking at each bin as a whole medium that

communicates its function. The second concept focuses on cues by utilizing visible utilizes transparent material for each bin. One advantage of it is that it makes it more direct to users to know the different functions of the bins by looking at what is already in the bins. The other advantage is that transparent bins make the relatively private activity of recycling clearly visible to the public, which brings a sense of social pressure. In this way, it improves people's motivation to recycle. The third concept focuses on feedback loop- recycling bins embedded with sensory-experience that can calculate how much CO2 is reduced based on how much the user recycled, and this feedback is visually accessible immediately after a user uses a recycling bin, which is also meant to improve people's motivation to recycle.

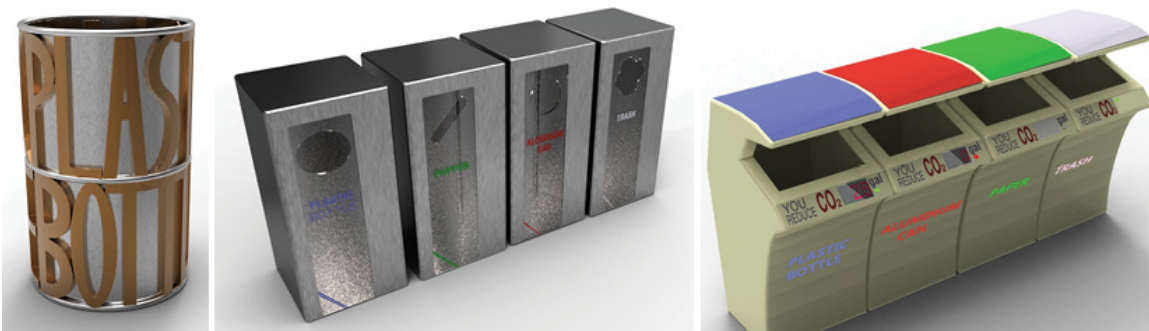


Figure 2: The Iterations of Recycling Bins Concepts

Since the second idea is more successful in terms of both improving both user's motivation and communication of each bin, which are both equally important elements in people's decision making-process, I decided to test the prototype of this concept in the field.

The field testing of the prototype (Figure 3) proved that the idea of transparent bin is successful in terms of guiding people to do the right thing. For example, in the previous research, people would throw coffee cups into either paper bin or trash bin. But actually

when paper is soiled by food or drinks, it is no longer recyclable. So in this new prototype, I put some coffee cups in the trash can in advance before testing. Seeing these cups prompted people to, throw their coffee cups into the trash can.



Figure 3: The Field Testing of a Recycling Bin Concept

One thing intrigued me during the field testing. Many people passing these bins would touch and to play with this rough, uncompleted prototype. Some even rested their bags on it for a while. This playful interaction with recycling bins led me to develop the concept further, transforming recycling bin into a playful game.

By playing with the scale of the recycling bins, the immediate action of throwing waste into the bin is slowed down into a more visible process. Considering the material of the waste itself, each bin is embedded with a different idea of game. For example, the colorful aluminum cans would form a sculpture itself inside the bin. For the paper bin, paper would fly slowly down to the bottom, which slow down the process of recycling and makes it more visible to the user. Plastic bottles from different heights would create different sounds. But there will not be anything for the trash can- as a way to try to discourage people from using it.



Figure 4: Final Recycling Bins Concept

The final concept is successful in two ways. Firstly, it sculpts people's behavior to recycle better by improving the communication and making it playful. Secondly, it initiates reflection on the recycling behavior through the unusually large scale of the bins and the playfulness of the materials. The exploration of the characteristics of the recyclable materials themselves (aluminum can, paper, plastic bottles) plays a significant role in both of these aspects. This subtle aspect of experience of considering easily ignored aspects of materials facilitates a reflective behavioral change to recycle better. My recycling bin project has Reflection, Playfulness and Subtlety, three elements lead to an experience of situatedness.

Chapter 3: A Theoretical Approach to Develop a Strategy to Achieve Situatedness

REFLECTION

The first characteristic of situatedness is reflection. Moreover, when using an object for a reflective behavioral change, people should not only reflect on the object they use, but also the action they operate upon the object. Similar to Kristina Niedderer's idea of creating mindful interaction,¹⁴ here I describe reflection as an attitude of both awareness and inclination to think. While Niedderer's idea of mindful interaction usually occurs in the context of social interaction, reflective interaction can be extended to other contexts.

