A Look into the Design Process:

Theory Driven Design for Behavior Change

by

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A Thesis Presented in Partial Fulfillment
of the Requirements for the Degree
Master of Science in Design

Approved November 2019 by the
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ARIZONA STATE UNIVERSITY

December 2019

ABSTRACT

As the designer is asked to design, create, or simply solve a problem, many factors go into that process. It generally begins with defining the scope or problem that undergoes an iterative process utilizing different tools and techniques to generate the desired outcome. This is often referred to as the design process. Notwithstanding the many factors that influence this process, this study investigates the use of theory for behavior change and its effect on the design process. While social behavioral theories have been extensively discussed in the realm of design, and a well-developed body of literature exists, there is limited knowledge about how designers respond to and incorporate theory into their design process. Fogg's *persuasive design* (2003), Lockton's *design with intent* (2009) and Tromp's *social implication framework* (2011) stand as exemplars of new strategies developed towards design for behavior change that are able to empower designers' mindsets, providing them with a uniquely insightful perspective to entice change. Instead of focusing on the effectiveness of the design end product, this study focuses on how theory-driven approaches affect the ideation and framing fragment of the design process. A workshop case study with senior design students was utilized with focused observations and post-workshop interviews to answer the research questions. This study contributes by providing a useful method of documenting a behavioral economics theory to the design process in a workshop setting. It also provides insights on how behavioral change theory application can be incorporated in a segment of the design process.

DEDICATION

I dedicate this work to my wonderful family for their continuous help and support. I am most thankful for my husband Saud, for his fierce support and encouragement since the beginning of my graduate journey. Without him, this accomplishment would not have been possible. I would like to express my gratitude for my parents for always supporting and motivating my education journey. The emotional support I had from my siblings kept me going when I doubted myself. Last but not least, to my beautiful Shaha thank you for always being my inspiration and the light of my life.

ACKNOWLEDGMENTS

This work would not have been possible without the support of many. Firstly, I would like to express my deepest appreciation for my committee chair, Professor Mauricio Mejia, who has continuously supported me throughout the whole process. Without his guidance and generous time and patience, this thesis would not have been possible. I am also grateful to my other committee members Professor Alfred Sanft and Daniel Fischer for their continuous time, guidance, and for always being available despite their overwhelming schedules.

I am also grateful to Professor John Takamura for his strong support and guidance in preparing me for my thesis, along with his constant and genuine support since the beginning of my graduate studies. I would also like to thank Professor Lori Brunner and Professor Dean Bacalzo for their generous support in recruiting volunteer students from their design studio courses.

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CHAPTER 1

INTRODUCTION

"Theory-rich design can be playful as well as disciplined. Theory-based design can be as playful and artistic as craft-based design, but only theory-based design is suited to the large-scale social and economic needs of the industrial age." Ken Friedman (2003, p. 521)

When a designer is asked to design, create, or simply solve a problem, many factors go into that process. A designer could utilize his identity, experience and creative thinking to tackle the problem. There are different steps taken in which the problem is defined to finalizing the design [Figure 1]. Faculty and graphic design students at the Maryland Institute College of Art describe the design process to include defining the problem, getting ideas, and creating form. That process utilizes tools and techniques like brainstorming, sketching, mind mapping, interviewing and co-designing to generate an outcome (Lupton & Phillips, 2008). One factor that influences the design process is the designers' education that they acquired. Education equips designers with the necessary foundation in order to expand and thrive.

While design educators have different ways of teaching studio classes, they however mostly revolve around traditional visual design principles. Many theories directly related to visual composition are used for teaching design studios to create well-rounded artifacts. There has been a shift suggesting that approaches like co-design, human-centered design, design thinking, along with semiotic theory could be the basis for the practice of contemporary design (De la Cruz & Mejía, 2017, p. 84). This implies on how there is a

need to broaden the use of theory as design approaches changes from composition to communication and more recently social change.

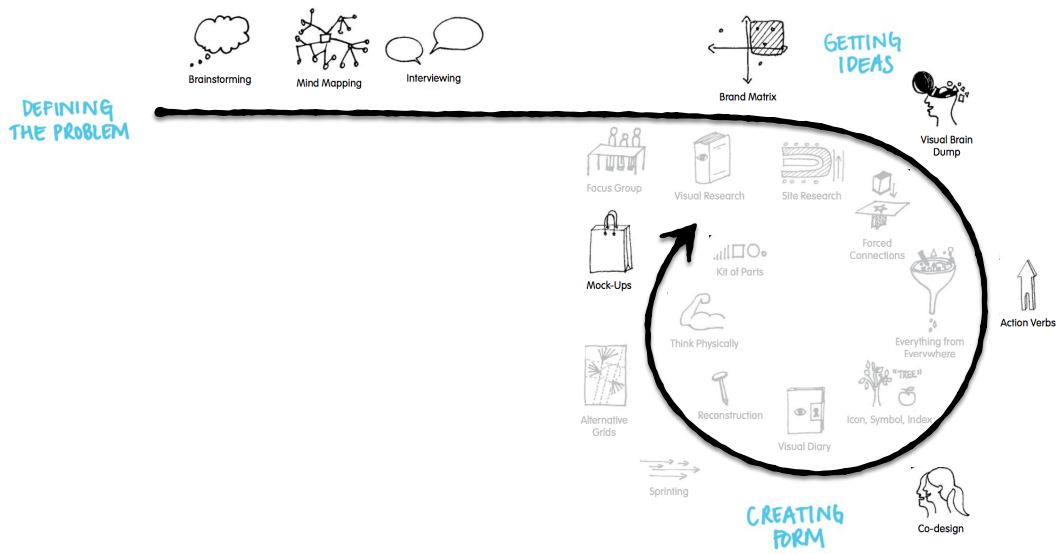

Figure 1. The Design Process (Lupton & Phillips, 2008).

In the literature, designers tend to borrow theories from different disciplines and use them for decision making. Theory-driven design connects the design process with concepts and ideas derived from certain theories and models. For instance, employing theories from social sciences to identify and maintain given desired behaviors has shown to be an effective tool in the design of communication campaigns (Fishbein & Yzer, 2003, p. 181). Previous research has reported theory-driven design cases; for example, Consolvo and colleagues (2009) draw from many social behavioral theories including the theory of *presentation of self in everyday life* and *cognitive dissonance theory* to drive the design process in a problem of health behavior change. Findings reported from their successful trials and experimentations contribute to the utility of applying theory to derive a new set of design strategies for persuasive technologies that motivate lifestyle behavior change.

Both of which are discussed further in Chapter 2 (see Theory-Driven Design for Behavior Change).

Theories in design are more relevant than ever due to the increasing complexity in the contemporary nature of design projects (Eastman, Newstetter, & McCracken, 2001). Todays human-centered design requires designers to understand theories of cognition. Also, in design for behavior change, designers appear to demand behavioral theory to design effective solutions. More studies have been focusing on empirically documenting the success of behavior change processes in design (Cash, Hartlev, & Durazo, 2017). The design for behavior change process is more strategic and differs from those in mainstream design because the latter are more based on intuition and the creative genius of the designer.

Theory is a model or principles derived from any discipline that can be an asset to practitioners. Friedman (2003) asserted that a designer is a "synthesist" who's tasks are widespread from a problem solver to a solution seeker. He claimed that in order to tackle complex problems, a designer needs to start with research, constructing a background and approach. Friedman attributes design failures to lack of method, knowledge and preparation and believes that theory-based design approaches enriches the creative quality of design. Although theory has been well regarded in recent design endeavors, it has yet to be tested as a vital foundation in any design process.

Although social behavioral theories have been discussed in the realm of design, there is limited knowledge about how designers incorporate behavioral theory in design practice. While theory is useful in all activities of a design process, some specialized theories such as behavioral economics are more useful in creative and ideation activities

(Mejía, Forthcoming). As a case study research, this thesis uses focused observation and post workshop interviews with senior design students to shed light on the application of theory within the design process. In particular, analyzing theory incorporation by focusing on how designers interpret and integrate theory into their ideation and decision-making phases. To do so, a theory from behavioral economics, nudge, is introduced to design student participants in their ideation session during a design workshop for positive behavior change. A qualitative study with an in-depth description on the student designer's practice is documented using methods of thematic analysis. Insights from this study provide two main primary contributions. First, it provides a useful method of documenting a behavioral economics theory introduction to the design process in a design workshop setting. Second, it contributes with insights on how theory application can prove formative in a segment of the design process.

CHAPTER 2

LITERATURE REVIEW

Design as a whole can be viewed as multi-faceted. It can combine a designers' education, creativity and curiosity. Through education, students learn the design process in addition to the different principles and guidelines of design. They also learn theories and approaches applicable to problem-solving and creating well-rounded products and services. In order to have well-rounded effective outcomes, it has been argued that theory is essential. This chapter begins with a brief overview on how design education can influence the design process. It is followed with cases illustrating theory-driven design and its use in the design process. The chapter concludes with a review of new strategies that have evolved with the purpose of design for behavior change by incorporating theories from psychology and human behavior.

The Design Process

In design education, studios are environments where students learn design by doing. In addition to learning basic design principles, students rely often rely on their creativity, problem-solving techniques and intuition. Many art, design, and architectural curricula are based on the Bauhaus ideology and their pedagogy (Lerner, 2005). Basic design principles like form, space, and contrast will always be the foundation of design, but with time new concepts and guidelines have emerged. Theories from language and perception like the Gestalt and Semiotics are perceived to strengthen designs. The semiotic theory is also argued to be as crucial as other contemporary approaches entering the world of design (De la Cruz & Mejía, 2017). Since then, there has been a change in the design world,

contemporary approaches have been instilling themselves into everyday design curriculums.

Design has been evolving throughout the years. In addition to market-led, consumer-based design production, now an increasing number of designers are shifting towards socially useful design (Thorpe & Gamman, 2011, p. 217-218). This shift has also been seen in design education. Traditionally, design studio teaching methods and approaches often focus on creative production along with visually related theories and models. It has been constantly evolving from composition to cognitive dominance.

Design education has been based on the master-apprenticeship model, in which instructors are expert designers that might not be able to explain the theory and principles that guide their actions (Frascara, 2007, p. 63). Students in design studio courses engage in an environment that promotes experimentation and failure with instructors that provide mentorship (Sawyer, 2017, pp. 109–110). However, it can be said that theory has rarely been a core component of the design education and design practice. The quality of the design process can be, to a significant extent, attributed to the efficacy of such models.

There have been many studies observing the designers' process. Professionally, Laing and colleagues (2015) describe the design process of practicing participants as: client briefing, research, conceptualization, mock-ups, sign off, and production. They described the ideation phase to include personal development, cognitive aid, communication of an idea, aesthetic of the client, aesthetic of the audience, and aesthetic of the market. They also reported some of the problems that designers faced. Those of which include "collecting material, costs and time associated with gathering these visual resources […]

diversity of media and devices that are used in the design environment, fixation on existing works during the design process, and knowing from where resources came" (2015, p. 1206) to name a few. Unsurprisingly, designers do not think about theory as a challenge in the design process.

A designer's mindset and approach usually forms in the ideation phase, where the inspiration, framing and molding of the project takes place. Kolko (2010) describes the process of synthesis as "an abductive sensemaking process" (p. 17). He also explains that a designer's creation is a combination of data manipulating, organization, pruning and filtering. This can suggest that theory is capable of driving, framing, and influencing the ideation process that can act as a powerful tool for designers. It is however yet to be tested.

Theory-Driven Design Process

Many factors can be seen impacting a design outcome such as aesthetics, functionality and purpose. Sometimes, problems come in different forms, and for a designer to tackle unfamiliar obstacles, equipping them with knowledge sheds new perspective to find appropriate solutions. Raein (2004) argued that integrating theory in studio teaching is essential. When theory, text and visuals are combined, he claimed students are able to attain a deeper understanding of their subjects. Rein further explains that approaches like empathetic design and problem-based learning also require students to seek suitable knowledge to attain innovative solutions. This knowledge can be from neighboring or broader disciplines. Theories, mindsets, and methods borrowed from other fields have also been proven to be effective towards the designed product. In a case study

of fashion design, Jung & Ståhl (2018) used a branch of philosophy called somaesthetics to elaborate somatic wellbeing through combining bodily perception and fashionable creations. On a more science-based approach, Gentes and colleagues (2016) brought together design and fundamental physics as an interdisciplinary approach for a design experiment, and stated that it played a "reflexive role on design practice" (p. 564). While seen as effective, in both previous cases introducing foreign theories into the design process, students struggled with digesting and implementing those theories within the design process. Additionally, time was considered as a limiting factor to comprehend complex concepts for design-oriented students. It may be suggested that, the more the concept is further away from the design discipline the more time students require to understand and implement it in their designs.

Initiating a project with applying relevant knowledge can be effective. Utilizing methods, mindsets and knowledge at the beginning of a design process may help steer the way a project is going. It can range from simple ideation techniques, user research, or evidence reflected from previous works. In design for behavior change, Lockton et al. (2010) *Design with Intent* tool focuses on modifying the design process to assist designers in achieving the "target behavior". It is used as a suggesting tool to strengthen a designers expertise, insights and creativity. In the inspiration mode the designers' are provided with six different "lenses" to approach design for behavior change. These lenses group design patterns with similar behavioral assumptions to act as "creative trigger" in the ideation phase.

Theory-Driven Design for Behavior Change

It is common to seek knowledge from other disciplines to accomplish behavioral change. Design for behavior change intentions was first observed in Don Norman's design psychology or the application of behavioral theory in design (Norman, 1988). Norman borrowed concepts from psychology and human factors research to enable designers with guidelines for well-rounded designs. Individuals and organizations are becoming more aware of the reality and potential to alter people's behavior. New strategies have been developed with the purpose of design for behavior change, like Fogg's (2009) *persuasive design*, Lockton's (2009) *design with intent*, and Tromp et al's (2011) *social implication framework*. The latter argues that the type of strategy used is based on the desired behavior and presents a framework that explains the relationship between the product, human behavior, and the implication of that behavior (Tromp et al., p. 6). Such models have the potential to empower designers' mindsets by providing them with a uniquely insightful perspective to entice change.

The *persuasive technology* model emphasizes the need of three specific factors to create persuasive designs (Fogg, 2009); namely, motivation, ability, and triggers. The model is a simplified practical theoretical framework that can be used to drive the design process. It also appears as a translation of behavioral theory for designers with limited treatment of original behavioral theory. Filippou et al., (2015) use a combination of the Fogg's *persuasive technology* model with a habit-forming model to design features in a persuasive mobile application to improve student's study habits. The authors focus on the ability and motivation triggers within Fogg's model to establish their persuasive system

design. However, the effectiveness of the application is yet to be determined once a prototype is created and tested.

Persuasive technology gadgets have shown to impact people's behaviors when approached with a different lens. Consolvo et al. (2009) used two theories from social psychology. *Presentation of self in everyday life* and *cognitive dissonance* theories, among others, were used in their experimental technological designs to increase people's everyday physical activity. Merging theories from psychology and design strategies can shape and sustain such positive behaviors. The authors propose a set of design strategies for behavior change based on the findings and theory. Results from their two case studies in the use of persuasive technology, validated their approach and strategy, and was successful in changing everyday behavior. Their claimed success in behavior change through the use of theory to derive design strategies provides insights on the effectiveness of theory incorporation in the design process.

Theories from social psychology have also been employed in design for behavior change. John and colleagues (2018) not only focus on how the visual stimuli plays an important role in triggering sensory determinants to encourage behavior they also incorporated Bandura's Social Learning theory into their co-design methodology. As a scoring matrix, the latter was used to assess the validity of a design prior to testing and implementation. This suggests combining different methodologies of co-design with fundamental behavior change knowledge can create effective long-term shift in healthcare behavior. The study however did not provide details about the role of theory in the codesign process.

Theories from behavioral economics have also been discussed within the design discipline to change human behavior. Nudges, a concept derived from Behavioral Economics, taps into a person's reflective or automatic thinking systems to influence behavior (Thaler & Sunstein, 2009). In design, the cognitive biases that exist in thinking systems can be utilized in favor of generating desired behavior. Mejia (forthcoming) asserts that nudges can be valuable in the inspiration phase of the design process but can't be regarded as design principles.