In the article , Niedderer¹⁵ offers a systematic analysis on how to make the user aware of the interaction with an object and reflect on it. Niedderer calls this kind of object a Performative object. Niedderer developed a strategy of disruption of function to achieve this goal. *The Social Cups* (Figure 5) is a good example that explains this strategy: the shape of the cups resembles a upside down cone so that each cup cannot stand itself. Instead, the cups each have a little connector that makes it possible to stand when it is connected to another two cups. This interaction with cups facilitates people's interpersonal communication. The social cups utilize a disruption of function to make the user aware of this interaction and reflect on it. We can also see from this example that besides the disruption of function of the cups- their forms resemble a upside down cone, a second step is needed which provides a way of compensating for the disruption of function-each cup has a little connector that enables them to be connected and thus stand.

¹⁴ Niedderer, Kristina . "Designing Mindful Interaction: The Category of Performative Object." *Design Issues* 23.1 (2007): 3-17. Print.

¹⁵ Ibid.

Both steps are needed in order to create an attitude of both awareness and an inclination to think. There are two points needed to be addressed based on this article. Here the term “function”, as Niedderer addressed, is not only the efficient functionality through which we usually approach objects. Function also has its broader meaning that represents a preconception of plan of actions that proper to anything. For example, in the concept of my recycling bin, the disruption of the scale of the bin changes what we normally perceive the way we use the bin - under our horizontal line. This can be understood as a modification of the function in this sense. The other point is that Niedderer mainly talks about utilizing disruption of function in the context of social interaction, this strategy can be extended to other contexts as well.



Figure 5: *Social Cups*

Reflection, as the key aspect of situatedness, can be achieved through disruption of function. But I doubt that the reflection caused by disruption would also be effective to lead to behavioral change in some situations. Disruption without any wit or playfulness might lead to an annoying result in our daily life, which would discourage people to use the product or object.

PLAYFULNESS

Though disruption of norm can achieve the goal of reflection on the interaction with an object, it might not be efficient to lead to behavioral change alone without any wit or playfulness. Playfulness, as a strategy, has been practiced very recently for behavioral change issues. The Fun Theory, which is an initiative competition website, believes that “something as simple as fun is the easiest way to change people’s behavior for the better.”¹⁶ A playful experience, to my understanding, should include a certain degree of newness, wit and a sense of humor. It offers a more engaging experience for people to update, extend or revise their knowledge while using an object. It is more of a discovery process than just a surprising moment.

One example of the playfulness in design is the *Piano Staircase* (Figure 6)¹⁷. By making the stairs look like a piano that people can actually interact with to play music, this design encourages people to take the stairs instead of the escalator.

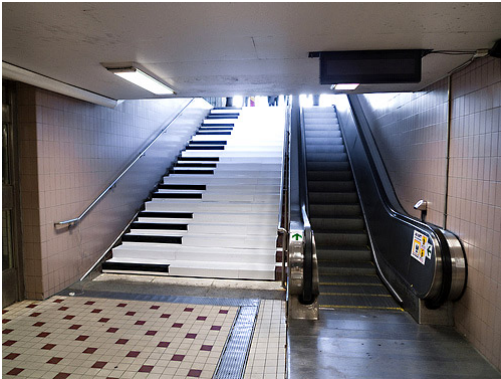


Figure 6: *Piano Staircase*

¹⁶ "The Fun Theory." The Fun Theory. N.p., n.d. Web. 25 Apr. 2012. <<http://www.thefuntheory.com/>>.

¹⁷ "Piano Staircase | The Fun Theory." The Fun Theory. N.p., n.d. Web. 25 Apr. 2012. <<http://www.thefuntheory.com/piano-staircase>>.

SUBTLETY

“It is common to hear of user experiences defined in terms of their intensity or power; yet to measure experience in this way is actually counterproductive in a number of instances. Contrary to popular misconception, it is the subtle and more ephemeral user experiences that penetrate the psyche through the slow and steady passing of time.”¹⁸ It is not true that people who love rock music is just because it is usually aloud, or achieving 0 to 100 MPH in four seconds in a sports car is just because it is fast. It is more ephemeral experience like the emotions rock music brings to you to be brave to do something you are afraid of to do before, or the feeling of control a car by a nice feeling steering wheel that penetrate our memory and calls for our revisit in our memory. Those experiences will grow every time we go back through and will create something new in our mind. “Therefore, measuring experiences in terms of their apparent intensity is unhelpful as it fails to designate the long-term efficacy and potential durability- of the experience itself.”¹⁹

In this report the idea of subtlety is focused on the degrees of disruption and playfulness and how they can work well together. In many cases, subtlety is opposed to discontinuity between things. Subtlety means a smooth flow of experience with something rich in it, while disruption always leads to a discontinuity of an experience. So subtlety to disruption means the right degree of disruption which will keep the continuity of the experience and also bring something new in it. Subtlety is also opposed to intensity. Subtlety is something we will not notice until we engage with it, while intense playfulness will exhaust our curiosity and the enjoyable interaction with an object deteriorates quickly. So subtlety to playfulness means something enjoyable will be

¹⁸ Chapman, Jonathan. "Authors of Experience." *Emotionally durable design: objects, experiences and empathy..* London: Earthscan, 2006. 83. Print.