CHAPTER 3

METHODOLOGY

This is an exploratory study that uses case study research as the methodology. Case study research allows to understand and explain complex phenomena that are difficult to control (Yin, 2017). Senior design students joined a three-hour design workshop session which included different ideation cycles towards sustainable behavior change (Figure 3). Students were selected based on education and experience level. Those in their senior year are closest to being professionals in the practice of design and therefore were selected as the study sample. A combination of industrial, interior and graphic senior design students were recruited a week prior to the workshop with the help of their studio instructors. A total of nine participants, two males and seven females ranging from 20 to 33 years of age were involved in this study. Participants from each of the aforementioned majors, were assigned into three groups with different design disciplines and each tackled a unique design problem. The aim for the participants was to entice a positive behavior through their designs. The specific intentions were derived and discussed with ASU's University of Sustainability Practices. Shorter shower times, less plastic consumption, and increase multimodal transit were the three predefined problems. Design for behavior change was used as the intention of the ideation session towards the specific target behavior. This study received IRB approval to perform the workshop.

In the beginning of the design workshop, participants had time to ideate using post-it notes and sketch paper using their own framing and problem-solving tools [Figure 3]. The goal of the first session was to warm up and allow for a comfortable ideation activity that is unrestricted with a predefined theory. In the second ideation session,

participants were introduced to the nudge from behavioral economics through a short presentation supplemented with descriptive handout. They were then asked to go through the same process of the first ideation session, however this time using nudge concepts. Doing so is considered as a *method mindset* for designers as explained by Daalhuizen (2014). The introduction of nudge therefore acts as a *mental equipment* giving a frame of reference for the participants to produce effective inferences "about prerequisites and necessary conditions needed for an effective brainstorming session" (2014, p. 58).

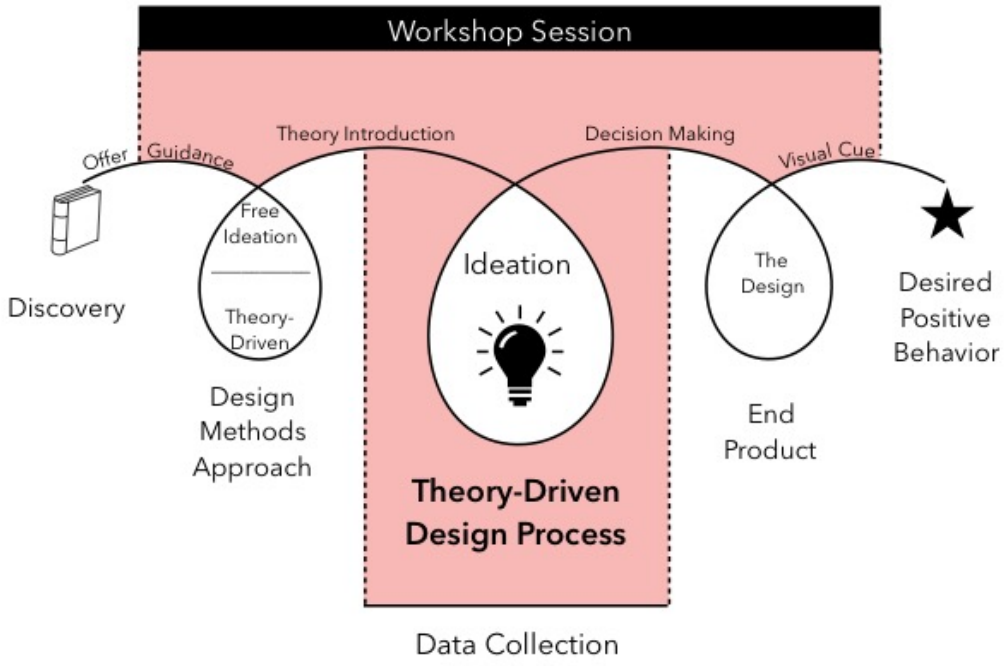

Figure 2. Framework of the case study workshop session.

The workshop was broken down into five phases within the three-hour session:

1) Preliminary Post-it Documentation (PPD): participants were asked to come up with as many ideas as they can and write them down on post-its (10 minutes);

2) Discussion and Sketching (DS): participants were asked to discuss then choose one idea and sketch it as a group (20 minutes);

3) Theory-Driven Post-it Documentation (TDPD): participants were asked to come up with as many ideas as they can and write them down on post-its (10 minutes);

4) Theory-Driven Discussion and Sketching (TDDS): participants were asked to discuss then choose one idea and sketch it as a group (20 minutes);

5) Storyboard Development (SBD): participants were asked to create a rough storyboard of their final idea (5 minutes).

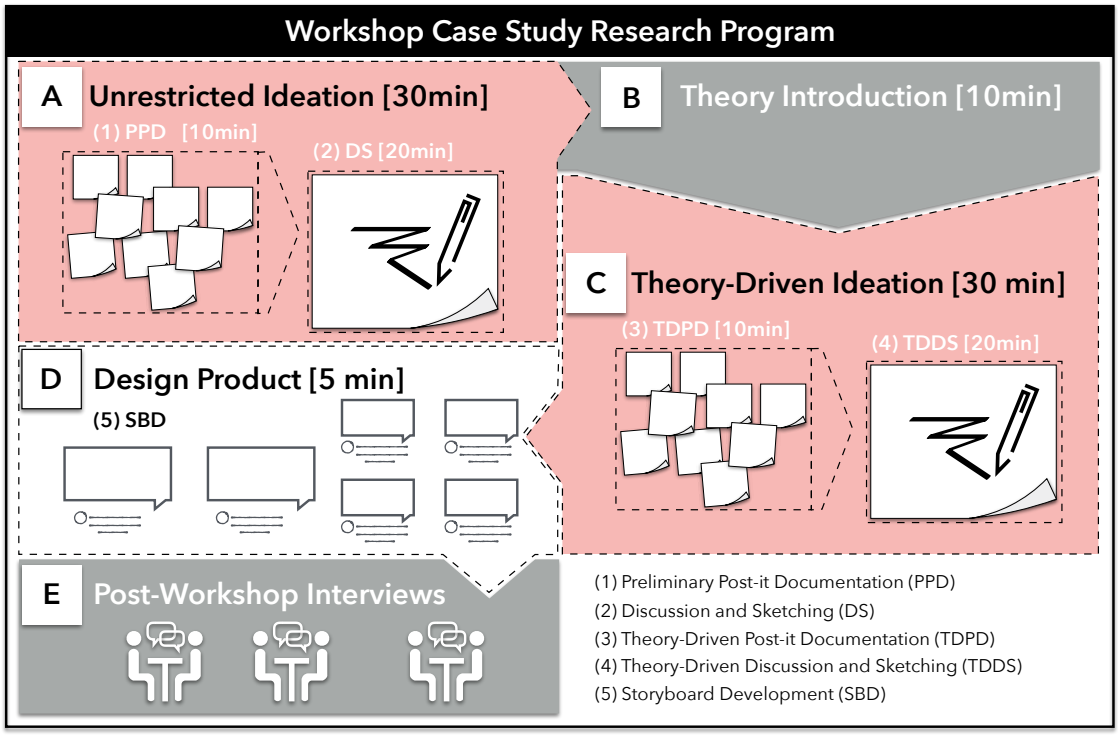

Figure 3. The workshop case study research program. **A.** Session One: participants worked through the design process unrestrictedly; **A.1.** Preliminary Post-it Documentation; **A.2.** Discussion and Sketching; **B.** Participants were introduced to the nudge theory; **C.** Session Two: participants worked through the design process using the nudge theory; **C.3** Theory-Driven Post-it Documentation; **C.4** Theory-Driven Discussion and Sketching; **D.** Storyboard Documentation; **E.** Post-Workshop Interviews.

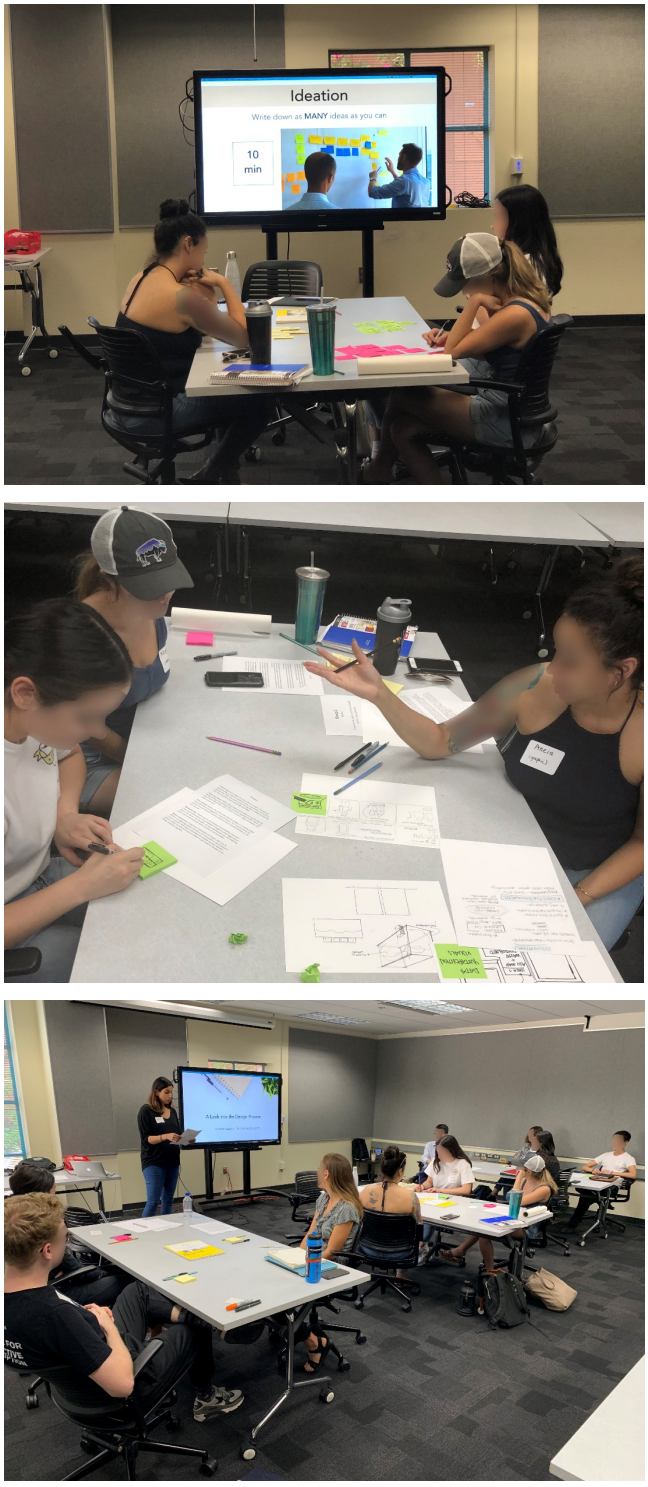

Figure 4. Photographs from the case study workshop session.

Data Collection

A qualitative approach is utilized to understand how participants incorporate and respond to theory in the design process (O'Leary, 2017). Since the objective was to understand the participants' design process, focused observations were conducted through-out their ideation process. Semi structured post-workshop interviews provided in-depth insights about the participants experience before and after theory introduction (see Appendix A for the interview guide). Participants articulated their thought process, idea inspirations and decision making. Data was collected with the intention of investigating what participants relied on in their ideation; whether it was past experience, concepts from other disciplines, or purely based on creativity and aesthetics. Elicitation techniques such as the free-recall method (Johnson & Weller, 2001) was employed in both post-it documentation phases (PPD and TDPD; Figure 3 A.1 and C.3). It was used to urge students in listing what they know about a certain topic. Audio recordings along with direct observations documented the participants ideation process and the different discussions revolving around framing and decision making. Specifically, data was collected to reveal the information and knowledge that participants relied on to come up with their initial ideas, and the changes happening after being introduced to the behavioral economics theory. All of which aim to answer the research question concerning the response and incorporation of theory in the design process.

Data Analysis

Data collected from both ideation sessions (DS and TDDS; Figure 3 A.2 and C.4) resulted in a series of audio recordings, written observations, sketches and notes provided

by the participants. The audio recordings from participant ideation discussions and post-workshop individual interviews were transcribed using Temi (*Temi*, 2019), an online speech transcription software. Results from the automated transcriptions were later manually edited for inaudible parts. Some recorded segments of participant discussions during the ideation sessions (DS and TDDS) were not audible and were therefore discarded from the analysis. Yet, all post-workshop individual interviews were audible and were therefore included in the data analysis. The collected data was then thematically analyzed (Braun & Clarke, 2006). The web-based software for qualitative and mixed method research analysis, Dedoose (*Dedoose*, 2018), was utilized to assist with coding the transcriptions and creation of categories. The validated transcriptions were thematically coded to focus on how the participants sought inspiration for their ideas and how they responded to the theory introduction. The coded data was then exported into a structured text format to be further analyzed. From there, coded text excerpts were extracted and grouped under similar themes to derive meaningful results. During the analysis process new codes surfaced, some were refined and others were discarded. Some themes were derived from the research question while others emerged during the analysis phase. (Table 1; See Appendix B for a sample of coded transcription excerpts).

Table 1. Thematic Codes

Theory Awareness Before Introduction
Design Education (Principals/Approaches)
Non-Design Theories
Design Processes
After Introduction to Nudge Theory (Response/Incorporation)
Personal Experiences and Cognition

CHAPTER 4

RESULTS

In this chapter, results of the analyzed data are reported in seven sections respective to the themes derived as discussed in the Data Analysis section of Chapter 3 and listed in table 1. The first section reports when students used design related principles and approaches in their design process. The second section reports when participants used non-design related theories in their design process. The third section reports how participants describe and approach their design process. The fourth section reports participant's previous awareness of the concept of nudge and behavioral theory. The fifth section reports how personal experiences and cognition impacted the participants' design process. The sixth section reported how participants responded to the nudge theory. And lastly how participants incorporated the nudge theory in their design process.

Influence of Design Education in the Design Process

Five participants reported that in approaching problems they initially apply what they learned in their design education including brainstorming tools and design principles. Participant 6 stated:

> Like in my studio classes I always like sketch the problem first either like with words, just like ideas and your like mind mapping it or even just like sketching it with the pencil first and like, because it's much faster to do with a pencil than in the computer.

Additionally, Participant 8 said “it's my education, what I've learned about, you know, typography and grids and balance and then a lot of it is, is just instinctual”. Four out of the nine participants expressed their approach being revolved around the end user and using design empathy to relate to the user. For example, Participant 1 mentioned “[S]o it's like really putting, it's like a lot of empathetic understanding to really put yourself in the user's shoe[s] and like understand like what do they need from this and do it”. This was confirmed by Participant 5 who said “[I]'ve just tried to put myself in people's shoes”. Participant 8 referred to her approach as a combination of personal experience, education and living life, as she expressed that “it's definitely a melting pot of my experiences, both with my formal education and just living life.”

Presence of Non-Design Related Concepts in the Design Process

Four participants said that they used their knowledge in marketing and advertising in their designs. Participant 1 says “I definitely think like digital marketing, advertising, especially with something like this like would be pretty I think pretty effective. And I was like, wow, this is the power of advertising”. Other participants mentioned disciplines further away from the design field influencing their designs, for example participant 4 stated the following:

> I'm taking sensation and perception right now for my psychology minor. So I have a little bit of background in psychology. So like thinking about [things] like motivation and perception and how the brain works and how we intake stimuli like a lot of that it just like comes naturally to my brain and like knowing how we form habits.

Participant 7 also mentioned other concepts which affected her design process, saying:

> I really took my meditation class and I have, I take a meditation class, um, with The Design School, it's like a, it's taught by an architect. So it kind of teaches you how to handle a design and everything with mindfulness.

Participant 2 mentioned the importance of psychology by saying “I think we should hand back into research and data and psychology, design is really all that impacting human behavior”.