¹⁹ Ibid.

discovered every time people go back to it. So the right degrees of disruption and playfulness will enhance our experience and encourage us to think. In many occasions when disruption becomes playfulness, subtlety comes naturally.

The first design example is to illustrate the concept of using disruption in a subtle way to change people's behavior. It is a *Toilet Paper* by Shigeru Ban (Figure 7).²⁰ By changing the shape of the tube in the middle to a square instead of circular, it gives some resistance and makes some sounds when being pulled by people. In this way, the toilet paper subtly influences people to use less paper than they do normally.



Figure 7: *Toilet Paper*



Figure 8: *Fly in the Urinal*

Another example explains the subtle relationship between disruption and playfulness. It is called *Fly in the Urinal* (Figure 8).²¹ The idea is simply to put a fake plastic fly attached in a urinal to make men focus on their urine flow. This playful disruption turns out to keep bathrooms 85% cleaner after utilizing these urinals.

The three characteristics: Reflection, Playfulness and Subtlety, will help to achieve the sense of situatedness and create a holistic experience when using an object,

²⁰ Hara, Ken'ya. "Re-design: daily products of the 21st century." Designing design. Baden, Switzerland: Lars Müller Publishers, 2007. 42. Print.

²¹ "Urinal Fly." Urinal Fly. N.p., n.d. Web. 26 Apr. 2012. <<http://www.urinalfly.com/>>.

which will finally lead to a reflective behavioral change. To my understanding, situatedness is a holistic experience with smooth flows of interactions, with something rich in it, which leads the user to discover something during the interactive process. The strategy to achieve the goal of situatedness is what I call “playful disruption,” which is most effectively applied in a subtle way.

Chapter 4: A Framework of Situatedness

In order to apply the strategy of “playful disruption” to different situations, I need to develop a framework to identify situations. I called as framework of situatedness. As I mentioned above, situatedness means a holistic experience when using an object, where users have three levels to reflect on which would lead to a behavioral change. The first level is when people act upon an object, they will reflect on their actions themselves, which tell them what exactly they are doing at that moment. Another level is to reflect on what these actions influence or change in the environment where the user is located. This reflection on the changes in the environment will direct people back to think about their own actions, and then lead to a reflective behavioral change. The third level is to reflect on a past experience which is triggered by the present moment in people’s memory. This sense of nostalgia directs people back to the present, and then this leads to a behavioral change. These three levels of situatedness- action, environment and nostalgia - offer a framework to understand how to apply “playful disruption” to achieve situatedness. Followed are three design projects focusing on different levels of situatedness.

ACTION

Everyday objects that we use become so natural to us that it is difficult for us to step back and to be aware of the interactions and of their influence on our behavior. The unthinking interactions with common objects are ubiquitous in the massive consumer goods. In order to initiate a reflection on a user’s behavior, the first step is to make them be aware of the actions upon on the object. A project, *The Chopstick Rest* (Figure 9), illustrates how to let people be aware of their behavior and guide them to act a certain way by adopting the strategy of “playful disruption”. *The Chopstick Rest* concentrates on

one inappropriate way of resting chopsticks: placing chopsticks separately, which implies breaking off your relations with your dining partner. The goal of this project is to allow people to realize this action is impolite and to guide diners to rest chopsticks in the correct manner.

The Chopstick Rest is designed to guide the user to appropriately rest their chopsticks through its form. The Rest is comprised of two identical parts that, when used separately, the curved body forces the chopsticks to undesirably roll off onto the table. This disruption of function is meant to create an awareness of the user's own behavior and to allow the user to realize that this behavior might be wrong. Playing with the two identical parts of the Chopstick Rest will reveal that they interlock creating an affordable area in between which is the appropriate resting position. The process of failure then play followed by discovery and success is designed to interactively teach proper use of chopsticks so that the message is communicated in an effective and memorable manner.