The Design Process Between Research, Functionality, and Brainstorming

Of the nine participants, five participants talked about their design process. Two of them reported that they start with research; for instance, participant 5 stated: “I like to do research, before I start ideating. So it was really interesting for me like trying to like just come up with something just made reading like a little brief that you guys gave us”. Participant 1 elaborated on the role of research saying:

> I guess mainly when you're given like a studio brief project, a lot of it is really up to you how deep you go into that research, how deep you go to that problem solving, right? So each time we're given that brief, it's really up to the student to, you know, how much you want to learn, how much you want to improve and how deep you want to go into this problem.

Three out of five stated that they initially focus on functionality of the design and later on the aesthetics where participant 5 said “we can kinda lay out like the features, the

benefits of the idea that we have and later on like actually like develop the aesthetics". Three out of nine participants said that they start their design process with sketching their ideas, for example Participant 8 stated:

> So I mean the foundations all there, you know, I think of, I think of like an idea and whether I'm sketching it, cause a lot of times in school I will draw things out and try it and you know, go back and take my time and then let it rest for a day and then go back to it.

Intuitive Awareness of Behavioral Theory

All participants explained their awareness of behavioral aspects in their personal backgrounds and approaches. Four participants recalled their own personal encounter with businesses effectively using such approaches and incentives. Almost all reported that they instinctively knew some of the rules or incentives to change behavior without knowing specifically about the nudge theory. In fact, one participant claimed their knowledge of the nudge theory, awareness of the published material, and interest in learning more about it prior to the ideation session. Others claimed that they did not know of its existence and lexicon. They, however, were strongly related to the subconscious applications of human behavior concepts during their design process. Even though their previous knowledge was neither accurate nor linked to a specific theory, it is associated with humans responding to certain prompts or stimuli. In the session prior to theory introduction (PPD and DS; 3.A) participants intuitively included aspects of behavioral theory. Those of which include reduced inattention, positive and negative reinforcement, and using senses to make people more aware of the effects of their behaviors. Participant 1 explained by saying:

> Actually even before you even said this [theory introduction], I was thinking about these rules and theories without knowing what they were… my ideas like already use like the meter thing is like reduce an attention. Like I already kind of was using it without knowing the theory… [it was a] relatable theory.

Data analyzed from Group One's first ideation session (DS; Figure 3 A.2) revealed that participants as a group intuitively used aspects of behavioral theory. They alluded to *social norms* in their discussions by saying "it's really fun if you make it culturally cool, like everyone's saving water now. Everyone will do it". In response, another group member states "[I]f everybody is doing it, you are being conscious of like doing it too. It's more like a movement and then everyone like follows". Another aspect discussed was *optimism*, where participants considered the point and reward systems, one of which conferred saying:

> I always thought of like what if there was just like a reward system? Like if you do accomplish taking a shower in five minutes and you get something in return? Um, which is interesting. When you said the thing about that point system I had thought that was cool.

Another aspect of the theory was *default bias* where they discussed forcibly changing behaviors. One participant expounded saying:

> A water meter that alerts the user after a certain amount of usage. And then even like a shower head that shuts off automatically, after a certain amount of time, which is sad but uh, but I was like, that would be kind of aggressively enforcing it.

In Group Two's first ideation session (DS; Figure 3 A.2) they focused more about the visual impacts on behavior and how visually seeing damage can effectively influence behavior. One participant explains by saying:

> And then I thought about this campaign where like every disposed plastic bottle, I guess it's displayed, I can be able to see like this is how much plastic we're using and he's just so like you kind of feel bad for it. Like if you actually see like this is how much we use in a week.

Another group member responded saying "[I]t plays into our emotions."

Influence of Personal Experiences and Cognition in Ideation

Five out of the nine participants asserted that their personal experience drives their designs and how they perceive it through their own eyes. They recalled their own personal encounters with similar campaigns and would constantly relate the situation to themselves. Participant 2 said:

> I thought about what would work on me, thought about similar initiatives on the campus and how they had been done and what I thought was successful. I thought about marketing and how I was going to sell a product. How would I do that? I think it's kind of what I've observed around me, my own personal experiences, similar topics.

Similarly, Participant 9 explains by saying:

> I picture myself in these situations. I mean obviously I'm only one perspective on planet earth, but I think of like, why I don't do this or why I do that and so much of it is tied to, um, how we behave socially. I mean, we're social creatures and how that, so I just think of how that affected me.

Mixed Attitudinal Reactions to the Nudge Theory

Participants had mixed responses after being introduced to the nudge theory with three participants having positive responses towards it. For instance, Participant 1 expressed her reaction saying:

> But then after really thinking about like the nudge theory and after the examples that you gave us, I was like, oh my god, this is effective because it changes my behavior even so, and I didn't even realize so I'm like, it will be really effective if we do implement it.

On the other hand, four participants had neutral or unclear responses to the nudge theory. Two out of the four participants indicated that they intuitively used the theory before being introduced to it. Participant 9 stated “we were probably thinking subconsciously about this as well before we were introduced to it, like in the first part of the ideation process.”. The remaining two participants thought that it’s a good way to start the ideation but not to solely depend on it. Participant 6 explained by saying:

> I think ideation is based on theory so that you can try things based on what has worked in the past or what theoretically could work in your head, and then you sketch it out to how you think it could work in theory. You know, and then you

> further it by trying it, you know, and then through like projects in school, I've learned that theory doesn't always work. Like you have to try it through the process of it and then alter like your idea based on that. Does that make sense?

Two out of the nine participants had initial negative feedback about the theory. They however had different views after they have discussed it further. Participant 3 started by saying:

> That was a little bit more difficult because I kind of felt restricted like I said about, um, like I had to use those theories. Um, whereas I usually try to think in that way anyway. I feel like it's better designed to influence people in like gentle ways to do something rather than forcing people to do something.

But once he talked more about it, he thought it gave credibility to his ideas. He followed by stating:

> With the knowledge of that, I can kind of come up with a bunch of ideas and then once I come up with them, I can identify which types of nudges are in those ideas and then maybe better focus them or like with that, that knowledge and like the research behind that theory, I can back up those ideas a little bit.

Correspondingly, Participant 4 thought of the theory as manipulative. She however felt that the ends can justify the means, and stated:

> But it's hard to knowingly implement those things because it almost feels like, like I said, like you're manipulating the end user. But when you think about the cause

> that it is for, you kind of understand the necessity, the necessity and you're just kind of using the brain's processes like for the benefit of your cause instead of like for evil or for like malicious intent.

Incorporation of Nudge Theory in the Ideation Process

Seven participants stated that the nudge theory had an impact on their design outcome. Participant 6 explains by saying that the theory "started to influence the solution to the problem... it can be more focused". Five of the seven participants expressed that it gave them a more developed, effective and solid idea. Participant 2 said "I think after having that review over the nudge theory, I think then we were able to create a more concrete and tangible product that would create a result". The remaining two participants thought it had a slight impact on their designs. Participant 9 said "we were probably thinking subconsciously about this as well before we were introduced to it, like in the first part of the ideation process. So yeah, I think overall it influenced a little bit of our process."

Five participants mentioned that they used specific aspects of the nudge theory, naming the exact terms from the theory, for example Participant 1 explained:

> The social norms is like huge. Like if everybody else is doing it, like humans just feel a need to like blend in with everyone else and fit in. So you're so much more prone to doing it if everyone, it's like peer pressure. It's like if everyone is doing it, it's cool now. And it's like a cultural change development.

More specifically, Participant 7 explains certain aspects of the theory as she said:

> We decided to use the default reduce inattention, social norms and optimism. Everything nowadays is social media, right? If you see somebody eating really cool food at this one place, you're gonna want to go there. So with our app, if you can see that other people that you know are using it makes you want to use it. So that was kind of like our way of using the theory.

Although there were mixed responses to the nudge theory, participants clearly valued the theory. Three participants relied on the theory to give more credibility for their ideas, for example Participant 5 said:

> I just switched the ones we had to apply to those nudges because I realized that way it could be more effective. Um, cause at first it was just like a really rough idea. But once it relates to a specific nudge, I think there'll be more effective now because it's been studied and it has a base.

Four participants thought of it as a good tool for ideation. Participant 8 said "I think theory gives you a starting off point, a foundation. Um, it gives you sort of a set of, I don't want to say like almost like rules, guidelines that you can kind of stem your idea process". Similarly, Participant 1 said "but then after post to knowing the theories, I developed more ideas from it. So I feel like theory is actually are probably the core of ideation"

In Group Two's second ideation session (TDDS; Figure 3 C.4), one participant changed their idea about positive reinforcement to negative reinforcement and said "so

maybe it's best not to show the positive impact people are having. Maybe it is best to show just the negative, you know". In their first ideation session (DS; Figure 3 A.2), they had the same aspect of using visuals to influence behavior but with more details and more developed ideas. One of the members said:

> Like something that I see that like makes me like realize the body of waste on the planet is when it's like, oh this is how many plastic bags we use? And then it shows like the earth and shows plastic bags wrapping around the earth. Like, like we've used enough plastic bags to wrap around the earth this many times. That's cause you can see like you know how big earth is and so when you have that like visual que of something that's like huge. You know what I mean? And then you see the juxtaposition. I think that like lights something up in people's minds.

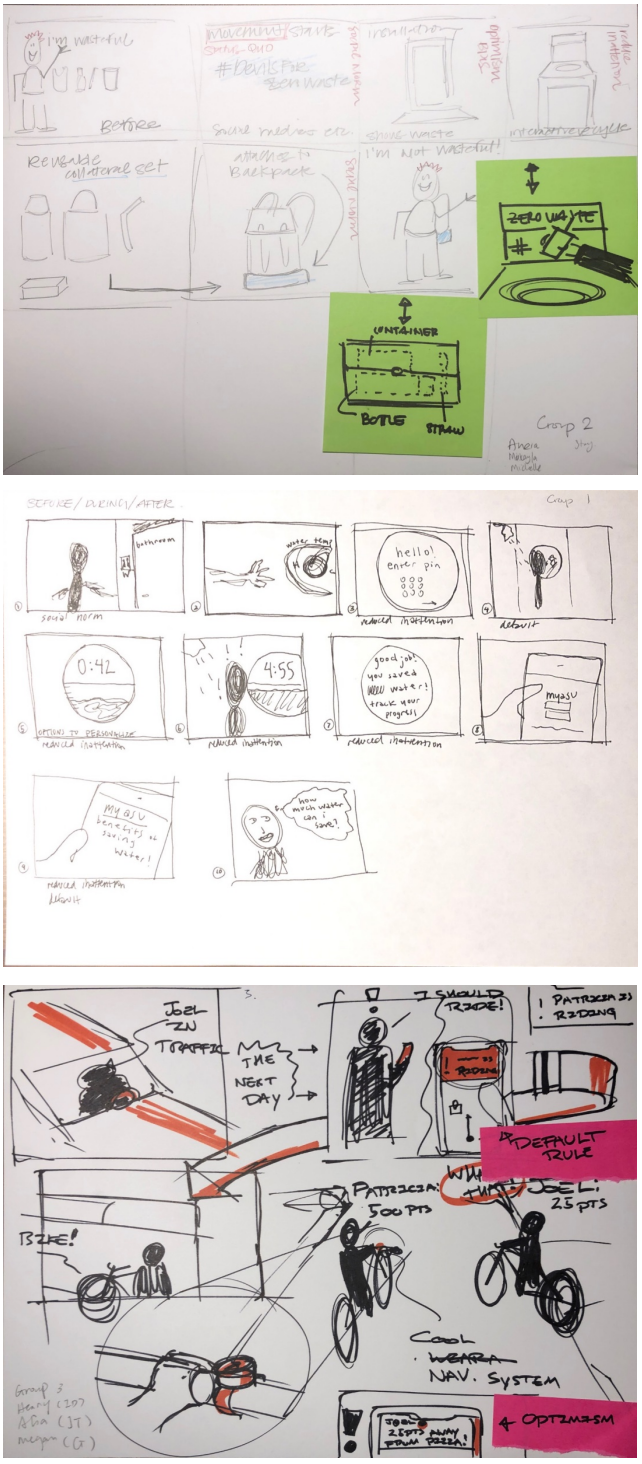

Figure 5. Storyboards developed by the participants.

CHAPTER 5

DISCUSSION

As the participants were divided into groups of three, they were encouraged to be collaborative and share their ideas and process with each other. They had to ultimately come up with a harmonious solution, agreeable by all team members. With this approach, the researcher was able to listen into the discussions of decision making and depict the factors influencing the design process. Data collected throughout the workshop generated detailed material that allowed for a deeper understanding of a theory-driven design process.

The influence of studio-based education was highly visible in the participants design process and approach. Not only did they use basic design principles in their ideation, but they also strongly relied on brainstorming tools such as mind mapping and sketching. This suggests how curricula are highly absorbed and grasped by design students. The employment of contemporary design approaches, such as design empathy and human-centered design, were also evident in both ideation sessions. This proposes how emerging design approaches can be relevant in framing user centered design projects. Their effectiveness could be attributed to the association of these contemporary approaches to the fields of psychology and human behavior. Such an observation responds to Frascara's (2007) polemic view against design education; he argued that "the aim of design education should be to foster the development of thinking, judging, collecting information, organizing it, managing resources, and producing visual communications that are effective and sensitive to users, contents, and contexts" (p. 67). Yet as found from this case study, design education and empathy in design were collectively pronounced in the design

process. This could be attributed to the utility of interdisciplinarity and social relevance of the design problems presented in the case study workshop.

Personal interest in topics removed from the design discipline per se had an apparent influence on participants' decision-making processes. Participants that pursued minor degrees such as psychology and art entrepreneurship adopted certain concepts that supported their judgment throughout the design process. Others that enrolled in electives within the Design School such as Mindfulness Fundamentals, and electives out of the Design School such as Marketing, also drew from different branches of knowledge. Generally, the participants displayed a strong interest in expanding their knowledge base either by taking classes, self-learning by research, or simply by listening to podcasts. This could be either a result of (**a**) institutional efforts that support and invest in inter transdisciplinary and transdisciplinary learning modules, or (**b**) personal efforts and curiosity. Both of which can fluctuate with different institutional programs and personal interests.

Participants intuitively applied some social behavioral concepts in their unrestricted ideation sessions. Although their application might not be as precise in terms of effectiveness, its tangential implementation was certainly apparent in the data. This can be explained by the proximity between design and psychology, and how subconsciously designers utilize human connection and behavior into their designs. Further, designers today are actively using human-centered design theory and methods. Exposure to these design products in everyday life could have forced participants to unconsciously make sense of human behavior even with tacit knowledge about behavioral theory. Another

reason could be that social behavioral theories are intertwined with contemporary design and marketing campaigns, which can be seen when participants recalled experiencing nudges from different businesses in their everyday lives. There were no issues with participants grasping concepts of the nudge theory after it was introduced to them. Previous authors such as Gentes et al., (2016) and Jung & Ståhl (2018) have reported cases where designers needed more time or had difficulties digesting and employing theories foreign to the design field. Results from this study provides new insights towards the practicality in the applications of theory-driven design in relation to nudge theory.

Although the participants did indicate their application of design education throughout the design process, most of them leaned into their personal experiences, logic, and cognition to relate and tackle the issue at hand. While its effectiveness can be debatable, this could suggest how much designers prefer to initially approach a design problem with their personal intuition and knowledge. As discussed in Chapter 2, Kolko (2010) refers to this as *abductive sensemaking*. He further explains that "[A]bduction acts as inference or intuition, and is directly aided and assisted by personal experience" (pg. 21). At the same time, it is considered to be highly error-prone and merely an "argument to the best explanation" (p. 20). That is simply because erroneous conclusions can be drawn from inferences despite the truthiness of the premise. Research and reliance on theory can therefore lessen such proneness to error resulting from abductive logic.