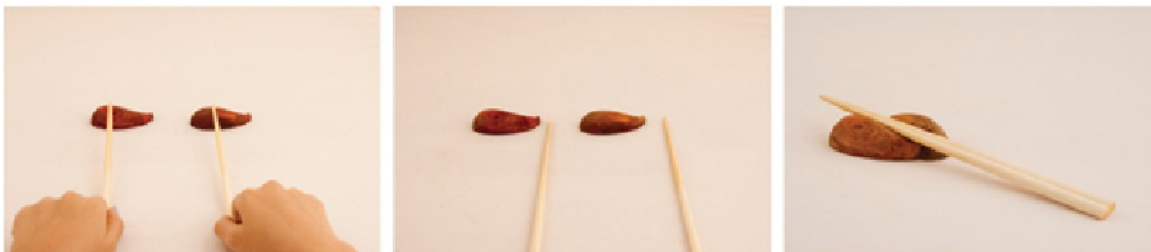


Figure 9: *The Chopsticks Rest*

Thinking from the perspective of a user's action is appropriate for those projects which focus on either the right or wrong behavior. Instead of teaching a user in a didactic way, the method "playful disruption" turns instructions into an intelligent and meaningful experience.

ENVIRONMENT

In the context of people's social behavior, it is necessary to think bigger. By putting their actions in the environment around them, the actions create an impact on the things or people around them. By making people aware of the change in the environment triggered by their own action, it will then sculpt their behavior to the intended way.

The project *An Interactive Bench* (Figure 10) is meant to encourage interpersonal communication in public places. I am intrigued by the subtle ways an environment changes when one person approaches another. Consider when a person is passing by you; you feel a slight breeze and sense their presence and soon after, both are gone. I use this notion of momentary, subtle motions to develop a point for interpersonal communication.



Figure 10: *A Interactive Bench*

Due to a single air cushion underneath all of the seats, when one person seats down, the rest of the seats will be forced upwards by the expansion of air in the cushion. Then the air slowly leaks out of the cushion returning the seats to their original level relationship. By creating a moment that is more interactive and playful than usual, I am challenging both the physical and emotional boundaries that separate people in order to provide an opportunity for communication between them.

NOSTALGIA

If levels of action and environment are only focused on the current situation, the level of nostalgia is to try to connect a current situation with a person's past experience or memory. By bringing people an emotional response through a similar situation in their memory, it will lead people to reflect on their current situation.

The project *Read More / Watch Less* is to encourage people to read instead of watching too much Television. The concept is that as the user watches television, an image of firelight appears on the screen of their remote control. Over time, the flame intensifies as an alarm to indicate excessive TV watching and obscures the remote interface. With the intensity of this fire/alarm, the object shifts from being a working remote to something that must be addressed—by putting it back into its holder and thus becomes a reading light.



Figure 11: *Read More/ Watch Less*

Additionally, by presenting the warm image of firelight within the home, the hybrid object evokes a sense of nostalgia for the forgotten pastime of families gathering around the fireplace to read together. The transformation of the remote into a reading lamp by placing it on the base in turn encourages the activity of reading which places the user into the time families gathered around the fireplace instead of the TV. Through this

pleasant association, I try to create an aspect of reflection on the current situation and encourage people to read instead of watching TV.

Chapter 5: Conclusion

These projects illustrate a designer's approach to achieve reflective behavior change- by creating an experience of situatedness. Situatedness is a holistic experience revolving around a product where designed artifacts recursively derive their meaning and is simultaneously the object of interpretation. Situatedness should include three elements: Reflection, Playfulness, and Subtlety. This text also illustrates how the strategy of "playful disruption" can be applied to achieve the sense of "situatedness" in its three different levels: Action, Environment and Nostalgia.

Future research may further be concerned with more design practices of the concept. Concern for applying the knowledge gained through using physical objects to digital environments and interactions with ubiquitous technologies, which I believe will help me to broaden my understanding of this concept and will also lead to other new design strategies.

Glossary

Situatedness: a holistic experience revolving an artifact where designed artifacts recursively derive their meaning and are simultaneously the object of interpretation.

Disruption: a break into an established patterns of perception.

Playfulness: an engaging experience for people to update, extend or revise their knowledge with certain degree of newness, wit, and a sense of humor when using a designed artifact.

Subtlety: a smooth flow of experience with something rich in it, which we will not notice until we engage with it.

Action: operation acted upon an artifact.

Environment: a situation with multiple actions or other elements that can be changed by changing the action in this situation.

Nostalgia: some kind of emotion triggered by the comparison of a past situation/ experience with the present in one's mind.

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