A sense of comfort was observed with participants who grew excited knowing more about the nudge theory after it was introduced. The same participants heavily relied on this new knowledge unquestionably and systematically throughout their design process. Others

whom perceived applications of nudge theory as manipulative or forcible still recognized its effectiveness and credibility when applied, respectively. These dichotomous perspectives have been widely debated in the literature as ethical nudges. Haug and Busch (2014) raised these concerns in the ethical use of nudges in consumer goods. They urged designers to be ethically responsible for their designs by being mindful to vulnerable users who can be easily targeted and cognitively challenged. Authors have also cautioned the use of non-transparent nudges that may limit people's choice and thus considered as a form of manipulation (Blumenthal-Barby & Burroughs, 2012; Haug & Busch, 2014). Therefore, designers using theories like behavioral economics – nudge – should be mindful of the ethical implications of their work.

Despite the diverse responses, all participants ultimately integrated the theory in their design processes. This was evident in the analyzed data from audio recordings, post-workshop interviews, and more so in the participants documentation using the storyboards (Figure 5). The participants believed that they are able to strengthen and improve design ideation processes when they used the theory. Some participants felt very comfortable and excited to have guidelines from a validated theory to back up their decision making throughout the design process. The credibility of the theory made participants more confident in their designs. Some participants felt that the theory was an effective ideation tool, sourcing them with ideas that are diverse, developed and more tangible. This supports Mejia's (Forthcoming) assertion that "nudges are a rich source of inspiration in design processes" but not be regarded as a design principle. The simplicity and practicality of nudge as a theory is also to be regarded for such ease of incorporation. The time and effort

needed from participants to digest the theory was not a limitation and thus implies on the relationship between complexity and usability.

As with any other research, this study has some limitations that were identified as part of the workshop and data collection methods. Firstly, the low number of participants challenges generalizability through the findings specific to the sample. Secondly, the type of theory chosen was considered simple and thus easily incorporated. Theories with increased complexity can be difficult to comprehend and thus can impact the results differently. Thirdly, the length of the workshop was found to be a limiting factor to allow for generating and developing ideas. Additionally, participants brainstorming was inherently restricted; while unintended they had no access to resources such as a simple web search to gather additional information. They were also tasked with a specific ideation process (post-it documentation and collaborative sketching activities) which might of controlled the way they naturally ideate. Lastly, some of the data collected through audio recordings of ideation sessions were found inaudible. The placement of the recording device in addition to the participant seating effected the quality of the recording.

CHAPTER 6

CONCLUSION

This case study focuses on the early stages of the design process, the ideation and framing and how designers approach problem solving using a theory. With two ideation sessions, one with no direction and the other with a theory, participants were able to gain another perspective. Instead of focusing on the effectiveness of the end designs, the researcher focuses on how theory-driven approaches effect the ideation part of the design process and how designers respond and incorporate theory. A theory from behavioral economics was introduced to the participants with design for behavior change as an intention for the workshop. With data collected from focused observations and interviews, a better understanding of how theory was incorporated was constructed.

The study findings indicate that the participants generally approached ideation with their personal intuition and design education. Some of the participants utilized concepts and knowledge gained from other non-design concepts and classes to generate ideas. The ideas from participants shifted after the nudge theory was introduced in the second ideation session. Although most participants felt that they applied similar concepts intuitively, yet they had mixed responses towards it. Excited participants used it as guidelines to base their ideas on, neutral participants thought that it can improve their designs while help stem more ideas, and hesitant participants thought it was restrictive and manipulative yet credible and necessary when justified. Regardless of their responses they seem to easily digest and apply it. This suggests that when designers are exposed to an environment where they encounter social theories (i.e. for marketing and advertising purposes), they are prone to relate and use some aspects of it in their own design processes. On the contrary some cases discussed

in the literature show the struggle designers go through when asked to apply theories further away from the design field.

As theory-driven design has been gaining more attention in recent years. The literature suggests this increase in theory-driven methods and tools. Either to assist with ideation or as a framework for designers (Lockton, 2009; Fogg, 2003; Tromp, 2011). This can be confirmed with the findings where participants thought the theory is a good ideation tool. Especially utilizing the nudge theory in the ideation phase, as Mejia (forthcoming) asserted in his work. Friedman (2003) and Kolko (2010) both emphasize the importance of research and theory in the design process.

The findings of this study suggest a number of noteworthy areas for future research. Different perspectives could be acquired in studying how professionals would respond to a theory in their design process. Compared to students, experienced professionals could with a well-established design practice could impact the incorporation of the theory across the design stages. Employing different behavioral theories is another area of research that should be studied. The literature, as reviewed in Chapter 2, indicates that the complexity of theory could be a major factor in altering a designer's approach and method. This can be approached through extended research activities and by conducting lengthy workshop sessions each focused on defined stage of the design process; thus, giving an opportunity for designers to incorporate theory in different phases of the process as well as testing the efficacy of the end products.

Personal experiences, education and research create well rounded artifacts. Designers curiosity and passion to satiate the void in their knowledge to generate ideas is

crucial in their design process. Seeking knowledge could be attributed to personality, experience or professionalism. Either way, when designers are faced with a tame or wicked problem, theory comes hand in hand with addressing the issues well equipped. Theory, as long as it is applicable and relatable, provides the appropriate insights for designers.

REFERENCES

Blumenthal-Barby, J. S., & Burroughs, H. (2012). Seeking better health care outcomes: The ethics of using the "nudge." *The American Journal of Bioethics*, *12*(2), 1–10.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative research in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101.

Cash, P. J., Hartlev, C. G., & Durazo, C. B. (2017). Behavioural design: A process for integrating behaviour change and design. Design Studies, 48, 96-128.

Consolvo, S., McDonald, D. W., & Landay, J. A. (2009). *Theory-driven design strategies for technologies that support behavior change in everyday life*. 405–414. ACM.

Daalhuizen, J. J. (2014). *Method Usage in Design: How methods function as mental tools for designers*.

De la Cruz, L. A., & Mejía, G. M. (2017). Reflective didactic strategy to integrate semiotic theory and creative practice in graphic design education. *Art, Design & Communication in Higher Education*, *16*(1), 83–97.

Dedoose (Version 8.0.35) [Web Application]. (2018). Retrieved from www.dedoose.com

Eastman, C., Newstetter, W., & McCracken, M. (2001). *Design knowing and learning: Cognition in design education*. Elsevier.

Filippou, J., Cheong, C., & Cheong, F. (2015). Combining The Fogg Behavioural Model And Hook Model To Design Features In A Persuasive App To Improve Study Habits. *ArXiv Preprint ArXiv:1606.03531*.

Fishbein, M., & Yzer, M. C. (2003). Using theory to design effective health behavior interventions. *Communication Theory*, *13*(2), 164–183.

Fogg, B. J. (2009). *A behavior model for persuasive design*. 40. ACM.

Frascara, J. (2007). Hiding Lack of Knowledge: Bad Words in Design Education. *Design Issues*, *23*(4), 62–68.

Friedman, K. (2003). Theory construction in design research: Criteria: Approaches, and methods. *Design Studies*, *24*(6), 507–522.

Gentes, A., Renon, A.-L., & Bobroff, J. (2016). *Design and Interdisciplinarity: The improbable introduction of" fundamental physics" in a design school*. Presented at the DRS 2016.

Haug, A., & Busch, J. (2014). *A framework of ethical nudges in the design of consumer goods*. Presented at the Proceedings of Design Research Society's 2014 Conference, Umeå.

John, K., Flynn, D., & Armstrong, M. (2018). *Co-designing Behaviour Change in Healthcare*. 2101–2115. Design Research Society.

Johnson, J., & Weller, S. (2001). Elicitation Techniques for Interviewing. In J. F. Gubrium & J. A. Holstein (Eds.), *Handbook of interview research: Context and method* (pp. 491–514). Sage Publications.

Jung, H., & Ståhl, A. (2018). *Soma-Wearable Design: Integrating Somaesthetic Practice and Fashion Design for Somatic Wellbeing*. Presented at the DRS2018Design Research Society. Limerick, Ireland. 25-28 June, 2018.

Kolko, J. (2010). Abductive thinking and sensemaking: The drivers of design synthesis. *Design Issues*, *26*(1), 15–28.

Laing, S., & Masoodian, M. (2015). A study of the role of visual information in supporting ideation in graphic design. *Journal of the Association for Information Science and Technology*, *66*(6), 1199–1211.

Lerner, F. (2005). Foundations for design education: Continuing the Bauhaus Vorkurs vision. *Studies in Art Education*, *46*(3), 211–226.

Lockton, D., Harrison, D., & Stanton, N. A. (2010). The Design with Intent Method: A design tool for influencing user behaviour. *Applied Ergonomics*, *41*(3), 382–392.

Lupton, E., & Phillips, J. C. (2008). *Graphic Design: The New Basics*. New York: New York: Princeton Architectural Press.

Mejía, G. M. (Forthcoming). Nudges are not design principles. *Journal of Design Strategies*, *10*(1).

Norman, D. A. (1988). *The psychology of everyday things.* Basic books.

O'Leary, Z. (2017). *The essential guide to doing your research project*. Sage.

Sawyer, R. K. (2017). Teaching creativity in art and design studio classes: A systematic literature review. *Educational Research Review*, *22*, 99–113.

Temi Audio Transcription [Web Application]. (2019). Retrieved from www.temi.com

Thaler, R. H., & Sunstein, C. R. (2009). *Nudge: Improving decisions about health, wealth, and happiness*. Penguin.

Thorpe, A., & Gamman, L. (2011). Design with society: Why socially responsive design is good enough. *CoDesign*, *7*(3–4), 217–230.

Tromp, N., Hekkert, P., & Verbeek, P.-P. (2011). Design for socially responsible behavior: A classification of influence based on intended user experience. *Design Issues*, *27*(3), 3–19.

Yin, R. K. (2017). *Case study research and applications: Design and methods*. Sage publications.

APPENDIX A

INTERVIEW GUIDE

Ideation (free):

1. Walk me through your process in your free project? Can you go back and articulate your thought process?
2. How did you generate ideas? What inspired them? Did you use any knowledge or concepts from other classes?
3. How did your group select ideas? What stood out in certain ideas?
4. Which part of the project you gave more thought? (i.e. effectiveness, aesthetics, theory behind it?)
5. How do you feel about your group rough prototypes?

Ideation (theory-driven):

1. Walk me through your process in your free project? Can you go back and articulate your thought process?
2. How was it having theory guidance in your design process? And how did it influence your design thinking, if any?
3. Have you heard about the Nudge Theory before this workshop?
4. How would you describe your understanding of Nudge Theory?
5. How did you generate ideas? What inspired them?
6. How did your group select ideas? What stood out in certain ideas?
7. Did you reuse the same product from the free project or went for a new product? Why is that?
6. Which part of the project you gave more thought? (i.e. effectiveness, aesthetics, theory behind it?)
7. How do you feel about your groups rough prototypes?

Collaboration Skills:

1. How do you understand your role in the design ideation process? Were you a co-designer and collaborator or you took charge of the process?
2. Do you know any collaboration skills for designers in the process of design? (for instance, communication, empathizing, knowledge interpretation, etc)
3. When collaborating with your group members, what collaboration skills did you apply in the design process?
4. Among those collaboration skills, what is the most important in your design process? And why?
5. Which collaboration skill do you need to improve or refine after learning from the design process? And why?
6. Learning from others experience is an effective approach for design ideation, did you utilized that in your design process? Why or why not?
7. Do you have any new ideas about collaboration from the design process? (including positive and negative ideas)
8. How has the school prepared you to collaborate with other disciplines?

APPENDIX B

SAMPLE OF CODED TRANSCRIPTION EXCERPTS

Participant	a. Theory Prior to Introduction
1	"Actually even before you even said this, I was thinking about these rules and theories without knowing what they were… my ideas like already use like the meter thing is like reduce an attention. Like I already kind of was using it without knowing the theory"
2	"We're not at least aware of what theory is being applied to our ideation, but I, I think we're always practicing it"
3	"I usually approach design problems with a mindset of like how can we incentivize people to do things rather than forcing them not to do things."
4	"I didn't know the terminology of it but I knew that they existed. I think I've studied them in different contexts but I didn't know like the specific names." "but also before then thinking about how you motivate people to make change and I immediately thought about the theory about habit forming and how it takes 21 days to get the brain to like form a habit or change a behavior. So tidbits like that I guess maybe I implemented."
5	"It was the first time I, I heard like the definition of nudges, like asset thing." "I always tried to apply that same thing and I'm interested in even user experience as well. So, and how we can shape those behaviors to create like a bigger impact." "Like I definitely like do have taken into account like information overload and like when you make decisions, how do you make them and what go is go, goes into that subconsciously and consciously. Um, like I've, I've thought about that, I just didn't know like it kind of had like a different application"
6	"I noticed when you were going through these individually that I could think of examples like in my life that I saw this but I didn't realize that, you know, it's like subconsciously taking it in" "Oh yeah, like I saw this when I was doing that on this day, this reminds me of something I saw here"
7	"you don't know that you're putting in the theories at the beginning, but we all know like, we all like that automatic, right?" "I think we actually thought of all of these, you know, automatically…I feel like we might've done that already in the first process of it. Like, Oh, if we do this, they'll get that. If we do this, they will buy this. If they have this many points, they'll get this, like all these different incentives. So I think it was kind of hard to categorize each one when in reality they all kind of intertwined." "I know like not those specific terms, but I know that those, like those examples like, Oh, if you're going to go buy a hot dog, it's better combo."
8	"I mean, the little bit of background in marketing that I have or you know, that I've been, I haven't like taking marketing classes, but I've just been around it in it and you know, working in restaurants and even in design and stuff, so, um, and then you just know people's behaviors and you just know what people gravitate towards. It's just instinctual. You just watch people"
9	"we were probably thinking subconsciously about this as well before we were introduced to it, like in the first part of the ideation process."

APPENDIX C

IRB APPROVAL LETTER

EXEMPTION GRANTED

German Mejia Ramirez
HIDA: The Design School
-
mauricio.mejia@asu.edu

Dear German Mejia Ramirez:

On 9/10/2019 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	A Look into the Design Process: Theory-driven design for behavior change
Investigator:	German Mejia Ramirez
IRB ID:	STUDY00010632
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	• Workshop_plan, Category: Other (to reflect anything not captured above); • RECRUITMENT_SCRIPT, Category: Recruitment Materials; • workshop_Interview guide, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Consent_form, Category: Consent Form; • Form-Social-Behavioral-Protocol, Category: IRB Protocol;

The IRB determined that the protocol is considered exempt pursuant to Federal Regulations 45CFR46 (2) Tests, surveys, interviews, or observation on 9/10/2019.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

APPENDIX D

SAMPLE OF THE CONSENT FORM

Consent Form

A look into the design process:

theory-driven design for behavior change

I am a graduate student under the direction of Professor Mauricio Mejia in the in the Masters of Science in Design program at Arizona State University. We are conducting a research study to investigate a designer's "design process" in Design for Behavior Change. Exploring different approaches to achieve a desired positive behavior. We are also studying team collaboration in design.

I am inviting your participation in a 3-hour design workshop. You will be given design ideation tasks to work on. We will be ending the workshop with discussion and interviews. You have the right not to answer any question, and to stop participation at any time.

Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time, there will be no penalty and no grade/credit reduction. You must be 18 or older to participate in the study.

Ideas will be shared with the ASU office of sustainability for future project considerations.

Participation in this workshop could shed a light on new design approaches in design for behavior change, giving you a learning experience. Discussions and interviews will be used to acquire information about the ideation and framing phase of the design process. There are no foreseeable risks or discomforts to your participation.

Your responses will be confidential and used in the data analysis process. The results of this study may be used in reports, presentations, or publications but your name will not be used. All materials are password protected and only accessed by the research team. The recording will be kept for one year only. Anonymous transcriptions and notes will be kept for three years.

I would like to audio record the discussions and interviews. The workshop/interview will not be recorded without your permission. Please let me know if you do not want to be recorded; you also can change your mind after the workshop starts, just let me know.

If you have any questions concerning the research study, please contact the research team at:

Aysha Alwazzan: aalwazz2@asu.edu
Prof. Mauricio Mejia: mauricio.mejia@asu.edu

If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (480) 965-6788.

By signing below you are agreeing to be part of the study.

Name:

Signature: Date: