

12-2008

# Designing A Curriculum In Design Thinking For Creative Problem Solving Users

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## Recommended Citation

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DESIGNING A CURRICULUM IN DESIGN THINKING FOR CREATIVE  
PROBLEM SOLVING USERS

Helene A. Cahen

Master of Science



Designing a Curriculum in Design Thinking for Creative Problem Solving  
Users  
by

Helene A. Cahen

An Abstract of a Project  
in  
Creative Studies

Submitted in Partial Fulfillment  
of the Requirements  
for the Degree of

Master of Science

December, 2008

Buffalo State College  
State University of New York  
Department of Creative Studies

## ABSTRACT OF PROJECT

*Designing a Curriculum in Design Thinking for Creative Problem Solving Users*

This project explored the development of a curriculum in design thinking for graduate students with a background in Creative Problem Solving. Design thinking is currently becoming more prevalent in key schools as well as in businesses making the curriculum very timely. This project details learning goals and flow for a full curriculum as well as the details of the activities, hand-outs, presentations and logistics for the first two days of a five-day intensive class. In addition this program was "prototyped" during the course of this project, demonstrating the value of the material developed as well as participants' interest in the topic.

Helene A. Cahen



Date

12/02/2008

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Dates of Approval:

12/01/2008



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## ACKNOWLEDGEMENTS

This project is the completion of more than a year focused on learning about design thinking. This has been an exciting journey that required sacrifices from those around me and particularly my family and friends, who I neglected over the past year. I first want to acknowledge the love and support of my husband Dean Hanley and my three children Adrien, Morgane and Axel who had to accept that “mummy could not play until August 3<sup>rd</sup>” or that once again I would miss a family reunion or a ski week-end. They have been incredibly supportive and they have given me the motivation and emotional support I needed to make this journey. As I stated in my vision statement in CRS 635 “I will be an idea igniter and inspire others to use and grow their creative potential”. I hope that by completing this Master program, I will provide a role model for my children and inspire them to reach their potential and to make a difference in the world.

I would also like to acknowledge my mom who always encouraged me to follow my own path as well as my dad who was an inventor and gave me the passion for new ideas.

In addition, I want to acknowledge all those I met on this incredible journey and who made this project possible. At the International Center for Studies in Creativity, I want to acknowledge all my professors who encouraged me go into places that did not know where possible. Professor

Murdock for her sense of freedom and joy, Cindy Burnett for demonstrating the power of humor and fun in the classroom, Professor Puccio for encouraging me in finding my voice as a creative leader, Assistant Professor Cabra for believing in the importance of design thinking and encouraging me with his time and vision over the past year, Assistant Professor Keller-Mathers for providing her unique perspective as a master teacher and Jonathan Vehar for being a great voice in providing perspective and feed-back all along. I also want to acknowledge all my peers and friends from the “class in the grass” for their friendship, inspiration and many wonderful conversations. I particularly want to thank Mark Hylton for his friendship and insightful perspective about design thinking, Deborah Clifford, my buddy, for bringing leadership and playfulness, and Randah Taher for her curiosity, enthusiasm and support which made prototyping this project possible.

Finally I would like to thank Charlie Ellinger and George Kembel at the d.school where it all started in August 2007. Charlie, thank you for taking my call and considering my request, and George, thank you for being open and offering me an opportunity to learn about design thinking.

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## **SECTION ONE: BACKGROUND TO THE PROJECT**

### **Introduction**

More than a year ago, I began a search for others similarly interested in the process of creativity in the San Francisco Bay Area. Somebody had mentioned to me that a new school had recently been co-founded by IDEO and Stanford, called the d.school. I was intrigued and determined to investigate further. I met with the Director of the school, George Kembel and was able to attend their Design Thinking Boot Camp as an observer. I had never heard of “design thinking” previously, but after this introductory class I wanted to delve deeper into the topic. Its human-centered approach fit well with my background in marketing research, and I saw the potential of integrating and combining it with Creative Problem Solving (CPS). I became so interested in the topic that I decided to deepen my learning by enrolling in an independent study with Professor John Cabra, who advised me during the spring 2008 semester. During the course of this project, I read further into the literature and the process of design thinking. I initiated ongoing dialogues with practitioners and scholars from the field of design thinking and CPS, discussing ways to integrate the two processes and mind-sets, and I created a video presentation of my journey and learnings. Over the past eight months I became more interested in the potential for teaching design thinking to others, particularly CPS practitioners and students, as I could see the

benefits of integrating the two approaches. Since design thinking is mostly a group process, I saw some benefits in being able to use this training as a way for participants to reflect on their creative leadership skills. I also saw an opportunity to broaden my consulting services.

### **Description**

This project is designed to create a curriculum in design thinking that can be taught at the graduate level, in programs such as the Master of Science in Creativity at the International Center for Studies in Creativity (ICSC). In this project, I focus on students, at the master's level of study who have had some exposure to CPS. This curriculum can also be adapted to different audiences such as graduate students with no experience in CPS, or corporations and non-profit organizations that could benefit from training in design thinking. The curriculum fits the time frame and content requirements of the three credit hour graduate level course. This project provides a detailed description of an intensive and experiential 40 hour five-day course. The description includes learning goals and activities, in and outside the classroom. As part of this project, a fully detailed template of the activities, hands-outs, course materials and learning goals are provided for the first two days of the course.

### **Rationale for Selection**

I have chosen this topic because I have personally seen how design thinking can be a mind changing and powerful approach to creativity. I am excited about sharing my knowledge with others and possibly help address some of the limitations that have been raised about CPS. Clients, prospective clients and fellow students have raised some concerns about CPS perceived lack of appeal for those who are visual or kinesthetic thinkers or “doers” that may become frustrated about the length of the process, and about the difficulties of selling the outcome of the process because of its lack of concreteness. Kelley (2001) wrote: “Give your management team a report, and it’s likely they won’t be able to make a crisp decision. But a prototype is almost like a spokesperson for a particular point of view, crystallizing the group’s feedback and keeping things moving” (p. 112).

On the other hand, CPS brings a solid framework that has been thoroughly researched and proven effective. For example the well-known Creative Studies Project demonstrated that creativity training impacted students in tests as well as in real-life. Students who were trained in creativity scored better in tests related to real life situations, academic situations and creativity as well as gained creative behaviors that impacted their overall college life and non-academic creative performance (Parnes & Noller, 1972). In addition, Puccio, Firestien, Coyle and Masucci’s 2006 review of the research related to the effectiveness of CPS in the workplace concluded that CPS training significantly impacted attitudes (such as

openness or trust) and behavior (such as preference for ideation and less premature critical evaluation) and groups ability for a successful resolution of challenges. The thinking skills associated with CPS, as described by Puccio, Murdock and Mance (2007), favor the dynamic balance approach that clearly separates diverging and converging activities, coupled with a large set of implementation tools.

I believe that combining design thinking and CPS can be a very powerful approach to solve complex challenges. I had several discussions with alumni of the ICSC about design thinking and I have seen anecdotal evidences that they have started to integrate some of the framework of design thinking in their work. I am convinced that students with a background in CPS and in theories of creativity are particularly able to quickly integrate the design thinking approach within their current body of knowledge as they already know many skills and mind-sets associated with creative thinking, and therefore will particularly benefit from the learnings of this curriculum.

### **Project Contribution**

There is a growing interest in design thinking. Schools like Stanford, the Chicago Institute of Design (ID) and the Rotman School of Management at the University of Toronto are all seeing value in developing curriculum emphasizing this approach. In a June 2008 *Harvard Business Review* article, Tim Brown wrote: "Thinking like a designer can transform

the way you develop products, services, processes-and even strategy” (p. 85). On the business side, there is a renewed interest in people trained with a design approach rather than a standard MBA approach. They are more able to deal with increasingly complex issues, to work in teams and to use an integrative rather than analytical approach. For example, Roger Martin (2006), the Dean of the Rotman School, suggested that “Business education has to be made more like design education” (Dunne & Martin, p. 514). However, I found only a couple of articles or presentations on the topic coming from the field of creativity (ICSC, Creative Problem Solving Creativity and Innovation (CREA), Creative Problem Solving Institute (CPSI) or Creativity and Innovation Management (CIM) conferences), or the five creativity journals including *Journal of Creative Behavior*, *Creativity and Innovation Management Journal*, *Creativity Research Journal*, *International Journal of Creativity and Problem Solving*, and *Psychology of Aesthetics, Creativity, and the Arts Journal*. There are also very limited classes or workshops in the field of design thinking offered outside of the three main schools (Stanford, ID and Rotman) and design schools focused on training designers, so creating a curriculum in this field has the potential to attract students and professionals from diverse background. As a learner and practitioner in the field of creativity, I think it is important to raise awareness and interest in our community around this broadened approach and possibly to create new bridges with the design and design thinking communities.

## SECTION 2: PERTINENT LITERATURE

### Introduction

When I first began to explore this topic and performed a cursory literature search, I could find very little on the topic of design thinking. However when digging deeper and adopting a broader view with expanded search criteria, I found many books and journals around design, specialized areas of design (such as architecture or engineering) along with some recent articles that more specifically address design thinking. Margolin (1989) acknowledged that design disciplines are fragmented and therefore definitions, research and writing about design are also fragmented. Because design thinking is relatively new, I believe it is beneficial to start with a broad review of design definition, history and literature, before focusing on design thinking. The challenge is to select from a large body of literature some key perspectives around design and design thinking that will constitute the foundation upon which the curriculum will be based.

### Design

#### ***Definitions of Design***

There are probably as many definitions of design as there are definitions of creativity. These disparate definitions of design focus on diverse aspects of design (the process, the person, the product or the

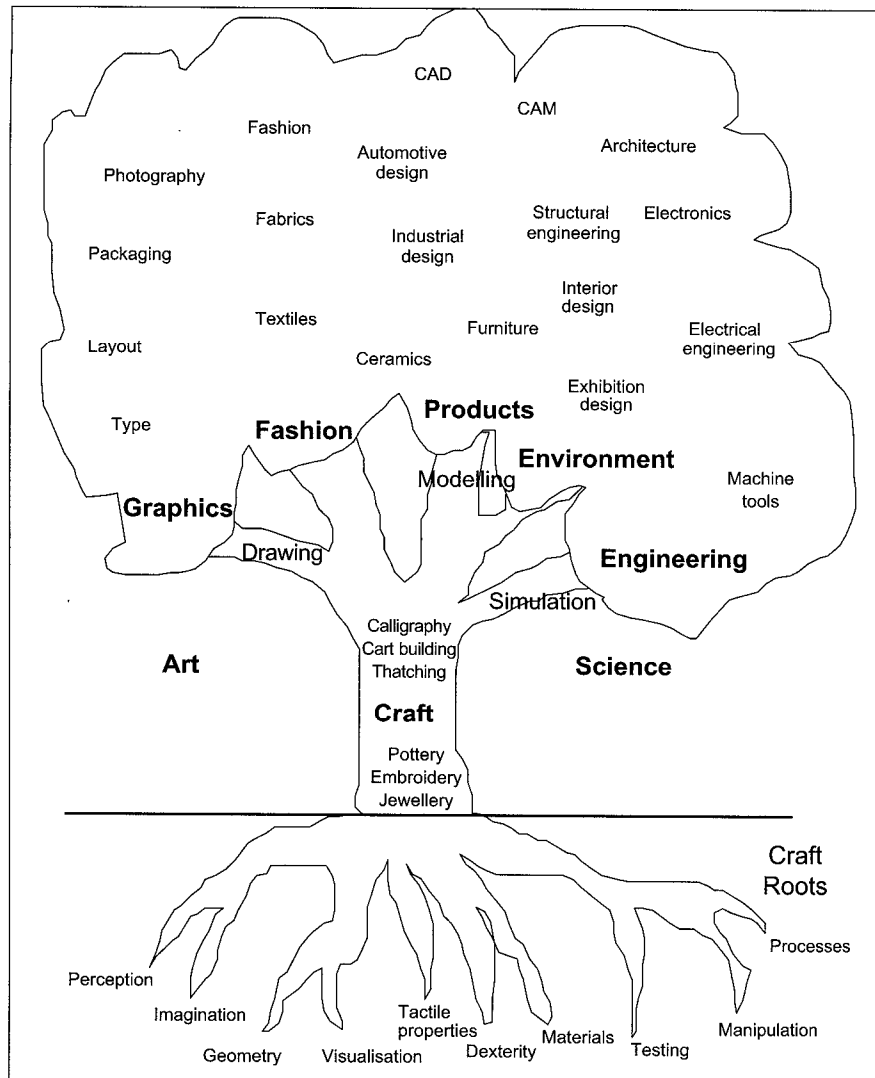
environment) similar to the 4P's of creativity defined by Rhodes in 1961. For example Simon's 1968 broad definition focused on the person and the product: "Everyone designs who devise a course of action aimed at changing existing situations into preferred ones." (Simon, 1988, p.67). Charles Owen (2004), a professor at the Chicago Institute of Design and one of the primary scholars in the field integrated the person, the environment and the outcome when he defined design as "a profession that is concerned with the creation of products, systems, communications and services that satisfy human needs, improve people's life and do all of this with respect for the welfare of the natural environment" (p. 3). He viewed the role of design as becoming more critical in a highly competitive environment and as a way of improving quality of life. Another process-focused definition by Design and Innovation Management Professor Von Stamm (2003) stated that: "Design is a conscious decision-making process by which information (an idea) is transformed into an outcome, be it tangible (product) or intangible (service)." (p. 17). Schön (1983) focused his approach of design on a 'reflection-in-action' type of attitude, which contrasts with an over-focus on techniques and rationality.

### ***A Brief History of Design***

Design itself is not a new discipline: objects have been designed since the Neanderthals and ancient civilizations had architects and engineers who designed complex buildings such as pyramids and temples.

A few other areas were developed over time, such as decorative art or graphic design (particularly in the field of fonts). In the medieval period, sketching and design emerged. For the first time, sketching was being used as a way to help thinking and disconnected from the process of making (Buxton, 2007). However it is only in the past century, more specifically since World War II, that design has exploded into the many disciplines we see today. Because the disciplines were so new, they have historically focused on their own specificity rather than looking at commonalities with the other design-related disciplines. Walker (1989, as cited and reproduced in Van Stamm 2003, p. 526) created a family tree that represented all the specializations around design (Figure 1). This drawing clearly highlights the recent explosion of design-related disciplines.





*Figure 1: Walker's Design Tree*

Cross (2007) highlighted some of the events of the recent design history. Design started to be perceived as a science in the 1920's, and the Modern Movement (which included the famous architect Le Corbusier) became interested in producing "works of art and design based on objectivity and rationality, that is, on the values of science" (p. 119). The year 1962 was the beginning of a scientific interest in looking at design

methodologies, with the first Conference on Design Methods in London. Because the challenges and the technologies were becoming more complex, the focus in the 60's was on trying to optimize the process by deconstructing "a complex problem into a set of well-defined problems and to seek experts in sub-disciplines to solve those problems" (Beckman & Barry, p. 26). This approach was generally not successful as the process was too mechanized and individualist and was finally rejected at the beginning of the 70's. At the end of the 70's and the early 80's, researchers made additional efforts particularly in the field of engineering and industrial design. "Design shifted from a clear-cut problem-solving process to a problem-formulating process in which getting to a collectively acceptable starting point (so that appropriate resources could be committed to solving the problem) was the core of the effort" (Beckman & Barry, p. 26). New journals were created, such as *Design Studies* in 1970, *Design Issues* in 1984, *Research in Engineering Design* in 1989, the *Journal of Engineering Design* and the *Journal of Design Management* in 1990, *Languages of Design* in 1993 and the *Design Journal* in 1997, showing a renewed interest in exploring components of the design disciplines further. Schön (1983), a professor of architecture suggested that the field of design has broadened again and that "there has been a tendency to think of policies, institutions, and behavior itself, as objects of design" (p. 77). Cross (2007) believes that the current challenge is about finding a way to create a dialogue across disciplines "that is at the same

time both interdisciplinary and disciplined.... We must concentrate on the ‘designerly’ ways of knowing, thinking and acting” (p. 124).

### ***Design, Education and Science***

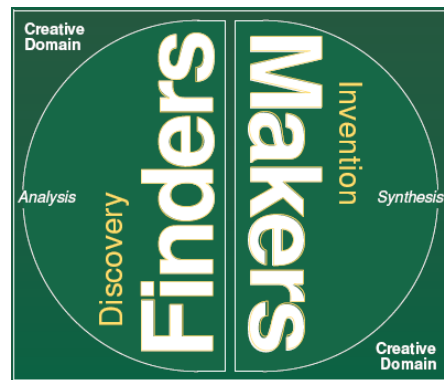
Scholars from a number of well-known institutions are emphasizing the need for education in design as a specific field that is differentiated from other disciplines. For example, Cross (2007) compared the culture of science, design and humanity and showed that design can bring a unique contribution to students. (See Table 1 below based on Cross, 2007, p. 18).

Table 1  
*Comparison of Sciences, Humanity and Design*

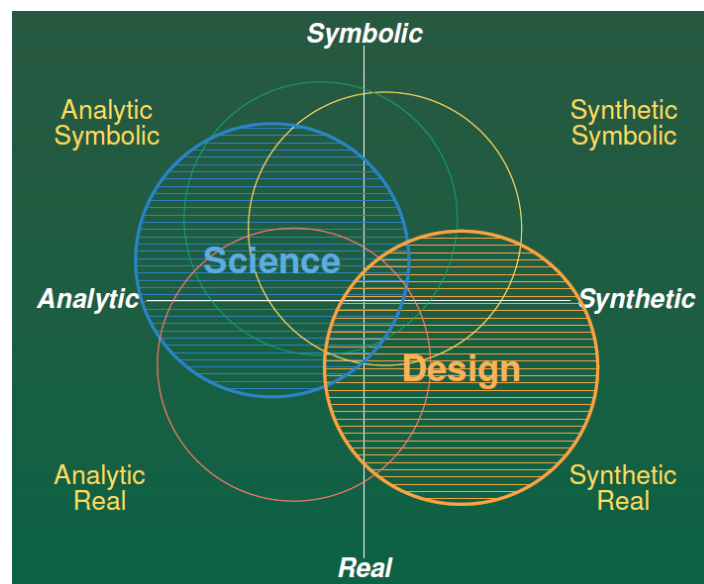
	Sciences	Humanities	Design
Phenomenon of Study	The natural world	Human experience	The artificial world
Appropriate Methods	Controlled experiment Classification Analysis	Analogy; Metaphor Evaluation	Modeling; Pattern-formation Synthesis
Values	Objectivity; Rationality; Neutrality Concern for ‘truth’	Subjectivity; Imagination; Commitment Concern for ‘justice’	Practicality; Ingenuity; Empathy Concern for ‘appropriateness’

Charles Owen (2007) viewed design thinking as a complement to science thinking. Those who exercise their creativity through discovery are “Finders” who are oriented towards analysis and tend to be scientists. Those who demonstrate their creativity through invention are “Makers” who

are oriented towards synthesis and are likely to be architects, engineers or designers (Figure 2).



*Figure 2: The Two-Domain Creativity Model: Finders and Makers*  
Owen, 2007, p. 7



*Figure 3: Science and Design as Complementary Fields*  
Owen, 2007, p. 16

While science uses a highly analytic process and a content that is more symbolic, design uses a highly synthetic process and is strongly concerned about the content being grounded in the real world (Figure 3). Owen emphasized the need for specific design education as its own field.

### ***Design and Creativity***

The relationship between design and creativity is mentioned typically from the design perspective. I could not locate any creativity scholars mentioning design, but many of the design and design thinking scholars mention creativity, and refer to known creativity literature. For example, Owen states that “creativity is of major importance to design thinking, as it is to science thinking and thinking in any field” (2008, p. 30). Buxton (2007) clearly referred to the Dynamic Balance, the succession of diverging and converging that Puccio, Murdock and Mance (2007) described as “core to the CPS process “ (p. 40), when he wrote that his definition of design is:

Design is choice, and there are two places where there is room for creativity:

1. the creativity that you bring to enumerating meaningfully distinct options from which to choose
2. the creativity that you bring to defining criteria, or heuristics, according to which you make your choices. (p. 145)

Some writers in the field of design and design thinking see design as being more action oriented and more specific than creativity. For example, Fraser (2006) differentiated creativity and design by highlighting that design is more focused on action:

Creativity is technically about the *ability* to create something new. Design is about the process of making or *doing* something new. And that’s where design is more aligned with innovation on a grand scale-it is not an attribute, it is fundamentally about *action*. (p. 25)

Boland and Collopy (2006) suggested that design is more specific than creativity and “provides a context for creativity by channeling it toward humanly satisfying purposes” (p. 53).

## ***Design Thinking***

### ***From Design to Design Thinking***

*“We can’t be all designers, but we can use aspects of design thinking in our lives, to embrace, amplify and mitigate risk in order to create lasting value for ourselves and our world” (Rodriguez & Jacoby, 2007, p. 58).*

It is only very recently and particularly during the past ten years that researchers, professors and practitioners have begun to look for commonalities, moving design from a process to a way of thinking called design thinking.

Essentially there was a shift from design to design thinking, from products to experience. The idea is that any problem can be approached from an experiential, observational, hands-on manner. Watch and listen, figure out the problem, then solve it. (*“The World as Prototype”*, 2007, p. 2)

The core concept of design thinking is starting to have more impact in the business world. This is due to the significant influences of IDEO and the writing of Kelley, Brown and Moggridge, all from IDEO, Owen (from ID), Martin from the Rotman School of Management, Cross from the UK Open University and a few others. They in turn have impacted many large companies, such as Procter & Gamble (P&G) and Apple. The primary focus has been on applying the principles and mind-sets used by product designers and other traditional designers in others creative areas and with multifunctional teams. Brown (2008) defined design thinking as a

“discipline that uses the designer’s sensitivity and methods to match people’s needs with what is technologically feasible and what a viable business strategy can convert into customer value and market opportunity.”

(p. 86). I prefer his visual definition posted on his blog at

<http://designthinking.ideo.com> (Figure 4).

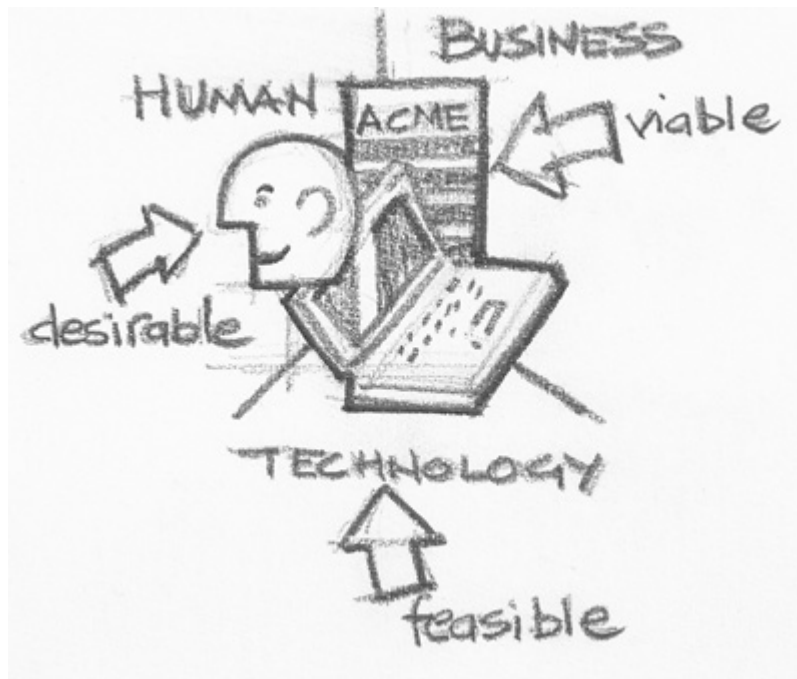


Figure 4: Brown’s Visual Definition of design thinking

Roger Martin, Dean of the Rotman School of Management, who has been instrumental in integrating design thinking as part of the school MBA program, defines design thinking as:

The way designers think: the mental processes they use to design objects, services or systems, as distinct from the end result of elegant and useful products. Design thinking results from the nature of design work: a project-based workflow around “wicked” problems. (Dunne & Martin, 2006, p. 517)

Finally the recently created Stanford Hasso Plattner Institute of Design, also called “d.school” and whose teaching focuses on design thinking, perceives design thinking as “a philosophy that good process ensures good ends and that problems can be solved through observation” (*“The World as Prototype”*, 2007, p.1).

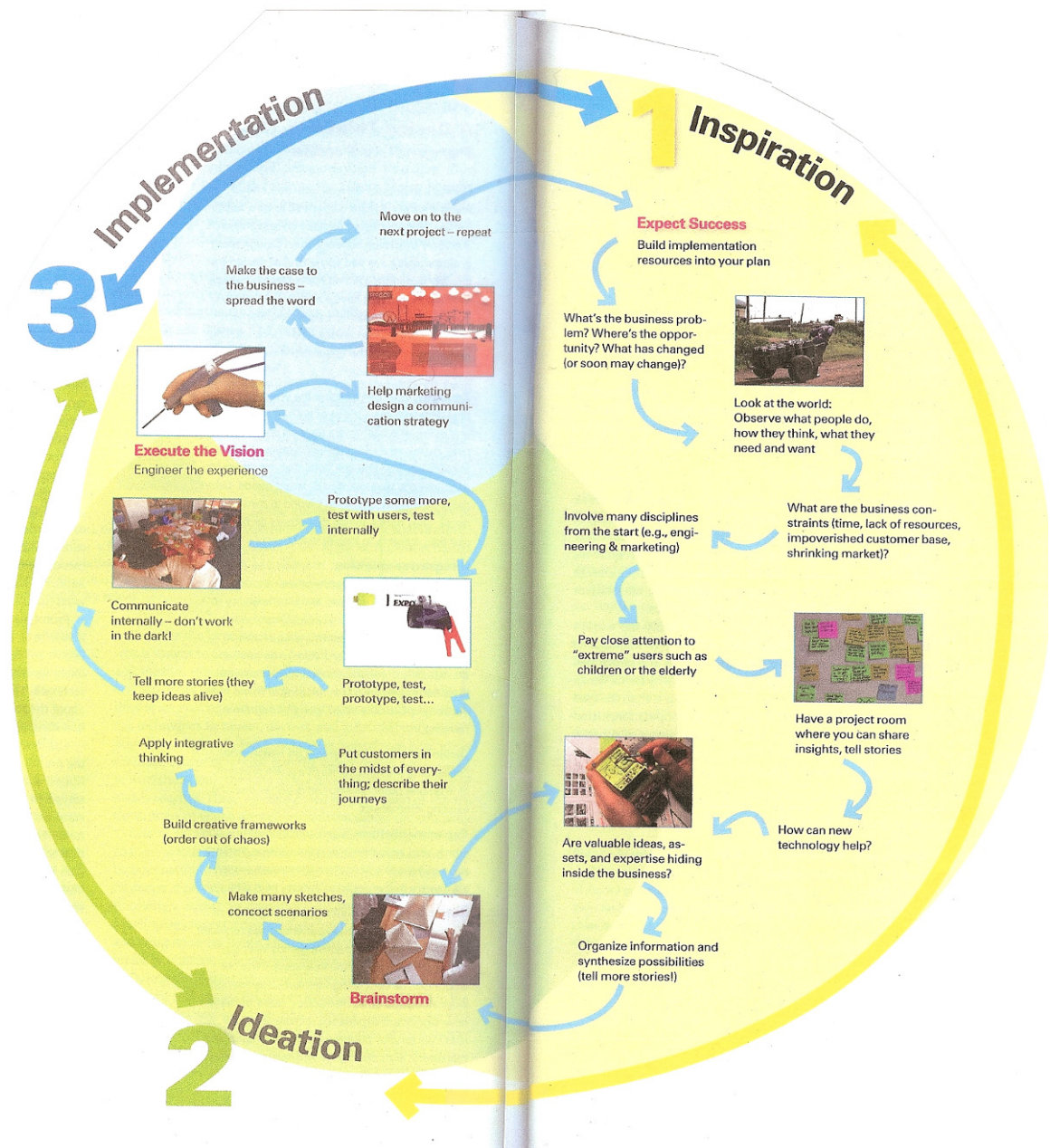
### ***The Key Components of Design Thinking***

#### ***The process.***

*“Best described metaphorically as a system of spaces rather than a pre-defined series of orderly steps” (Brown, 2008, p. 88).*

The design thinking process is iterative and non linear. In each of the “spaces”, a series of activities can be performed. The first space is called Inspiration in the IDEO model (Figure 5), and is concerned about finding information that can inform to the nature of the task at hand. The second space is called Ideation and focuses on generating, developing and testing ideas and solutions. The third space is called Implementation and is centered on mapping the path to the launch.

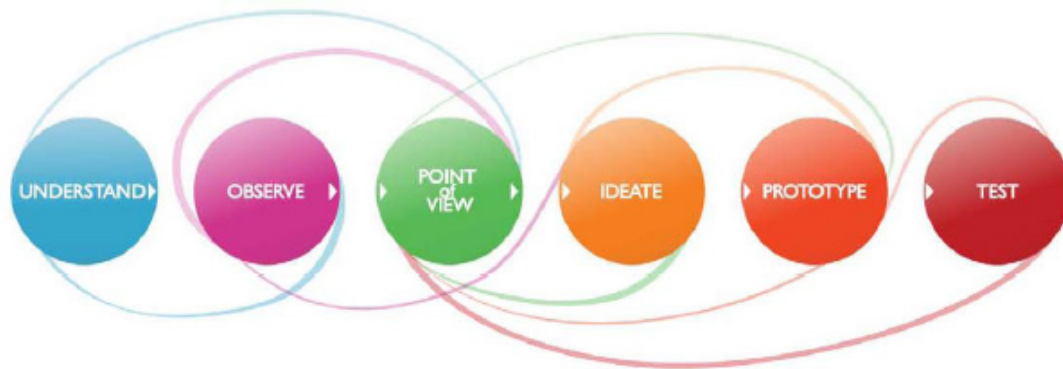




**Figure 5: IDEO's Design Thinking Process**  
Brown, 2008, p.88-89

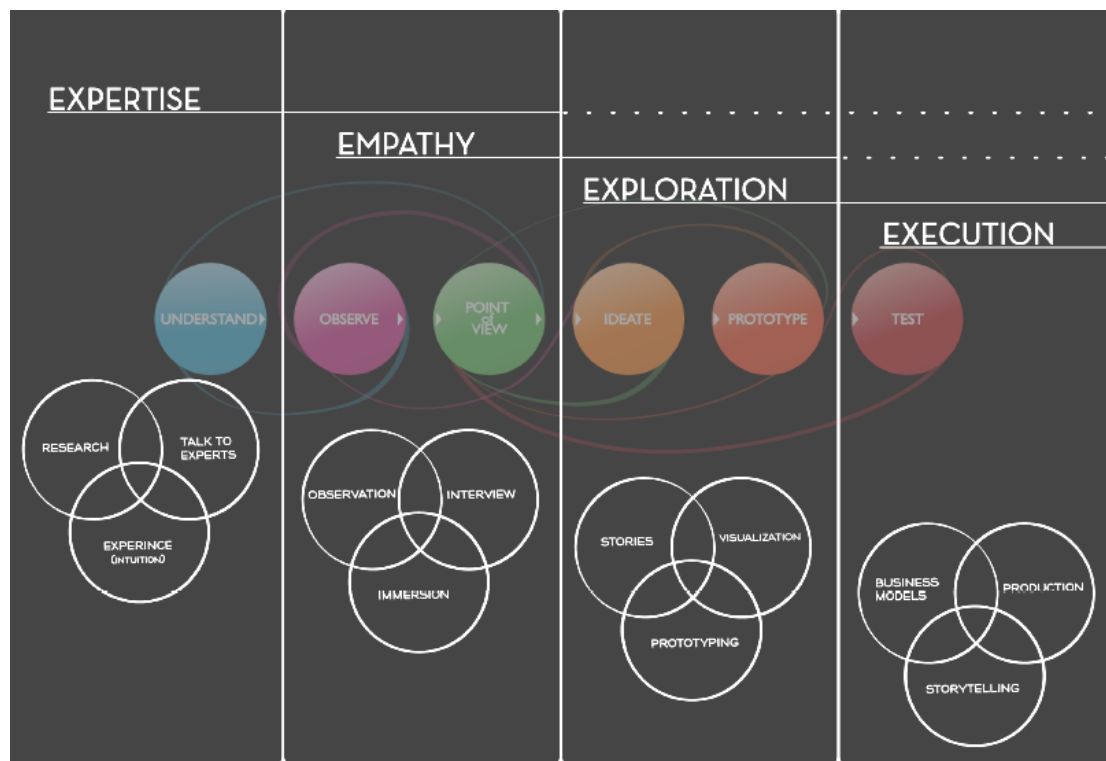
Moggridge (2007) summarizes the essence of this process when he explains in an interview that he sees the success of IDEO in "the study of people and prototyping techniques" (Wise, p. 4).

The model used at the Stanford d.school is very similar to IDEO's with a focus on the active steps (understand, observe, point of view, ideate, prototype, test) as it is used as a teaching tool (Figure 6).



*Figure 6:* The d.school Design Thinking Model (Experiences in Innovation and Design Thinking Boot Camp, d.school 2007, Personal Communication).

It also includes the mind-sets (expertise, empathy, exploration and execution) that a design thinker must adopt in each of the steps as well as the associated activities (Figure 7).



*Figure 7: The Mind-sets and Activities in the d.school Model (Experiences in Innovation and Design Thinking Boot Camp, d.school 2007, Personal Communication).*

***Human-centered and empathy.***

*"If you are not in the jungle you're not going to know the tiger" (Kelley, 2001, p.31)*

When A.G. Lafley (2008) became the new CEO of P&G in 2000, one of the first changes he implemented as a way to assist the company to regain market competitiveness, was to put the customer at the center of the innovation process and make he/she "the boss" (Lafley & Charan, p.34). Part of the work of a design thinker is to try to understand the user, defined here as not only the final user or consumer, but also all those who may be involved with the changes (Beckman & Barry, 2007):

The definition of customers and users may be quite broad. A team designing a product might consider all members of the supply chain

in its observational research. A team designing a new building might consider all those involved in constructing the building as well as all those who will occupy, maintain, or simply be walking by the building. Innovation for sustainability requires taking a system view, accounting for all those who will be affected in the short and long term by the product or service. (p. 30)

A design thinker has to understand the information first hand by observing people in real situation with a mind-set of empathy, looking to understand human behaviors and emotions. “Design thinking starts with people and look for evidence of desire” (Rodriguez & Jacoby, 2007, p. 56). Empathy is critical and it is about really understanding somebody’s goals and way of thinking and “what procedure and philosophy she follows to accomplish them” (Young, 2008, p. 2). For P&G it became a new approach with many employees literally living with consumers at their home, shopping with them and becoming part of their life so they could understand the whole person (Lafley & Charan, 2008). Importantly, understanding the whole person creates opportunity for creating ‘experiences’ rather than products or services. For example P&G recently created a web-site for its Oil of Olay brand ([www.olayforyou.com](http://www.olayforyou.com)) where women can answer a questionnaire about their skin and their needs, then receive personalized recommendation for products that will meet their specific needs and not being overwhelmed by the large number of products on offer in a store (Rae, 2008). Kelley (2001) wrote:

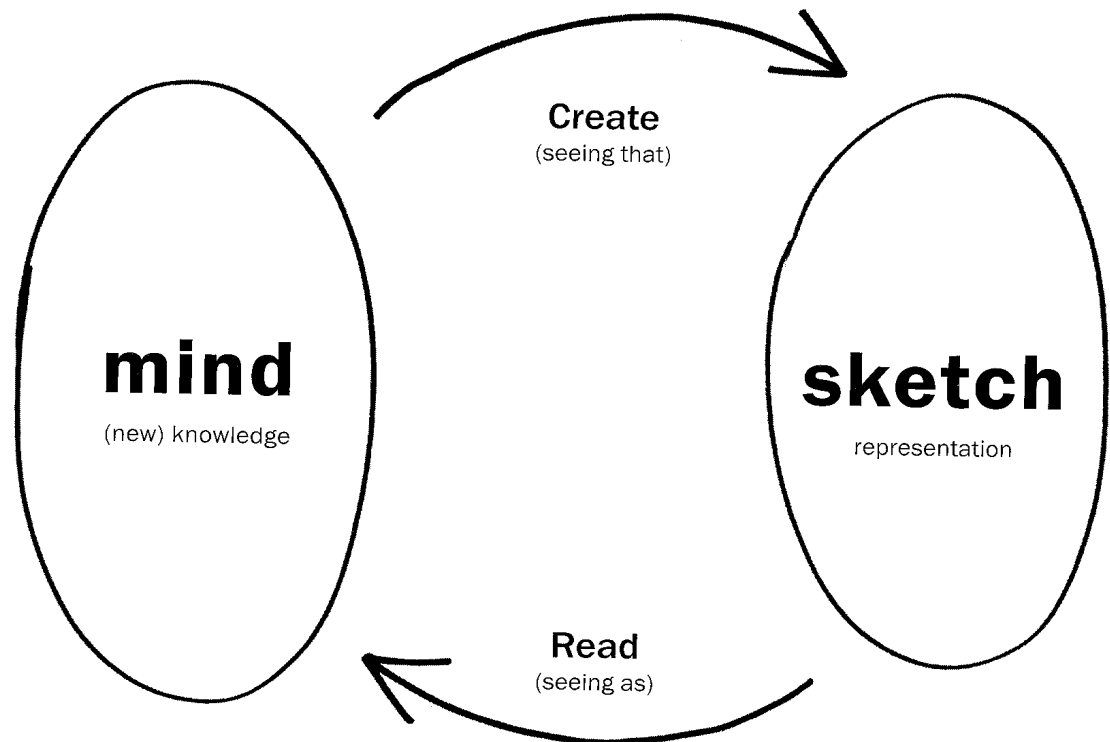
Seeing and hearing things with you own eyes and ears is a critical first step in improving or creating a breakthrough product. We typically call this process ‘human factors’. I prefer ‘human inspiration’ or, as IDEO human factors expert Leon Segal says, ‘Innovation begins with an eye’. (p. 28)

***Visual thinking and sketching.***

*“Sketching is not only the archetypal activity of design, it has been thus for centuries” (Buxton 2007, p.111).*

Visual thinking is a critical part of design and design thinking. Design thinkers use visual thinking in most aspects of their work. Arnheim, a Harvard professor in Psychology of Art, stated in his classic book *Visual Thinking* (1969), “Drawings, paintings and other similar devices serve not only to translate finished thoughts into visible models but are also an aid in the process of working out solutions of problems” (p.129). He also highlighted that the visual medium has the benefit of being a two or three-dimensional space while verbal language has only a singular dimension. McKin (1972), a Stanford professor believed that “Visual thinking is a ‘meta-strategy’, a fundamental mode of thinking (and a major alternative to other modes such as verbal thinking). Included under visual thinking are the three interactive strategies of thinking by seeing, imagining and drawing” (p. 161). Hanks and Belliston (2006) vividly described their experience of visualizing their thoughts by using sketching: “As my hands sketched the lines, my mind revealed a whole new method of thinking that I had not known before.... What happened to my mind was much more important than the sketches I produced“ (2006, p. 2). Lietka (2004) from the Rotman School emphasized the abductive nature of design thinking and its focus on visualizing desired future states, and “creating a blueprint for realizing this intention” (p.14). Buxton (2007) contended that sketching is core to designing and that sketches should be done quickly and inexpensively; one has to create many sketches with the right level of

details and some ambiguity for the goal of exploring alternatives to help the mind create new knowledge (Figure 8).



*Figure 8: A sketch of a Dialogue with a Sketch*  
Buxton, 2007, p. 114

***Prototyping and a prototyping attitude.***

*“Prototyping is a state of mind” (Kelley, 2001, p. 103).*

Prototyping is at the center of design thinking. Not only as a step and activity (to prototype) but more importantly as an attitude in addressing new solutions, and as a way to create a more meaningful dialogue and get early feedback (a prototyping attitude). “The key word at the d.school is ‘prototype’ used both as a noun and a verb. Basically it’s nonstop

inventiveness to meet human needs” (*The World as Prototype*, 2007).

Kelley (2001) explained in a chapter of this book focused on prototyping:

Prototyping is problem solving. It’s a culture and a language. You can prototype just about anything—a new product or service, or a special promotion. What counts is moving the ball forward, achieving some part of our goal. Not wasting time....Prototyping is a state of mind. (p. 103-104)

Kelley perceived a prototype as a way to learn, particularly useful for complex problems that seem insurmountable. Prototypes are also time savers and a great way to generate a dialogue and discover new issues. Prototyping, at least at the early stages, should be fast: “Quick prototyping is about acting before you’ve got the answers, about taking chances, stumbling a little, but then making it right” (p. 107). The example reported by Brown (2008) in Figure 9 is a prototype of a medical device made with a marker and a roll of tape (p.86).



*Figure 9: A Prototype of a Sinus Surgery Device*

Another benefit of prototyping is that it helps selling the outcome and making better decisions:

It is easy to reject a dry report or a flat drawing. But models often surprise, making it easier to change your mind and accept new ideas. Or make hard choices, such as forgoing costly and complex

features...A prototype is almost like a spokesperson for a particular point of view, crystallizing the group's feedback and keeping things moving. (Kelley, 2001, p. 111-112)

Schrage (1999) emphasized that fast prototyping is a way to create a dialogue and co-develop with clients. Prototyping forces organizations to become more explicit and to externalize their thoughts. He used the MIT Technology Media lab as an example of an organization whose culture is based on "‘Demo or Die’ (which) captures the prevailing belief that it's not enough to have brilliant ideas; you have to be able to demonstrate them" (p. XIII).

Prototypes do not have to be physical: "If you are working on a project that has a service or human component, sometimes it helps to have a team member-and even clients-express the project through archetypal characters in a little improvisational skit. Living, moving prototypes can help shape your ideas" (Kelley, 2001, p. 112).

### ***Stories and story-telling.***

*"The creating and telling of myths is part of human nature" (Kelley, 2005, p. 243).*

Stories alone or together with prototypes, are ways to encourage people to act and react and it is seen as a critical element of design thinking.

Crafting and telling simple, emotional, concrete stories is a critical part of the design thinking approach. Focusing on storytelling ensures that the essence of the value proposition is communicated and understood in a way that allows people within an organization to learn and act. (Rodriguez & Jacoby, 2007, p. 57)



In their book *Made to Stick*, Heath and Heath (2007) explained that 'sticky' ideas have a longer lasting effect and can help change behaviors . They described six principles that can help make ideas *sticky*, summarized in the anagram SUCCEsS: Simplicity, Unexpectedness, Concreteness, Credibility, Emotions and Stories. The reason stories are so powerful is that they create emotional connections both within the audience and between the audience and the user. Kelley (2005) believes that storytelling builds credibility, unleashes powerful emotions and helps teams bond, sways a group point of view, creates heroes and gives a vocabulary of change. Stories also give "permission" to explore controversial topics, and help make order out of chaos. Baek (2008) observed designers working on three separate projects and analyzed all the resulting narratives (the author uses Lacey's definition of a narrative being "information as a connected sequence of events" in her paper, p. 5). Observing all their meetings, her conclusion is that designers use narrative as a way of thinking and dealing with challenges. She found out that narratives could help designers understand the project and the process, better understand the clients and the customers, problem-solve, and help manage the project. Narratives can motivate, build teamwork and foster a friendly atmosphere. It is interesting to notice that the Moggridge's 2007 book *Designing Interactions* is actually a collection of stories and interviews that he organized around themes such as play, people and prototypes.

***Multi-functional teams.***

While it is acknowledged that teamwork and collaboration are a necessity for companies and organizations focused on innovation (DeCusatis, 2008), design thinking has a particular emphasis on the team approach because of the belief that appalling problems require different minds to help solve the challenge. In a 2007 interview, Moggridge highlighted the importance of working in team when grappling with complex issues, because the “shared mind is more powerful than the individual mind” (Wise, p .3). The Stanford d.school makes multidisciplinary teams a pillar of their approach and claim on their web site:

Having worked with hundreds of organizations to design products, services, and environments, we believe true innovation happens when strong multidisciplinary groups come together, build a collaborative culture, and explore the intersection of their different points of view  
([http://www.stanford.edu/group/dschool/big\\_picture/design\\_thinking.html](http://www.stanford.edu/group/dschool/big_picture/design_thinking.html))

The d.school believes that design and innovation is most successful with team members from many fields (Figure 10).

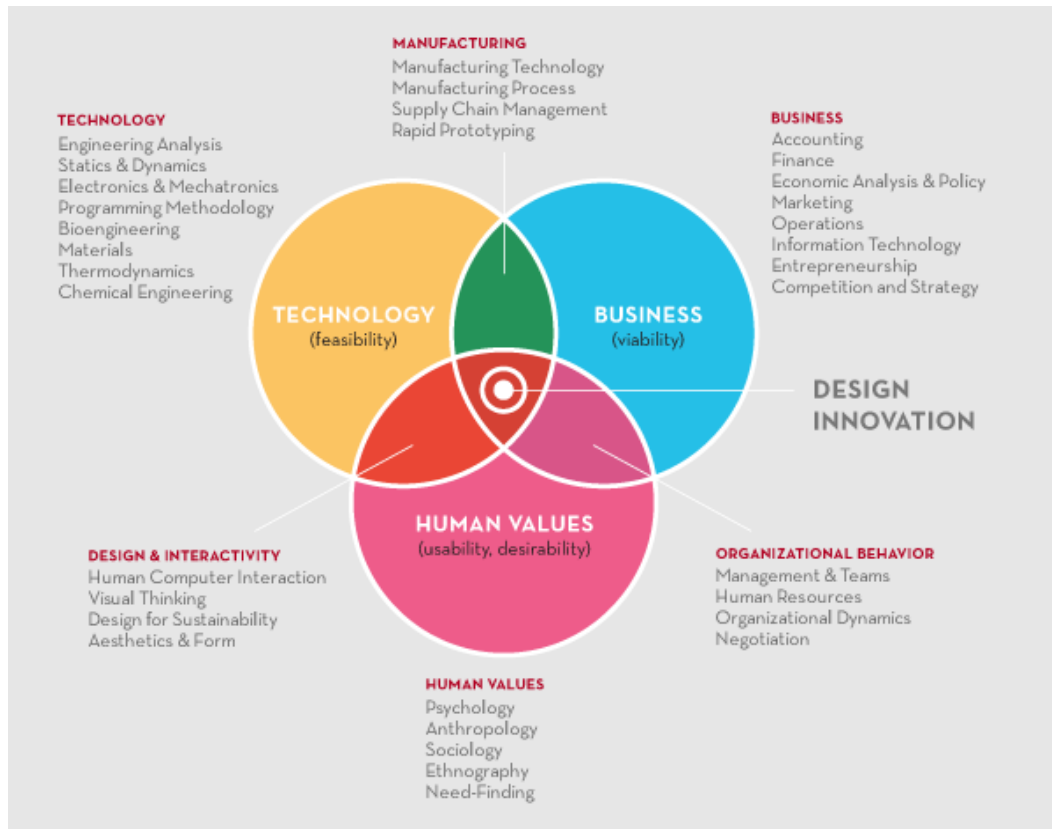


Figure 10: The d.school Multidisciplinary Approach to Design Thinking

[http://www.stanford.edu/group/dschool/big\\_picture/design\\_thinking.html](http://www.stanford.edu/group/dschool/big_picture/design_thinking.html)

Martin (Dunne & Martin, 2006) stated that schools must start thinking that multi-functional teams are a key to success, and should realize that the traditional educational system has overly emphasized individual success. On the business side, Buxton (2007) demonstrated in his case studies about the iPod and a new mountain bike that having multiple disciplines involved made the outcome so successful. Chan (2008) elevated this concept to a higher level, as he suggested that by making design thinking collaborative, it is no longer confined to technicalities,

processes and products, but becomes an “interactive, political and reciprocal process” (p. 6) that ultimately broaden the role and impact of designers and design thinking.

***Personalities and thinking styles associated with design thinking.***

Design thinkers by definition have unique ways of processing thoughts, in particular integrative thinking, which is the ability to hold opposite thoughts together and find a way to integrate them in a solution (Martin, 2007). Cross (Sonalkar, 2008) believes that a core characteristic of designers is “constructive discontent” (p.1), which is noticing issues and wanting to find ways to make them better. Brown (2008) listed the characteristics of design thinkers as empathy, integrative thinking, optimism, experimentalism and collaboration. Owen (2005) highlighted 10 characteristics that capture the uniqueness of design thinking: conditioned inventiveness, human-centered focus, environment-centered concern, ability to visualize, tempered optimism, bias for adaptivity, predisposition toward multi-functionality, systemic vision, view of the generalist, ability to use language as a tool, affinity for teamwork, facility for avoiding the necessity of choice, self-governing practicality and ability to work systematically with qualitative information. These patterns of thinking impact the way design thinkers think and the types of solutions they create.

### ***Social responsibility.***

Many designers feel that they have a social and environmental responsibility when they design and that they need to take the consequences of their design into consideration. Cross (2008) said in a recent interview “Design is imagination with responsibility. It is rather easy to be creative...but a designer has to be also aware of social responsibility, environmental responsibility...at the same time.” (Sonalkar, p. 3). Owen (2004) suggested that given the enormous challenges of the world (food production, overpopulation, climate change, etc.), designers have a duty of “service at the highest level” (p. 12) and should use their unique skills to help solve issues at the policy-making levels.

We have new responsibilities....It is because of the way we think and the approach we bring to problem finding and problem solving...we offer another way to find information, gain insights from it, to organize it, evaluate it and project holistic concepts. (p. 10)

### ***Teaching Design Thinking***

#### ***The design thinker approach.***

Roger Martin, the Dean of the Rotman School of Management suggested that business education needs to integrate some of the principles of design education (Dunne & Martin, 2006) in particular:

1. Thinking about solving complex challenges using abductive logic (“the logic of what might be” p. 513) rather than deductive logic (“what should be”) or inductive logic (“what it is”).

2. Learning collaborative skills, which means listening to others and understand others' perspective.
3. Learning to understand the users and users' experiences by actually getting to learn everything about real users on a real issue.
4. Teaching tools and approaches like visualizing, prototyping, testing with consumer and improving continuously.
5. Learning about integrative thinking by "looking at things as a whole, not piece parts that you put together" (p. 516).

Martin also believed that faculty needs to teach differently and let the students think the way they want, rather than believing in a right or wrong answer. Owen (2005) suggested that design thinking be taught using project-oriented learning methods. Bisoux (2007) explained that often students are not used to working in multi-disciplinary teams and that it takes a while for them to start appreciating others' perspectives and points of view. She described an example of a class at the North Carolina State University's College of Management, where students used design thinking to create an inhaler for asthmatics. The students first developed an understanding of the users by using ethnography (observing and interviewing users) which allowed students to discover unarticulated needs, then began generating ideas, creating scenarios, sketches and prototypes, before integrating some of the business constraints. Another interesting concept of teaching design thinking, as applied by the Stanford d.school, is

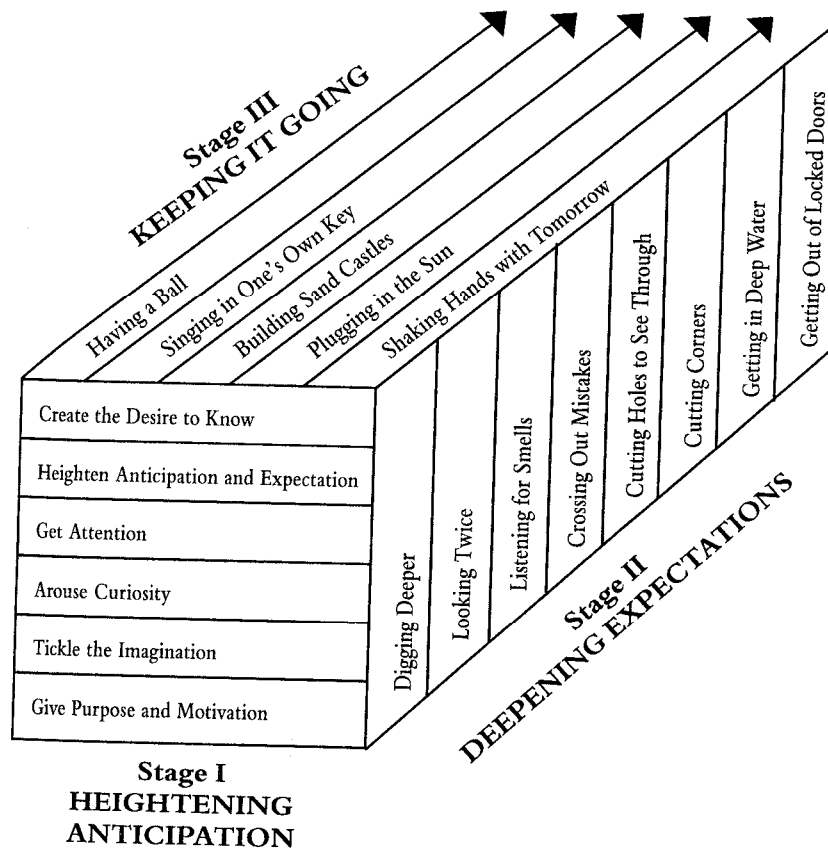
the idea that the class should model the principles taught. Therefore the class uses a multi-disciplinary teaching team and is always in prototyping mode, evaluating each session with the students and the teaching team, and making changes for the next session (Helene Cahen, personal communication).

### ***The pedagogical approach.***

Once the content of education and some principles are defined, there is the need to look at the learning outcomes and the pedagogical approach to teaching. This brief review is based on general educational frameworks and universal pedagogical approaches that are not content dependent.

The first one is a traditional framework called the Bloom Taxonomy of Educational Objectives. This has been used in education to help classify the learning outcomes (Krathwohl, 2002) and create a common language and comparison across courses. This framework was initially published in 1956 and revised by Krathwohl in 2002. The revised version added to the knowledge dimension (factual, conceptual, procedural and meta-cognitive) a cognitive process dimension (remember, understand, apply, analyze, evaluate and create). A Taxonomy Table was created as a way to visually understand the learning goals of a specific class or curriculum, as well as determine what may be missing.

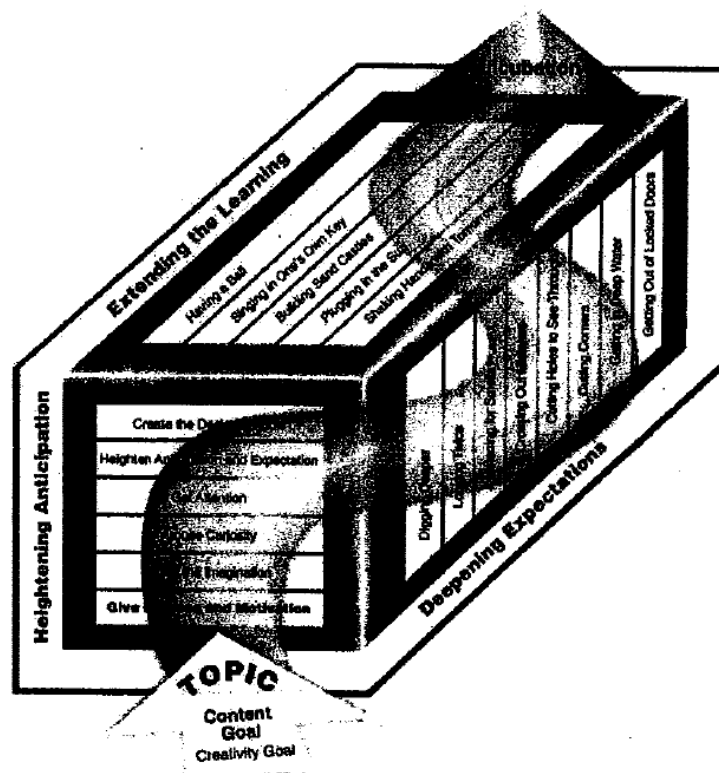
The second approach is the Incubation Model of Teaching and Learning, a universal teaching model developed by Torrance (1999), which “will make teaching more effective in any subject, at any age level, with any method of instruction” (Torrance & Safter, p. 38). The model is participatory and has three steps that are done consecutively: (a) heightening expectations so the student is excited about the lesson, (b) sustain motivation by digging deeper, and (c) continuing the learning experience after the lesson is over (Figure 11).



*Figure 11: The Incubation Model of Teaching and Learning*  
Torrance & Safter, 1999, p.39



The latest version of this model called Torrance Incubation Model of Teaching and Learning (TIM) was recently developed by Murdock and Keller-Mathers (2008) and emphasizes the iterative nature of the process (Figure 12).



*Figure 12: The TIM- 2008 Version*  
Murdock & Keller-Mathers, 2008, p.12

In addition, creative skills are used to teach the content creatively, regardless of the content itself (Murdock & Keller-Mathers, 2002). Finally flexibility is the key to its effectiveness. “The teacher or trainer should not presume to have all the answers...but encourages discovery from the learners” (p. 10). Interestingly those characteristics are similar to design

thinking which uses an iterative approach and an on-going prototyping attitude.

### ***The Future of Design Thinking***

Design thinking is still in its infancy. When I recently attended a design research conference organized by the Institute of Design in Chicago, two professors (Professor Leifer from Stanford and Professor Kumar from ID) emphasized that the discipline is too new to have books. There are many examples demonstrating that design thinking works, but not much yet about why it is working. Moggridge (2007) said in an interview by Wise:

The reason that design thinking is a buzzword is that it is recognized in terms of results. And what's not recognized is how to achieve it....So that's why design research needs to step into the forefront and become effective...making design process better understood...and hence, more respectable. (p. 2)

Rodriguez and Jacoby (2007) believed that design thinking, once integrated, becomes a life skill that can help to accomplish one's dream while limiting the risks. The authors suggested that the same approach could be applied to individuals or to organizations. Given the interest of design thinking in education, as well as being embraced and adopted by key companies, design thinking appears to have a huge potential in the years to come. George Kembel, the director of the Stanford d.school, interviewed in a recent article in the New York Times (Rae-Dupree, 2008) commented that design thinking couldn't solve everything, but that

“business thinking plus design thinking ends up far more powerful” (p. BU4).

## **Conclusion: Design Thinking and CPS, Similarities and Complementarities**

### ***Similarities***

While there is no published literature comparing CPS and design thinking, this review of the literature has shown similarities in:

1. The importance of creativity

Designers and design thinkers all acknowledge the importance of creativity when it becomes action oriented. While Puccio, Murdock and Mance (2007) do not mention design in their book on *Creative Leadership*, the authors emphasize that CPS “combines thinking with doing” (p. 29), which is similar in focus to design thinking.

2. The process (Figure 13)

3. The importance of keeping an open mind and suspending judgment

4. The importance of diverging and converging activities

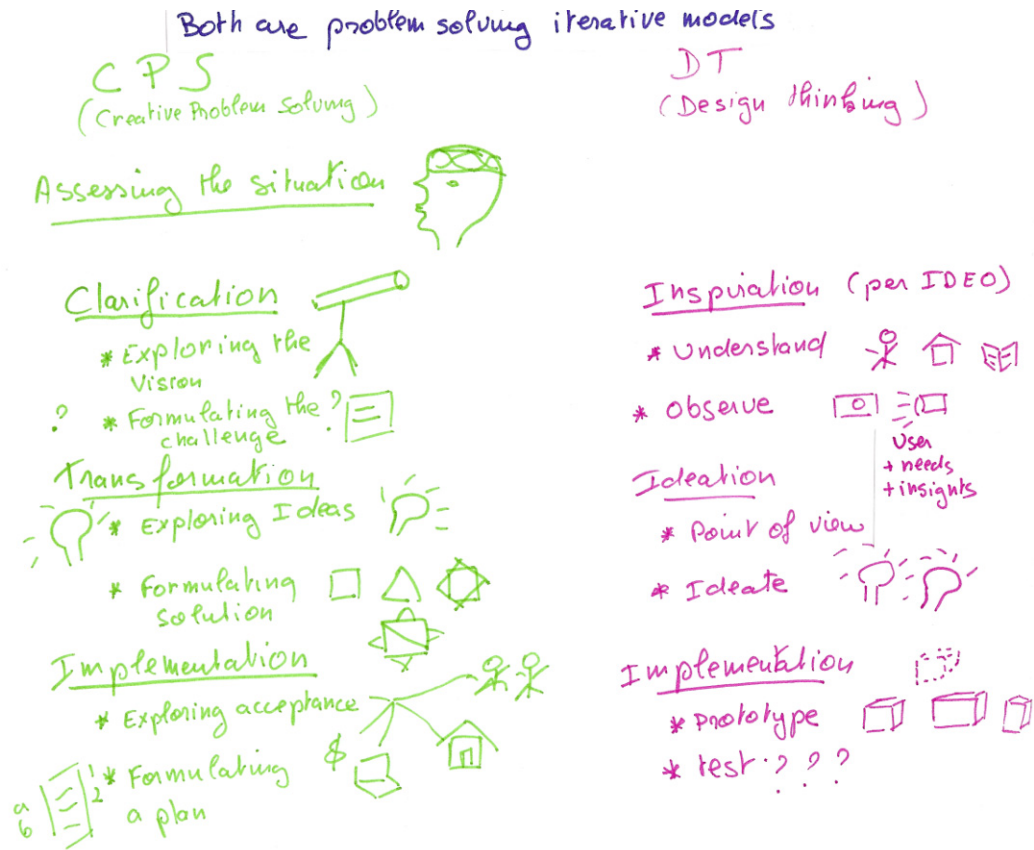
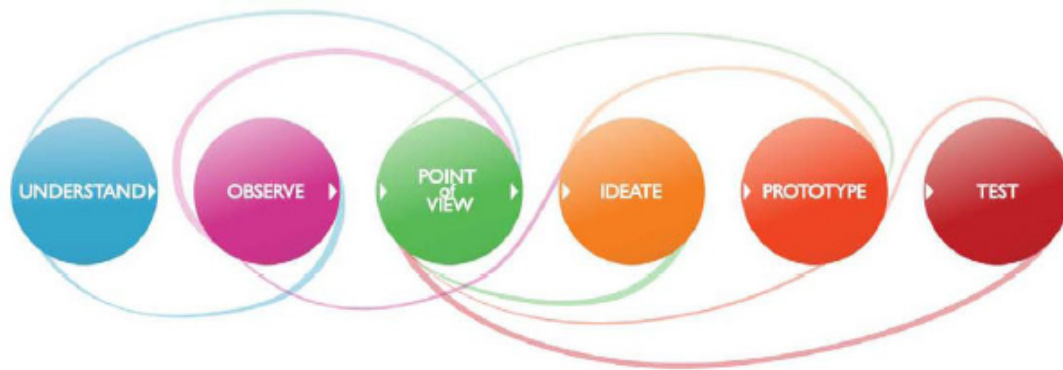


Figure 13: Comparison of the CPS and Design Thinking models  
 Cahen, 2008, p.21

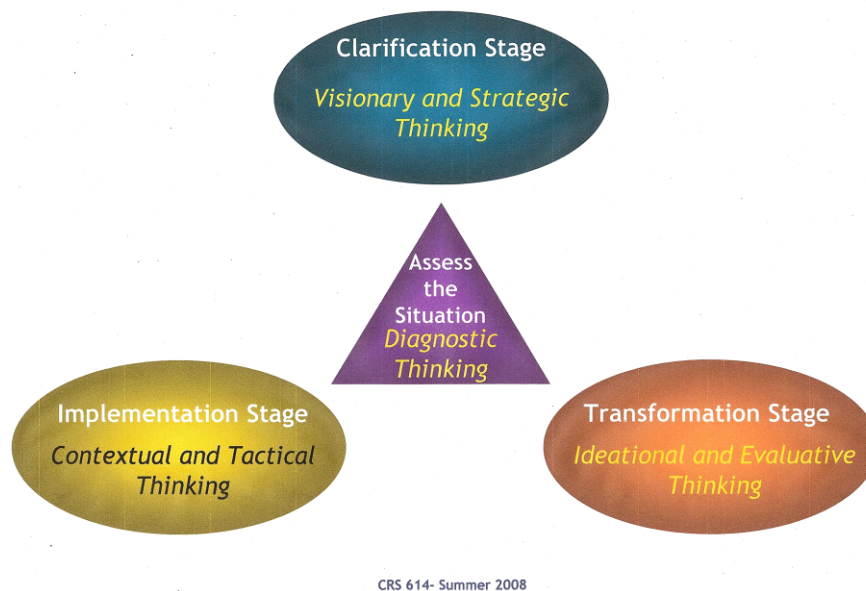
In addition, the thinking skills involved in both model are relatively similar (Table 2 and Figure 14).

Table 2  
 Comparison of the design thinking steps and the Thinking Skills

Design Thinking Steps	Thinking Skills
Understanding	Diagnostic Thinking
Observe	Diagnostic Thinking
Point of View	Visionary and Strategic Thinking
Ideate	Ideational Thinking
Prototype	Ideational and Evaluative Thinking
Test and Iterate	Contextual and Tactical Thinking



## CPS Stages and Related Thinking Skills



*Figure 14: Comparison of the Design Thinking Model and the Thinking Skills model*  
 d.school, Design Thinking Boot Camp, personal communication, and ICSC, CRS 614, personal communication

### **Complementarities**

Design thinking is also bringing some complementary skills and mind-sets to CPS:

1. An emphasis on being human-centered, understanding users as a critical part of Diagnostic Thinking, and the tool of ethnography.
2. A focus on using visual thinking throughout the process.
3. A new emphasis on adopting a prototyping attitude that may be particularly useful in the Evaluative and Contextual Thinking modes.
4. New tools to use in Contextual and Tactical Thinking such as story-telling and early testing.

CPS with all its rigor and 50 years of research may help design thinkers with the challenges of becoming a more scholarly discipline and being able to further the research mapping scientific reasons for the success of this approach.

## SECTION THREE: PROCESS PLAN

### Introduction

To successfully accomplish my goal of creating a graduate curriculum in design thinking, I had to learn more about the content via literature review of available materials. In addition, I needed to research other curriculums on this topic, define the learning goals, create an outline for the curriculum, then create the activities that would be used in the classroom, including all course material for the first two days.

First I looked at information and classes in the field of design and/or design thinking. Except for the Stanford d. school introductory class “Experiences in Innovation and Design Thinking”, which I had the opportunity to attend in the fall of 2007, I found very limited information during my online search. I also attended the Design Research Conference at the Chicago Institute of Design on September 19 and 20, 2008. This provided me with the opportunity to visit the school, get a feel for their programs, and talk to some of their professors and students, while meeting researchers who currently work in the field of user research. I then began an ideation process to define the desired learning outcomes, as well as ideas for activities. At the same time, I put together a proposal for a two-day workshop that would allow me to “prototype” both the content and the teaching approach. I also conducted a broad search of the literature, which gave me a sense of the history of design and design thinking and helped

me synthesize the key elements of design thinking. My literature review also provided me with information related to the design education approach, which I then integrated in the curriculum. Simultaneously, I interviewed student graduates of the d.school program and reviewed my own diary notes from my class to better understand the “users” perspective (users here being the students). I also briefly talked to the director of the d.school to understand his perspectives on content and delivery of a class in design thinking. I then put together an outline for a five-day intensive graduate level class, and a two-day workshop. As I was looking at a way to “prototype” a short version of the workshop, Randah Taher and Deborah Clifford, friends and alumni from the ICSC in Toronto suggested that they would be able to create the workshop in Toronto and where interested in both contributing to the project and learning at the same time. Deborah had a unique experience in leadership and Randah had been studying design thinking and its relationship with space and creativity. Since working in a team and having a teaching team was a core concept of this curriculum, this was the perfect opportunity to “prototype” this program. Given that we had only a short lead time to let potential participants know about the workshop, we shorten the workshop to a day and a half (less time off work for participants) and I had to review and shorten the material. I then finalized the whole day and ½ workshop including the overall flow, agenda, details of all the activities, hand-outs and power-point presentations and debriefing. This workshop was offered on November 10 and 11 in Toronto.



I prepared the workshop and was the main presenter. Deborah Clifford and Randah Taher assisted me as coaches and provided their unique perspectives to the discussions with the participants and helping facilitate the ideation phase of the case study. After completing the workshop, and based on the feedback as well as my self-reflection, I finalized the final five days workflow for the graduate class (including learning goals, brief description of the activities and timeline) as well as the details of the first two days (including detailed activity, agenda, power point presentation, pre and post class homework). I then assembled a “facilitator’s kit” that included word descriptions of the goals and activities included in each session, together with individual sheets that described each activity in detail, including goals, timing, description of the activity, teaching notes, a list of material, resources and some visuals.

### **Process Plan**

The final timeline for the project is included below in Table Three.

Table 3  
*Project Final Timeline*

<b>Date (week of)</b>	<b>Activities for creating a curriculum in design thinking</b>	<b>Activities for master project requirements</b>	<b>Hours</b>
August 25	-Discussion with John Cabra and Sue Keller-Mathers regarding creating a curriculum on design thinking	-Preparation for the master project class	20 hours
September 1st	-Review New Topic Course Proposal format (which is one of the outcome of this project) -Look for examples of design, and design thinking curriculum online -Create an “advisory board” Yahoo group -Share concept paper with Deborah Clifford for her perspective on leadership -Share paper with Randah Taher to see if her organization is interested in testing a “prototop workshop”	-Work on draft paper -Get feedback -Integrate feedback in draft paper -Write and answer postings on Angel -Discussion with Sue Keller-Mathers on the concept paper -Start concept paper	20 hours
September 7	-Discussion with John Cabra about the content of the curriculum	-Finalized and post draft concept paper -Read other concept papers and attend Angel discussion	25 hours
September 14	Attend design research conference : -Visit the Chicago Institute of Design and attend their open house -Attend conference -Rewrite the proposal for a two-day workshop with a marketing orientation (based on initial feedback)	-Send draft concept paper to Sue	40 hours
September 21	-Start drafting learning goals for the curriculum - Begin ideating on goals, concepts and activities	-Submit final concept paper - Discussion with Sue Keller Mathers -Look for new articles for literature review	15 hours
September	-Research additional articles on	-Review proceedings	20

28	<p>design thinking</p> <ul style="list-style-type: none"> <li>-Start converging on goals and activities</li> <li>-Draft a day-by-day description of a five-day class and a two-day workshop</li> <li>-Begin literature review in design thinking</li> </ul>	from the 2008 Design Thinking Conference	hours
October 6	<ul style="list-style-type: none"> <li>-Develop timelines for the two and five day curriculum descriptions to see how realistic they are</li> <li>-Research books and video material that may be appropriate for the class</li> <li>-Meet with the d.school director and an ex-d.school student to obtain a concrete perspective on a design thinking curriculum</li> <li>-Discussion regarding the logistics of creating a workshop in Toronto</li> </ul>	<ul style="list-style-type: none"> <li>-Update with Sue Keller-Mathers and John Cabra</li> <li>-Review design thinking literature and organize learnings by themes</li> <li>- Start draft of section two of the master project:</li> <li>-Start full bibliography document for appendix</li> </ul>	26 hours
October 12	<ul style="list-style-type: none"> <li>-Work on clarifying learning outcomes for the five-day workshop</li> </ul>	<ul style="list-style-type: none"> <li>-Write section one</li> <li>-Continue drafting section two, reading and organizing ideas</li> <li>-Angel Chat</li> </ul>	30 hours
October 19	<ul style="list-style-type: none"> <li>-Begin work on detailed activities for the day and half workshop to be conducted in Toronto in November</li> <li>-Create a template to present the activities in a visual manner</li> <li>-Rework the five-day class description to better integrate goals for each day and each section</li> <li>-Obtain feed-back on the five-day description from the Yahoo "advisory board"</li> <li>-Update with John Cabra</li> </ul>	<ul style="list-style-type: none"> <li>-Finalize section two of the master project</li> <li>-Draft and finalize section three</li> <li>-Proof-read and edit document</li> <li>-Send draft of the first three sections to Sue Keller-Mathers and John Cabra</li> </ul>	50 hours
October 26	<ul style="list-style-type: none"> <li>-Develop all the material for the day and half workshop</li> <li>-Discuss details with co-teachers</li> </ul>	<ul style="list-style-type: none"> <li>-Revise sections one to three</li> </ul>	30 hours
November	<ul style="list-style-type: none"> <li>-Finalize all details for the</li> </ul>	<ul style="list-style-type: none"> <li>-Begin drafting sections</li> </ul>	45

2nd	workshop -Fine tune the five-day description -Fine tune the New Topic Course Proposal	four to six -Start assembling material for Appendixes -Check-in with Sue Keller-Mathers and John Cabra	hours
November 9	-Present and debrief the workshop -Modify material and curriculum according to lessons learned -Revise curriculum based on feed-back from description	-Finish draft of section three to six and appendixes -Review and finalize section one to three	55 hours
November 17	-Finalize the "facilitator's kit", description of the five day class	-Send draft of the sections four to six and revised section one to three -Finalize appendices	40 hours
November 24	-Discussion with Sue and John -Finalize master project write up	-Finalize the master project writing -Finalize all appendixes	30 hours
December 1 <sup>st</sup>		-Post final version -Worked on details to be mailed -Prepare class presentation -Attend Angel class presentation -Mail all documents	40 hours

## SECTION FOUR: OUTCOMES

### Introduction

The purpose of this master project is to create a curriculum based on design thinking for participants with some background in CPS. Therefore the outcomes are geared toward preparing the material for the curriculum that could be used by different teaching teams and ensuring that the content is relevant, meaningful and fits within the constraints of a three-credit graduate class. As I began to gather all the elements together, I realized that any class material for existing classes I found were presented in a way that was not very *user* friendly because of lengthy descriptions, basic formatting and lack of pictures. In addition, the materials were written in a rigid lesson plan format, which limited the flexibility if the facilitator wanted to adapt some activities while delivering the class. I sensed a gap and saw the opportunity to create a 'facilitator's kit'. The 'kit' would allow a facilitator to easily mix and match different activities and presentations to create his or her own version of the class, or substitute activities as necessary such as changing a warm-up exercise or adding a new debriefing activity. Finally the kit will be a great "train the trainer" tool, as it is appealing, easy to use and includes not only verbal instructions, but pictures that illustrate the activities as well.

### Brief Review of Existing Curriculum

#### ***Non-ICSC Classes***

When I looked at all the curricula available related to design thinking for which I found a description online, most of the classes appear to be focused on design rather than design thinking. These curriculums feature a traditional format of reading, lectures and discussion, rather than a studio format with hands on projects. The more design-focused curricula have an emphasis on techniques such as sketching or prototyping, rather than the process. They also tended to be primarily focused on individual activities with limited emphasis on group work. Most of them were targeted at future designers rather than towards a broader audience (See Appendix B for a list of web-sites and links to the classes).

### ***Review of Format and Documents from Existing Courses at the ICSC***

The documents (syllabus, contract, course proposal and session plans) from the classes (for example CRS 302) at the center were very detailed. On the other hand, I found them difficult to read and not very exciting in their structure. This gave me the idea of creating a “facilitator’s kit” for detailing the session plans that would be in a user-friendly format and could easily allow for a new instructor to change activities or the order without having to start from scratch.

### **Literature Review as an Outcome**

Since creating a curriculum is a scholarly task, one the key outcomes in this project was to create an in-depth review of the literature

that would help me deepen my personal learning around the topic and find elements that can be used in the classroom (see Section 2). In addition I created a relatively exhaustive bibliography around design thinking and related topics such as visual thinking, storytelling, sketching, etc. (Appendix C).

### **Flow Chart for a Five Day Course**

I did several drafts of the flow chart of a five day course titled 'Experience In design thinking for CPS Users' and used the design thinking principle of early testing and iterating to get feedback and improve on the document. I was lucky to receive great feedback from Assistant Professor John Cabra, Assistant Professor Sue Keller-Mathers, Jonathan Vehar, Mark Hylton and Randah Taher which helped me improve the flow mostly in terms of clarifying the learning goals, ensuring that timing was realistic, and including time for reflection and discussion on the relationship between design thinking and CPS. Table 4 shows the latest version of the flow chart.

Table 4:  
*Day by Day Goals and Activities for the Design Thinking Experience for CPS Users Curriculum (5 days, 40 Equivalent Hour).*

### Pre work: Heightening Anticipation

<p><u>Profile for group setting</u></p> <ul style="list-style-type: none"> <li>- A short essay on the reasons for enrolling in the class and skills (would also help create the groups for day 1)</li> <li>-Take the FourSight thinking profile test prior to the class</li> </ul>
<p><u>Readings:</u></p> <p>Book: <i>The Art of Innovation</i> (Kelley, 2001)</p> <p>One or two articles from a selection:</p> <ul style="list-style-type: none"> <li>-Brown, T. (2008). <i>Design thinking</i>. <i>Harvard Business Review</i>, 86(6), p. 84-92</li> <li>-Owen, C.L. (2008). <i>Design thinking: On its nature and use</i>.</li> <li>-Wise, S. (2007). <i>Interview with Bill Moggridge</i>.</li> </ul>
<p>Watch Time Brown, CEO of IDEO at the MIT  <a href="http://mitworld.mit.edu/video/357/">http://mitworld.mit.edu/video/357/</a></p>
<p><u>Homework:</u></p> <ul style="list-style-type: none"> <li>-Post book, articles and video summary and key learnings in a mind-mapping format: (using Mindomo, a free mind-mapping software)             <ul style="list-style-type: none"> <li>⇒ What new learnings did you get from the readings and watching the video?</li> <li>⇒ How to connect these learnings to CPS and creativity?</li> </ul> </li> <li>-React to at least one other student mind-map (via a Skype discussion or blackboard function on Angel)</li> </ul>

### Day One: Heightening Anticipation and Deepening Expectations

#### Goals:

- Understand the key principles of design thinking
- Become mindful of the critical importance of “human factors”
- Learn to develop visual thinking ability
- Learn about Empathy, Ethnography and some of the tools for *Understanding and Observation*

Activity	Estimated time
<p><b>Morning goals:</b></p> <ul style="list-style-type: none"> <li>-Setting up the principles and experimenting design thinking first hand.</li> <li>-Raising initial awareness about creating and behaving in groups</li> </ul>	
Welcome and logistics	10 min.
<p>Warm up: work in pair then report to the group:</p> <ul style="list-style-type: none"> <li>⇒ introduce yourself (who you are, what you do, what you are passionate about)</li> <li>⇒ do a visual presentation of yourself (object or picture of object you like and why)</li> </ul>	10 min.



⇒ What do you expect to get out of this class? Report back to group in a couple of sentences	10 min.
Review agenda for the week and the day Questions and answers (Q&A)	15 min.
Why do we care about design? In small groups, discuss the characteristics of objects that are important to you (participants can use examples from the warm-up as a support for discussion) ⇒ why are they important? ⇒ how do they make you feel? As a full group make some initial conclusions	15 min.
Summarize as a group what you think are the key elements of design thinking (based on pre-work): write on chart	10 min.
Stretch break (stand-up and stretch)	2 min
Mini-experience: redesign an alarm clock (see booklet) -First design you ideal alarm clock -Then work with a partner and ask them question, then sketch, ask for feedback and prototype Debrief ⇒ what happened when you designed for yourself compared to somebody else? ⇒ what was the most challenging part of the process ⇒ what was surprising?	1 hour
<b>Break</b>	20 min.
Introduction to the design thinking framework (power point presentation) Q&A	45 min.
Create the teams: based on FourSight preference (alternatively based on background or even through random selection )	15 min.
<b>Break</b>	1 hour
Over lunch each team has three tasks: ⇒ find three things you have in common ⇒ find one thing in common that is about you (not your family, your job, your education or your house) ⇒ find a name for the team	
<b>Afternoon goal:</b> <b>-Start building team collaborative attitude</b> <b>-Learn about the <i>Understanding</i> and <i>Observing</i> steps of design thinking</b> <b>-Refine observation skills</b>	
Warm-up activity <i>And vs. But</i> : See activity sheet The goal is to show the difference in group work if the word “and” is used rather than the word “but”. Debrief and ask: ⇒ how is this similar to situations happening in the work environment?	10 min.
Syllabus: review curriculum, clarify homework	15 min.
Introduction to the first case study, <i>Redesigning The Trash Experience</i> , with a few facts (hand-out)	15 min.
Expertise -Presentation on how to gain expertise: Power Point presentation	45 min.

<p>-Let's practice:</p> <ul style="list-style-type: none"> <li>* internet search</li> <li>* phone calls to experts and consumers</li> <li>* experience for yourself: for example go around the room and building and write down how you are feeling regarding trash around you</li> </ul> <p>-Write the information on post-its in a headline format, one idea per post-it and share</p>	
<b>Break</b>	15 min.
<p>Ethnographic research</p> <p>Introduction to ethnography research (Power Point presentation)</p> <p>Present the skit <i>Good Versus Bad Interviews</i> (see activity sheet)</p> <p>Practice with three mini-labs:</p> <ul style="list-style-type: none"> <li>⇒ picture observation: show pictures or videos of people</li> <li>⇒ practice interview session in pair with another participant asking them about their habits and beliefs around trash</li> <li>⇒ role playing immersion</li> </ul> <p>Write learnings on post-its and share in each group</p>	1 hour
<p>Preparation to outside ethnography</p> <p>Each group will discuss and prepare real ethnographic research outside the classroom for that evening, both observation and interviews</p> <ul style="list-style-type: none"> <li>-Prepare plan to do interviews and observation after class (location, team as a whole or split, roles, use of camera or recorders, etc.)</li> <li>-Prepare questions for interviews</li> </ul>	20 min.
<p>Debrief using the PPCo (Pluses, Potentials, Concerns and overcome) tool</p> <p>Focus both on learnings and format</p> <ul style="list-style-type: none"> <li>-Use the PPCo Power Point presentation as a guide</li> <li>-Give a short booklet describing the tool</li> <li>-Type on the computer and project feedback as you debrief</li> </ul>	20 min.
<p><b>Homework and practice:</b></p> <p>As a team (or can split in two pairs)</p> <ul style="list-style-type: none"> <li>-Go and observe people behaviors around waste</li> <li>-Do at least two interviews</li> </ul> <p><u>Personal Diary work:</u></p> <ul style="list-style-type: none"> <li>-Spend 10-15 minutes to reflect on your learnings. <ul style="list-style-type: none"> <li>⇒ what did you learn about design thinking today?</li> <li>⇒ what was new to you?</li> <li>⇒ how is design thinking similar or different from CPS?</li> <li>⇒ what do you want to learn now?</li> <li>⇒ what did you notice about working in your team? (Using a PPCo format)</li> </ul> </li> <li>-Read article <i>Prototyping is the short hand of design</i> by Tom Kelley (2001)</li> </ul>	1-3 hours (after class)

## Day 2 Deepening Expectations

### Goals:

- Review and deepen day one learnings
- Refine ability to draw conclusions from observations
- Learn the importance of selecting a Point of View

**-Learn about prototyping, getting feedback and using iterations**  
**-Increase awareness of the uniqueness of each group member and the challenge associated with it**

Activity	Time
<b>Morning goal:</b> <b>-Review and deepen learnings from the day before</b> <b>-Learn about creating a point of view and taking it to Ideation</b>	
Warm-up: Get to know your fellow students better and acknowledge differences Activity: Either/Or (see Activity Sheet)	15 min.
Discussion regarding day one learnings ⇒ review framework ⇒ Q&A regarding what we have accomplished so far ⇒ pair discussion (use diary entries as a starting point) ⇒ group summary	45 min.
Review agenda for the day	5 min.
Post all the data from last night observations and interviews and share within each group	20 min.
Point of View (POV): Power Point presentation	15 min.
Break	15 min,
Create different points of view using all the observations collected in group and subgroups: -Write six to eight POVs (User + needs + insights) -Select two POVs -Write an ad (such as a classified ad) for each of them providing more information about the user -In each group select one POV to carry forward (more extreme is better)	45min.
-Transform the POV into questions that the team believes are the core of the design challenge. Use statement starters: How to...? How might...? What might be all the...? In what way might...? -Select one (vote if necessary)	15 min.
Ideation (diverge) -Remind the participants about the rules of ideation (Power Point and hand-out), including "be visual" -Starting with the question selected, ideate using words and visuals as the outcome -Use brainstorming with post-its and if time, add visual connections	25 min.
Ideation (converge) Each group member identifies their top idea in each of the following category: 'smart choice', 'holy grail', 'darling', 'most unexpected idea' -Combine some of the ideas if possible and keep two ideas	20 min
Lunch break	1 hour
<b>Afternoon goal:</b> <b>-Learn to use sketching, prototyping and testing to help develop a sellable solution</b> <b>-Review learnings from the case study and start reflecting</b>	
Do six sketches of the two selected ideas in 25 minutes, splitting the	20 min

group in two if necessary. Show sketches to members of the other groups and select one sketch based on feedback.	10 min
Rapid prototyping: Do two prototypes of one of the selected sketches, and select one Note: prototype may also be a skit or some other ways to represent the idea	15 min.
Get feedback about the point of view and prototype from at least one potential user	15 min.
Break and preparation for final presentation: point of view, story, show prototype	40 min.
Presentation: five minutes per group, five minutes feedback (assume four group maximum)	40 min.
Debrief -For yourself (see debrief hand-out) -Discuss in your group ⇒ what did we learn today? ⇒ how did we feel about the outcome of the project? ⇒ how did we worked as a group: likes, potential, concerns	15 min.
Session PPCo	15 min.
<u>Homework</u> : Review assignment Diary: spend 10-15 minutes reflecting on your learnings: ⇒ what did you learn about design thinking today? ⇒ how did you feel about having to sketch? About having to prototype? ⇒ how might you use sketching and prototyping in the future?  Read article: Rae, J. (2008). P&G changes its game. How Procter and Gamble is using design thinking to crack difficult business problems.	5 min.
<u>Optional</u> : dinner with designers, visit to a show or other fun and design related optional activities	

### Day 3 Deepening expectations

#### Goals:

- Understand the importance of multi-functional teams
- Experience the power of the process in a real situation
- Deepen the learning on research and observation
- Increase awareness of listening skills

Activity	Time
Welcome -Grandma's trunk, an improvisation exercise focused on openness and visual observation (see activity sheet)	10 min.
-Review agenda for the next three days	5 min.
Create new teams based on key skills sets (and/or FourSight) and assign a coach per team -Team warm up activities: agree on a list of 10 objects to take on a deserted island or the <i>Carrying a soda can</i> (Arnold, 2003, p.65) team	30 min.

building exercise -Debrief: ⇒ What was challenging about this exercise? ⇒ How important was leadership to help solve the challenge ⇒ What differences of style have you noticed in your group	
Real Client (if possible) to present their challenge Q&A to client	45 min.
In depth ethnography: -ID video on ethnography and discussion on learnings <a href="http://www.id.iit.edu/externalID/index.php?id=858">http://www.id.iit.edu/externalID/index.php?id=858</a>	40 min.
Groups to discuss their strategy to deal with the challenge and get organized to do their own understanding and observing phases of the process	30 min.
Understand and observe: TBD by team The teams could use the <i>IDEO method cards</i> to help pick some activities (lunch included in this time)	2 hours
Interviews or observations pre-organized in client organization or potential users (optional)	1-2 hours
Debrief using all the information including visuals Do a saturation board ⇒ use empathy map to organize the data: organize observations by users/personalities, situations and insights, quotes and defining words, actions and behaviors, thoughts and beliefs, feelings and emotions (source: d.school, 2007, private communication)	1 hour
-Write six to ten POVs -Each team member will pick one	1 hour
If necessary evening time can be used to finalize the POVs	
<u>Homework:</u> -Read introductory chapter of <i>Made to Stick</i> or Part One of <i>The Leader's guide to storytelling</i> (or other articles on storytelling). -Write a story based on the point of view you selected -Diary: take 15 minutes to reflect in your diary ⇒ what are the key learnings of the day? ⇒ how do you think the empathy mind-set can help with solving complex issues? ⇒ how would you integrate the ethnography tools within CPS? ⇒ what areas do you want to deepen your learnings in the next two days?	

#### Day 4 Deepening Expectations

##### Goals:

**-Learn about the importance of stories and storytelling to sell the outcome**

**-Learn to prepare for execution and convincing clients**

**-Learn the importance of creating feedback loops with the “users” and accepting the iterative nature of the process**

Activity	Time
Welcome back	5 min.

Warm-up: write a short one-paragraph story. Tell the story to three different persons without using any of the same words. Debrief: => what did you think? => how different was each story? => which one was the best and why?	15 min.
-Discussion regarding how design thinking and CPS may be complementary: In group of three with students that you not worked together before ⇒ how have you been using CPS? What works and where do you have concerns? ⇒ based on what you learned so far, what do you think works well with design thinking and where do you have concerns? ⇒ Are CPS and design thinking similar or complementary? In what ways? -Report key learnings to the group	45 minutes.
Transform the POVs created the day before into a series of challenges. Select one	30 minutes
Ideation for client case study and selection of three to four ideas	1 hour
Discuss article on storytelling Activity: all students are given a one or two page article about an issue. In pair, they have 30 minutes to create a short story that would “stick” and one minute to share.	45 minutes
Create 10 sketches of your ideas in your work group, and then pick two to prototype.	1 hour
Tell a story about your prototype and get feedback from possible users	1 hour
-Refine prototype, finalize prototype and prepare presentation	3 hours +
Homework: -Diary: ⇒ what do you think design thinking can bring to CPS? ⇒ what do you think CPS can bring to design thinking?	

### Day 5: Deepen Expectations and Extending the Learning

#### Goals:

**-Be able to create a personal approach for integrating design thinking and CPS**

**-Reflection on learnings: individual, team, the whole class, students and teaching team**

**-Learn and reflect about one’s own creative strengths and areas of opportunities as a member of a creative team**

**-Learn to welcome feedback as a gift**

Activity	Time
Warm-up: Temperature Check (see activity sheet)	10 minutes
Presentation with clients: eight minutes, four for Q&A and five for feedback We could also invite friends of the ICSC with a design perspective for broader feedback.	1 hour, 20 min.
Celebratory breakfast	30 minutes

Presentation on creative leadership in teams by expert	30 minutes
Discussion within each team: ⇒ write your own self-evaluation as well as evaluate your other team members and coach ⇒ discuss the successes and challenges of each team ⇒ identify enablers and resisters to the process ⇒ in a discussion format provide feedback to each team members with assistance from the coaches ⇒ individually each participant will write his learning as a team member and creative leader in a non hierarchical team structure ⇒ write ideas to implement to continue growth in this area	75 minutes
Lunch	1 hour
<u>Optional:</u> Watch video from TED ( <i>Why Design?</i> With Philippe Starck) <a href="http://www.ted.com/index.php/speakers/philippe_starck.html">http://www.ted.com/index.php/speakers/philippe_starck.html</a> (or alternatively have a guest speaker) => what did we learn about designers and design? => how does this fit with what we learned in this class?	30 minutes
Learnings on design thinking: =>create a visual or prototype that illustrates your own learnings from the class	30 minutes
Design thinking and CPS: In groups (new group of people that have not worked with each other before) ⇒ would you and how would you integrate the two in your own practice and personal life? Use diary entries as a starting point for discussion and include process and /or tools ⇒ create an integrated model ⇒ share with the whole group	45 minutes
-Create a story board that describe the works you can do as a creative leaders using CPS and design thinking to make changes in your professional and personal life: start with 2018, then today, then the intermediary steps (backcasting technique)	30 minutes
Debrief of the class: PPCo -Content, pedagogy, learnings -Class Survey	45 minutes
Closing activity: <i>The web we weave</i> (Arnold, K. 2003, <i>Team Energizers</i> ) or similar activity focused on thanking each participants for their contribution and acknowledging the interrelationship and importance of each team member	15 minutes

### Post work: Extending the Learning

#### Goal:

**-Integration of the learning in the students' personal and professional life**

#### Homework:

-Applying the process in a real situation and write a reflection paper on

overall and specific learnings
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### Workshop as a Prototype

Applying the principle of prototyping and early testing, I wanted to create a “prototype” of the class to get some feedback on the approach and to improve both the content and the pedagogy prior to embarking on teaching a three-credit graduate class. This workshop spanned a day and a half and had a diversified group of attendees in the fields of advertising, education, consulting, new product development, education, banking, etc. We advertised via a flyer sent in a social innovation newsletter, as well as to people we knew in Toronto. Participants were all interested in learning new ways to deal with changes and to learn about design thinking (see Appendix D for flyer’s description). The workshop occurred on November 10 and 11, 2008 in Toronto, Canada. In order to prepare for the workshop, I created a facilitator kit that included a detailed agenda, a description of the activities for the day and half, together with timing, facilitator’s note and logistical details for specific activities as well as all necessary power point presentations and hands-out (see Figure 15 for pictures of the workshop, Appendix E for the agenda and Appendix F for the flow chart).

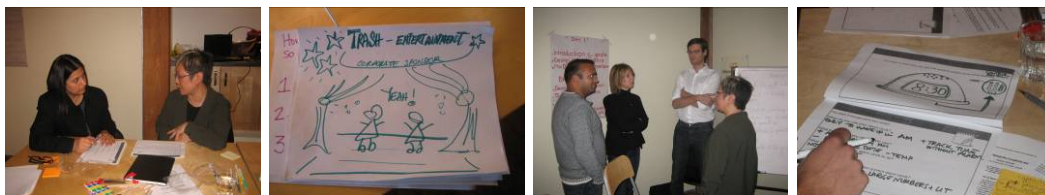


Figure 15: Pictures of the Toronto Workshop



Because the activities and Power Point presentations in this prototype were fairly similar to the ones described in the first two days of the workshop (See Appendices H to T), I decided not duplicate the information.

### **The Facilitator's Kit: Details of the First Two days of the Curriculum**

Since the workshop was very successful, illustrated by the fact that 12 out of the 14 participants indicated they would like to participate in a follow-up workshop in a few months, I kept the overall flow used in the workshop to create the details of the first two days of the five days curriculum. There were some slight modifications required by the requirement of being a graduate level curriculum, the specificity of an audience with some initial training in CPS, and the two day format (compared to a day and a half in the workshop). Therefore the main outcome of this project is a "facilitator kit" that includes all the information necessary to teach to the first two days of the graduate level curriculum. To make the kit easy to read and use, all the elements are color coded: green for flow and agenda, orange for Power Point presentations and hands-out, blue for facilitator's directions and logistics for activities that do not require a power point or a hand-out, brown for case study, purple for debriefing and red for home-work. I also includes pictures of the activities relevant to the context. All the information is in a binder separated by sections described above (See Figure 16 and Appendix G). This makes it very easy

for a new facilitator to create their own kit and customize the training, by modifying the workflow, changing the order or adding his/her own specific elements.

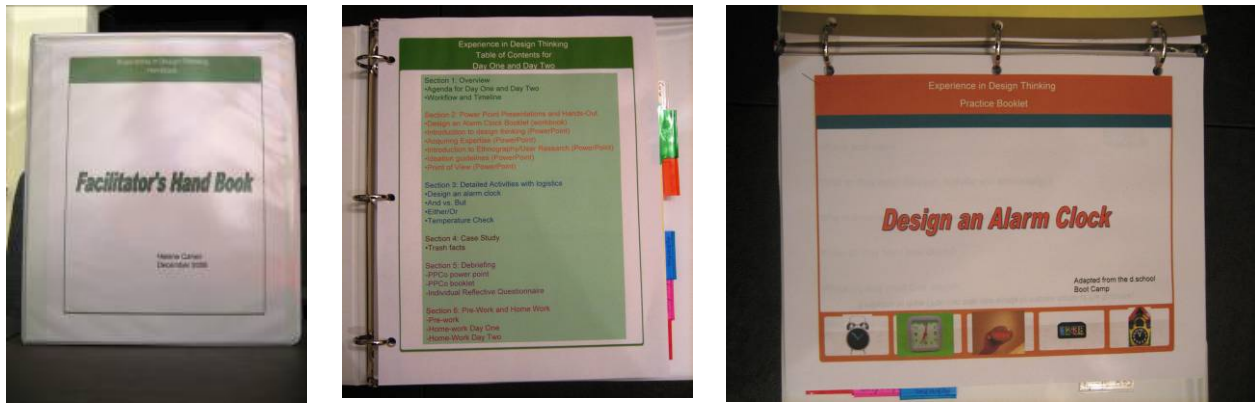


Figure 16: The facilitator's hand-book

The final kit includes the following elements (Appendix H to U) for details:

1. Agenda and workflow (green section)
  - Agenda (Appendix H)
  - Workflow: this includes timing, list of activities, facilitator's notes, stage in the TIM model (Murdock & Keller-Mathers, 2008) and logistical details for the first two days (Appendix I)
2. Power points and/or hands-outs (orange section)
  - Create an alarm clock introductory experience to design thinking (Appendix J)
  - Introduction to design thinking framework and principles (Appendix K)

- Introduction to research and expertise (Appendix L)
- Introduction to ethnography (Appendix M)
- Point of View (Appendix N)
- Ideation guidelines (Appendix O)

### 3. Activities (blue section; Appendix P)

- Temperature check: a warm-up focusing on getting a feel for the energy and enthusiasm of the group
- “And vs. but”: an exercise to help raise awareness about the impact on a group if people are building on each other’s idea rather than judging them
- Either/or: a warm-up focused on raising awareness of differences in preferences, style and value that may impact group work
- A skit on good and bad interviews

### 4. Case Study Information (brown section)

- Fact sheet on waste (Appendix Q)

### 5. Debriefing (purple section)

- Group PPCo: includes questions related to the content and the teaching process. The PPCo should be done at the end of each day (Appendix R)
- Individual reflective questions to be written at the end of each case study (day 2 and day 5) around learnings (Appendix S)

6. Pre-work and homework (red section; Appendix T)

- Pre-work prior to the class
- Homework for the first two nights

## **SECTION FIVE: KEY LEARNINGS**

### **Introduction**

I feel that this project went extremely well overall and that I was able to accomplish the most important part of what I had envisioned. From a content perspective, I benefited immensely from having been involved with this topic for the past year, which gave me a foundation of knowledge, the clarity to know going in what I hoped to accomplish and the opportunity to incubate. The process itself and my goals felt clear and I did not encounter major surprises. In addition, the manner in which participants of the workshop were able to immediately grasp the concepts presented and realize how this training might help them with change, was amazing. This was a confirmation of the power of design thinking, of my in-depth understanding of it and my ability to share and teach others. On the other hand, at the detail level, I felt rushed and overwhelmed the whole time with the need to both “do” and “write and reflect”. I most likely overdid it on many aspects of the project, spending too much time on the details. As this project was so all encompassing, I had to consciously and regularly prioritize and, at times, let go of the big picture and focus exclusively on my next step.

### **Key Learnings Regarding the Content**

## ***Lack of Scholarly Research and Synthetic Vision Around Design Thinking***

I spent much time and energy synthesizing learnings around design and design thinking. While I found some information relevant to design thinking in fields such as design, architecture, user research, storytelling and sketching, there was extremely limited synthetic information or scholars in the field. Attending the User Research Conference in Chicago in September 19 and 20, 2008 was both very interesting and disappointing. It was very interesting trying to understand the user researchers. At times I felt like an anthropologist studying a new tribe. It was definitely an immersion experience. My disappointment was that, similar to the literature review, I discovered that many practitioners lacked understanding of the broader field of design and design thinking, and tended to focus on the more technical aspects of their field. I think that because these disciplines are new and because of the limited formal education, people tend to see their own “tree” rather than the forest. I consider design thinking to be at the beginning of an effort of integration and that the full consequences are still unclear. It is interesting for me that a few years ago IDEO was focused on helping design products, but that they now have a very significant part of their business focused on services and organizations (Cahen, 2007, personal communication). There are very few scholars in the field. Owen and Cross may be the most prolific ones and there is a definite need for research to better understand how and why

design thinking works. Moggridge, in his interview with Wise (2007) said “research can help us be good design critics....and that helps explain us to the rest of the academic world” (p.2).

### ***Design Thinking can be Taught to Non-Designers***

As a creative problem solving approach, design thinking is a synthesis of universal principles from the field of creativity, leadership and the art that non-designers can learn and apply in a variety of circumstances. It integrates many universal concepts, such as the importance of visual representation (used by artists as well as scientists), storytelling, trying things on a small scale (used by inventors), listening to others and getting feed-back (used by therapists as well as great leaders) which I believe may make design thinking a powerful approach to change, from the lowest level to changing the world. In our workshop we had 14 participants and only one had any design related background but they were all quickly able to understand the principles and then see ways to make it relevant and impact change in their own life.

Owen in his call to action as the key note speaker at an International Conference in 2004, said:

We have new responsibilities...It is because of the way we think and the approach we bring to problem finding and problem solving...we offer another way to find information, gain insights from it, to organize it, evaluate it and project holistic concepts.  
(p.10)

He concluded his speech “It may seem arrogant to believe that design thinking can have a serious impact at policy-making levels. But what if it could? I think we all would rather we tried than wish we had” (p.12).

### ***Teaching in an Experiential Way Help Ingrained the Learning***

Many participants had read or heard about design thinking. However the experiential nature of the training, where they were immediately put into a situation of having to design an object (here an alarm clock) and go through some of the key steps appeared very powerful, based on observation and feedback. From an observer standpoint, I could see the excitement and energy in the room, and the group PPCo (Appendix U) and the individual written feedback showed the usefulness of the experiential learning. At the end of the first four hours, the participants had already gained insights and could already see the potential. Even participants that came from the “creative world” of advertising agencies (three participants) and/or had previous training around innovation saw the unique potential of this approach. For example in the group PPCo, participants suggested that learning about design thinking helped them acquire an understanding of a step-by-step process and ways to explain and articulate the stages with others. They also suggested that this training might help them be more open as a leader, innovate faster, work better in teams and bring out new aspects of creativity in themselves and others (Appendix U).



***The TIM Approach to Teaching Works Well with the Experiential Approach of this Curriculum.***

I am familiar with the TIM model having studied it as part of my Master's program. I have tried to integrate its three stages (Heightening Anticipation, Deepening Expectations and Extending the Learning) as the instructional model during the workshop both as I was looking at each day of the workshop, as well as within the different activities in the workshop. While I am still in the uncomfortable early learning stages regarding using this model, I appreciated its iterative nature. Murdock (Murdock & Keller-Mathers, 2008) described the TIM "as iterative in theory, structure and application with connected and related stages...meaning that even though cognitive theory appear linear in the model graphic, they do not necessarily operate that way" (p. 20). Using TIM as a framework (see figure 11, Torrance & Safter, 1999, p.39) to build the curriculum helped me ensure that I would create a desire to learn (for instance by suggesting some readings prior to the workshop), deepen expectations by providing opportunity to revisit some activities several times (*Looking Twice* in the TIM), using different angles (*Look at it Another Way* in the TIM) or start by experiencing a new process (*Getting in Deep Water* in the TIM) and ensure plenty of time for reflecting and discussing learnings. I believe this approach worked well and is a reason that the participants felt they learned a lot. This is an area that I am very interested in understanding better, and wish I had greater opportunity to reflect on while I was creating the

curriculum. I also was grateful that in a private discussion with Assistant Professor Keller-Mathers, she mentioned the need for flexibility as you use this model. As the workshop unfolded, I had to modify the timing and agenda several times to allow the participants to learn at their own pace. For example, on the second day I had planned a brief review of the first day learnings but it became such a rich discussion that I let it go for half an hour and cancelled one of the other activities.

### ***The Power of Multifunctional Teams and Creative Leadership***

While we had very limited time to talk about leadership and teams, people worked in randomly created teams and without an official leader. When we debriefed, some participants mentioned that they could see the potential of working in a team with people from very different backgrounds in a highly collaborative way. Many respondents were surprised by how well it worked. The environment that we created in the workshop was a fun and safe atmosphere where people felt free to experiment in a way that they may not be able to in their normal work environment. While I did not have a chance to fully integrate the leadership aspect of this curriculum, I believe that within a five day curriculum there is opportunity to set up the stage around leadership in teams, and then help raise awareness during the entire curriculum, so that the last half day can be focused on reflecting back on this topic.

***I Feel Confident I Have the Knowledge and Ability to Deliver a Curriculum in Design Thinking***

The success of the “prototype” workshop allowed me to feel confident that the curriculum will be of interest to the ICSC students. Deborah Clifford and Randah Taher (both ICSC alumni) who assisted with teaching the workshop, and Nina Sancoor (current ICSC student) who attended the workshop found it highly valuable. I also received positive feedback on the overall flow of the five-day workshop from other alumni (Mark Hylton) and professors at the center (Jonathan Vehar, John Cabra and Sue Keller-Mathers). Finally the enthusiasm of 14 participants from a wide variety of background and expectations demonstrated the interest in the topic to participants from a variety of background as well as their interest and ability to get engage with the content (see Appendix U: PPCo of the Toronto workshop).

**Key Learnings Regarding the Process**

***The Design Thinking Process, Combined with my Training in CPS, Worked Well to Move this Project Along***

During this project I learned that both CPS and design thinking are great frameworks to create a new outcome and that they are particularly useful in a combination.

***Using the design thinking framework all along the process what successful.***

I initially decided that I would practice what I am preaching and follow the general steps of the design thinking process, including some back and forth related to its iterative nature. I first gained expertise via the review of the literature and other material available such as blogs and videos, interviews experts in the process (for example George Kembel, the director of the d.school, design researchers at the conference and professors in the field) and potential users of the class (past and future students). I also used my notes from my immersion experience class last year at the d.school and attendance at the Design Research conference to help me better frame the needs of the user. Next I used ideation techniques to put together the curriculum. Then I created an early prototype of the curriculum in the form of a description of a five day class and got some initial feedback via sending the description the Google “advisory board group”. Finally I finalized my prototype and presented it to real users in a day and half workshop. I also used visual thinking throughout the process, creating mind-mappings at several stages and creating an outcome, the “facilitator kit” which is visually appealing. Overall I found that the process, which I have been using for over a year now, easy to use. I am still challenged at two of the primary stages; getting enough information regarding the users, and feeling comfortable with sharing my “early prototypes” with others. It is comfortable for me, both in the educational and corporate worlds, to present the best possible outcomes. It is very difficult for me to let go of this and to share something that is not

“perfect”. I believe it is partially linked to my own personality and partially to the way I have been trained in organizations and academia. However, I learned that it is easier to obtain great feedback when the outcome obviously does not look finalized. With a rough prototype, people are not worried about hurting your feelings or suggesting to the maker of the prototype that it does not work for them and that it was wasted time. In addition, I have had a mind-shift in viewing feedback as a gift, and being more open and thankful rather than defensive, when people suggest changes.

***Prototyping is a great way to move a project forward and get feedback.***

As a design thinker working on a curriculum in design thinking, I knew that by following the process, I would learn more. Particularly, I was convinced that I should prototype a short version of this curriculum. While my professors were supportive of the concept, they also point out that the time was limited and that usually new ICSC courses are approved based on a paper description in the format of a New Topic Course Proposal document. Once approved, the instructors are given two opportunities to teach the full curriculum, and to improve it before a final decision is made. It was tempting not to do a prototype as it added more pressure in trying to organize and deliver it, but I also felt that I had to be true to the process. Rather than focus on the formal outcomes that would be needed

specifically to move a concept to a course proposal, I chose to go in the direction of formulation of an outline, facilitator's kit and prototyping. I am very glad I made this decision. Not only did the workshop provide me with great feedback, but it also increased my confidence and familiarity with the curriculum. This approach also provided me with some great stories to sell the concept to the ICSC and other places, and even some potential clients that would consider hiring me to do a training within their organization.

***My training in CPS was tremendously useful going through the process.***

I believe that I am a better design thinker because of my training and knowledge of the Thinking Skills Model (Puccio, Murdock & Mance, 2007) and the tools associated with CPS. This was most useful both for me and in the workshop in terms of being sure that the challenge was defined clearly, in the use of efficient tools for convergence to move the process forward and to help others realize the critical role of the dynamic balance in the success of creative problem solving. In addition, I believe that the ability of the three members of the teaching team to facilitate the ideation phase of the process for the groups, rather than being self facilitated like it was done at the d.school, made the results of the group case study much more successful, particularly given our lack of time. Finally I realized that a good trainer needs the same traits as a good facilitator in being focused on the process but also open, flexible and willing to adapt and respond to the

fluid needs of the audience. While I had a clear agenda and prepared the activities and workflow thoroughly, I constantly made adjustments, adding or removing parts and changing the schedule as required to achieve the overall teaching goals.

### ***The Whole Project Took Significantly More Time Than Anticipated***

During this course of this project I learned that creating a curriculum is very time consuming because of the research involved, my lack of previous experience in creating a curriculum, the need to be able to share the knowledge with others and the logistics of prototyping.

### ***The review of the literature was time consuming because of the fragmented nature of the discipline.***

Because design thinking is so new I had to look in many directions to fully understand its roots, and the universal nature of some of the principles. In addition because I was planning on teaching about this topic, I felt I needed to know the topic in-depth, resulting in a total of over 100 hours in the review and writing of the literature review, in addition to the time I had already spent over the past year. This in part was necessary because the literature review served as an aspect of the outcome of the project.

***Creating this curriculum was time consuming because of my lack of experience and the challenge of communicating its experiential nature.***

While I knew this project was ambitious, I did not realize how long it would take me. I had never created a full curriculum and had only experience creating short workshops where I only needed to prepare enough for me to deliver the workshop but did not have to share the knowledge with other trainers. Therefore it was almost impossible to realistically anticipate the time required to complete this project. When I started I had some of concepts in my head and a vision for the curriculum. However I was required to write everything down and articulate it so it would make sense for others just by reading the documents. Because of the experiential nature of the curriculum, I struggled to find ways to present the information so it would make sense to someone who have not experienced design thinking before. I know that I will not be entirely successful because of the interactive nature of the curriculum which makes this learning experience somewhat indescribable. For example while I had shared and discussed the information with Deborah Clifford and Randah Taher who assisted me in presenting the workshop, it was still a real surprise for them to see how the workshop turned out. I think that the facilitator's kit, which also includes pictures related to some of the activities, is a great step in helping communicating the nature of the curriculum but



that, by nature, one has to attend at least a day or two to fully understand this curriculum.

***Organizing and teaching the workshop was also time consuming.***

Because of the tight timing, lack of budget, the international team work required to put together a workshop in Toronto and logistical details for staging a first time workshop, I end up spending almost two weeks preparing, delivering and travelling for the workshop. Because I did not want to travel with my 20 pounds of equipment which I usually bring when I facilitate or train, we had to scramble to finalize the logistical details. Luckily our workshop began in the afternoon and we were able to gather almost everything we needed, necessitating some creativity in the material we used. One example is that we bought some take out boxes rather than card boxes to use for the alarm clock exercise.

***This Project Reinforced my Belief in the Benefits of Working in Teams as Well as the Challenges Associated With Them***

From the beginning, I had the vision of a teaching team that would co-create and co-present the workshop. Given the time constraints, time-difference and the fact that my training partners have had limited exposure to the topic, the co-creation part of the workshop, particularly prior to the workshop, was limited. However, while I end up being the main presenter

for the workshop, their presence and additional perspectives was highly valuable. Deborah Clifford's unique perspective on leadership and Randah Taher's knowledge around space and creativity and storytelling, made the discussions with the participants so much richer. It also gave me a chance to have additional perspectives on what was happening in the room, and for us to make changes together as a teaching team during the workshop. Finally I realized that this was the perfect opportunity to use this session to "train the trainer" and Randah has already indicated that she is considering teaching another workshop on this topic.

***The Pace of the Workshop was Incredibly Fast but the Participants Stayed Engaged and Enjoyed it***

Because the workshop was a day and a half and we had to cover a lot of the basic content, I felt that I was constantly asking participants to move on and give them less time than I would have thought appropriate. However when we debriefed, the participants mentioned that they would rather do the workshop in a day and a half rather than two, and that the pace was beneficial in that it forced them not to over analyze some of the details. Reflecting back, I still believe that the same content may be better covered in two days, but that there is opportunity to condense it and still make it meaningful. Creating shorter versions will force me to focus on the essence and I can now see ways to create workshops of any length (from 2 hours to five days).

## SECTION SIX: CONCLUSION

### Introduction

This project was a success overall and I feel excited about the next steps of implementing this curriculum, creating more workshops and speaking opportunities and developing my consulting practice in this field. I think this is the perfect timing for this topic, as awareness of the concept of design thinking is building in the business world (with new books and articles coming up every month) and in the world of academia (with new programs and classes being created). In addition many in the design thinking field believe that the complexity of our time makes the need for new solutions and for design thinking critical. Brown (2008) wrote:

The need for transformation is, if anything, greater now than ever before. No matter where we look, we see problems that can be solved only through innovation: unaffordable or unavailable health care, billions of people trying to live on just a few dollars a day, energy usage that outpaces the planet's ability to support it, education systems that fail many students, companies whose traditional markets are disrupted by new technologies or demographic shifts. These problems all have people at their heart. They require a human-centered, creative, iterative, and practical approach to finding the best ideas and ultimate solutions. Design thinking is just such an approach to innovation. (p.92)

As people become more aware of the concept of design thinking there will be more need to training. Several participants in the Toronto Workshop saw the needs to create a similar workshop for internal training in their organization to help create a common framework to deal with changes.

I also believe this curriculum is a great complement to the other classes offered at the ICSC, not only because it introduces a new perspective around creative problem solving, but also because of its team component that would provide a unique experience on creative leadership. While in the current ICSC program students learn to become a creative leader mostly from a facilitator role, this curriculum will provide applied knowledge on becoming a creative leader within a team of others with complementary skills, and about the power and challenges of team work.

I have three main challenges once this master project is completed. First, I need to finalize the full five days of the curriculum with the same level of details than the first two days, write the Buffalo State New Topic Course Proposal document and hope this will help convince the ICSC to offer a graduate class soon as this topic is so timely. My second challenge is to keep my motivation and momentum going so that I will follow-up on leads and contact potential organizations and universities, to determine if they are interested in training and consulting in this area. In addition, I would like to create a team of trainers that could co-create and deliver programs in design thinking as I am convinced that a teaching team is a great benefit to the participants and is the way I would enjoy working in the future. Finally, I am interested in developing an “open-source” type of model of cooperation among trainers in design thinking. I would like to share the facilitator’s kit and all the material with others trained in design

thinking, with the understanding that they will add in their own material and activities, therefore creating a deeper pool for training material. This might be a great way to learn from each others and save time developing material.

### **Next steps**

1. I will complete the Buffalo State New Topic Course document by the end of January 2009.
2. I will complete the 5 days curriculum activities by February 2009.
3. I will continue my discussion with Deborah Clifford about how to better integrate the multifunctional team and creative leadership component in this five day program and/or a specific workshop.
4. I will follow-up on the contacts from the November workshop that indicated interest in training in their organizations.
5. I will follow-up on an initial phone discussion I had with Victoria Cliché, the CPSI Executive Director regarding doing a presentation or workshop at CPSI in 2009. I will also look at opportunities to present at other conferences.
6. Via networking, I will initiate new contacts with universities i.e. UC Berkeley Extension, and other organizations to see if there is an interest in training or consulting in this field.

7. I will continue to consider ways to be involved with the d.school as the school is the leader in design thinking training.
8. I will consider writing an article for a creativity journal on a topic related to design thinking and creativity.
9. I will rethink my business model to integrate co-trainers and consultants that could work on an ad-hoc basis with me and to find ways to become part of a team.
10. I will consider ways to create an “open-source” approach to share resources with other trainers in design thinking.

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## **APPENDICES**

## **APPENDIX A**

### **Concept Paper**

# Designing a Curriculum in Design Thinking for Creative Problem Solving Users

**Name:** Helene Cahen

**Date Submitted:** 9/24/08

## Project Type

Develop my ability to create a curriculum, and share my knowledge of Design Thinking.

## What Is This Project About?

### Background

A year ago, I searched for others interested in creativity in the San Francisco Bay Area. Somebody had mentioned to me that a new school had recently been co-founded by IDEO and Stanford, called the d.school. I was intrigued and decided to investigate further. I met with the Director of the school, George Kembel and was able to attend their Design Thinking Boot Camp as an observer. I had never heard of “design thinking” previously, but after this introductory class it made me want to delve deeper into the topic. Its human centered approach fit well with my background in marketing research, and I saw the potential of integrating and combining it with Creative Problem Solving (CPS). I became so interested in the topic that I decided to deepen my learning by enrolling in an independent study with Professor John Cabra, who advised me during the spring 2008 semester. During the course of this project, I read further into the literature and the process of design thinking. I created a dialogue with practitioners and scholars from the field of design thinking and CPS, to discuss ways to integrate the two processes and mind-sets, and I created a video presentation of my journey and learnings. Over the past eight months I became more interested in the potential for teaching design thinking to others, particularly CPS practitioners and students, as I could see the benefits of integrating the two approaches. Since design thinking is mostly a group process, I saw some benefits in being able to use this training as a way for participants to reflect on their creative leadership skills. I also saw an opportunity to broaden my consulting services.

### What is Design Thinking?

The concept of design thinking is starting to have more impact in the business world because of the influence of IDEO and the writing of Kelley (2000, 2005), Brown (2008) and others. They primarily focus on applying the principles and mind-sets used by product designers to others areas. On my first day at the d.school, design thinking was described by the director as a “human-centered, prototype driven, iterative process” with a “bias towards action”.

Roger Martin, Dean of the Rotman School of Management at the University of Toronto, who has been instrumental in integrating design thinking as part of the school MBA program, defines design thinking as “the way designers think: the mental processes they use to design objects, services or systems, as distinct from the end result of elegant and useful products. Design thinking results from the nature of design work: a project-based work flow around “wicked” problems” (Dunne & Martin, 2006, p. 517). Charles Owen, one of the few scholars in the field, views design thinking as a complement to science thinking. While Owen (2005) believes that creativity is of major importance to design thinking, he also highlights 10 characteristics that capture the uniqueness of Design Thinking: conditioned inventiveness, human-centered focus, environment-centered concern, ability to visualize, tempered optimism, bias for adaptivity, predisposition toward multifunctionality, systemic vision, view of the generalist, ability to use language as a tool, affinity for teamwork, facility for avoiding the necessity of choice, self governing practicality and ability to work systematically with qualitative information.

### **Skills involved with the project**

The skills involved with this project are two-fold. This project will involve creating a curriculum using the Torrance Incubation Model (TIM) as a format and guideline to teach the content (design thinking), and using a creativity skill (possibly creative leadership). The delivery of the content will be engaging and will include a highly experiential curriculum. The delivery will follow the three stages of the TIM model: Heightening Anticipation, Deepening Expectations, and Extended Learning (Murdock & Keller-Mathers, 2002). Since the primary target audience for this initial curriculum would be people with some CPS background (although highly adaptable for other audiences), it would be important to help the students understand the design thinking approach and ways to integrate it within the CPS framework they are familiar with.

Overall this project will involve many of the thinking skills described by Puccio, Murdock and Mance (2007):

- Diagnostic Thinking to fully understand what needs to be accomplished.
- Visionary and Strategic Thinking to create the overview of the program and its goals.
- Ideational and Evaluative thinking to generate ideas for the curriculum and select the activities.
- Conceptual and Tactical Thinking to make it a compelling curriculum that organizations would be interested in.

### **Rationale for Choice:**

I have chosen this topic because I have personally seen how design thinking can be a mind changing and powerful approach. I am excited about sharing my knowledge with others and possibly help address some of the limitations that have been raised about CPS. In my discussions with clients and prospective clients, some issues raised concerning CPS are that it lacks appeal for those who are visual or kinesthetic thinkers or “doers” that may become frustrated about the length of the process, or the difficulties of selling the outcome of the process because of its lack of concreteness. Kelley (2001) wrote: “Give your management team a report, and it’s likely they won’t be able to make a crisp decision. But

a prototype is almost like a spoke person for a particular point of view, crystallizing the group's feedback and keeping things moving" (p112). On the other hand, CPS brings a solid framework that has been thoroughly researched and proven effective. The thinking skills associated with it, as described by Puccio, Murdock and Mance (2007), favor the dynamic balance approach that clearly separates diverging and converging activities, and a large set of tools. I believe that combining design thinking and CPS can be a very powerful approach to solve complex challenges.

## **What Will be the Tangible Product(s) or Outcomes?**

- A "Topic Course Proposal" that follows the International Center for Studies in Creativity (ICSC) template and will describe the student learning outcomes, the course content and a list of resources.

- A detailed description of two of the five days of the "Experience in Design Thinking for CPS Users" class. The first two days will be described in detail, including the purpose of the sessions, the teaching objectives, a description of each activity, time required, material needed and directions. It will also include homework prior to, during and after the class. The last 3 days will be conducted more broadly. The description may include visual and flowcharts, in addition to words.

- If time allows, and based on the interest of an outside organization, a "prototype" of a two- day training will be tested with a group to provide learning and feedback. "When a project is particularly complex, prototyping is a way of making progress" (Kelley, 2001, p.106). The purpose of this "prototype" would be to gain learning on the curriculum content. For that purpose, a PPC<sup>o</sup> (Pluses, Potentials and Concerns tool described in Puccio, Murdock & Mance, 2007, p.166) would be done with the group about the content and pedagogy of the workshop and the learnings would be integrated in a revised description.

- In addition, a short description may be developed for a possible workshop or talk at a creativity conference such as CREA or CPSI.

## **What Criteria Will You Use To Measure The Effectiveness Of Your Achievement?**

On-going feedback is critical to the design thinking process. I expect to receive on-going feedback on this project during the process of designing the curriculum.

- The first criterion will be met when I receive positive feedback from a panel composed of people in the creativity and design thinking field, as well as alumni and students that may be interested in the curriculum. For this purpose, I have created a "Design Thinking Advisory Board" Yahoo group on line, and will post ideas for the curriculum regularly and get feedback from the group via email.

- The second criterion will be met when I receive positive feedback from others involved in activities related to this project (i.e. informal discussions with peers, professors, students, designers, etc.).



-The third criterion will be met when my advisors (Professor Cabra and Professor Keller-Mathers) suggest the curriculum has been appropriately developed to be considered as a topic course for the ICSC.

-The fourth criterion will be met when, based on my own evaluation, I have developed a product that can be rolled out to the private sector as part of my consulting services menu.

### **Who Will Be Involved or Influenced; What Will Your Role Be?**

I will hold the leading role in this project. My role will be to develop the curriculum, get regular feedback from my advisors (Professor Cabra and Professor Keller-Mathers), my classmates, the “advisory board”, and others I may have the opportunity to talk to during the process. I will also need to review the literature and write my master project. If I have the opportunity to try out some of the activities, I will work closely with Randah Taher (who mentioned that her organization may be interested in the topic), Deborah Clifford (who is interested in being involved in the creative leadership component of the class) and the students, which would present a great source for feedback.

### **When Will This Project Take Place?**

This project includes the phase one of my initiative of creating a design thinking curriculum for CPS users. Phase one includes creating the vision for a five day program on design thinking, appropriate for graduate level educational audiences with a background in CPS, and a very detailed description of the first two days. This phase will take place between the months of September and November 2008. Phase two of the initiative is beyond the scope of this project. It includes completing the details of an entire five-day course. It also includes creating some variations around the curriculum: different formats for the course (for instance a three hour and a one day format), or different audiences (business, non-profit, etc.), audiences with different levels of experience in design thinking or creativity. Phase two will most likely commence in the winter and spring 2009. During both phase one and phase two, I will document some ideas about ways to get some speaking and/or training engagements around this topic, possibly at conferences (for instance CREA or CPSI).

### **Where Will This Project Occur?**

This project will generally occur at my home office in Berkeley, CA. I will also be getting feedback via telephone and on the web from different locations in the US and abroad. I attended the Design Research conference organized by the Chicago Institute of Design in Chicago on September 19 and 20<sup>th</sup> 2008, which provided me with additional content information. As part of phase one and two of the initiative, I will look to “prototype” a short version of the curriculum which would most likely be in Toronto, Canada.

## Why Is It Important to Do This?

I believe that there is a growing interest in design thinking. Schools like Stanford, the Chicago Institute of Design and the Rotman School of Management are all seeing value in developing curriculum emphasizing this approach. In the June 2008 Harvard Business Review, Tim Brown wrote: “Thinking like a designer can transform the way you develop products, services, processes-and even strategy” (p. 85.). On the business side, there is a renewed interest in people trained with a design approach rather than a standard MBA approach, as they are more able to deal with increasingly complex issues and teamwork using an integrative rather than analytical approach. For example, Roger Martin, the Dean of the Rotman School, suggested that “Business education has to be made more like design education” (Dunne & Martin, 2006, p.514). However, I could find very limited articles on the topic coming from the “creativity circles” (ICSC, CREA, CPSI or CIM conferences), nor the five creativity journals such as the Journal of Creative Behavior, the Creativity and Innovation Management Journal or the Creativity Research Journal. As a learner and practitioner in the field of creativity, I think it is important to raise awareness and interest in our community around this broadened approach and possibly to create new bridges with the design and design thinking communities.

## Personal Learning Goals:

- Gaining experience and knowledge in creating an exciting curriculum that is highly experiential
- Gain understanding of potential “users” of this curriculum so that I can position this curriculum in a appealing way to 1) prospective students and 2) organizations that may want to offer it either in an academic institution or in a corporation
- Gaining insights and developing multiple pathways to receive on-going feedback on this project
- Increasing my meta-cognitive understanding of the design thinking process
- Finding ways to create connections between team work and creative leadership
- Developing additional expertise related to design and design thinking
- Examining ways to integrate design thinking within the CPS framework

## How Do You Plan to Achieve Your Goals and Outcomes?

<b>Goals</b>	<b>Plans to achieve my goals in phase one of the project</b>
Gaining experience and knowledge in creating an exciting curriculum that is highly experiential.	-First I will need to research other curriculum. I will research curriculum done by other schools on the topic (acknowledging that public information is very limited) as well as review curriculum developed at the ICSC on other topics. -I will also review my learning from my class experience at the d.school and my independent study. I will revisit

	<p>my review of the design literature with the new goal of teaching a curriculum in mind. I will also spend time considering the different experiences and activities that may be included in the learning experience using divergent techniques and converging based on “users” feedback.</p> <p>-I will discuss with professors and trainers who have created their own curriculum to better understand the challenges.</p> <p>-If possible I will “prototype” and get feedback about some of the activities.</p>
<p>Gaining understanding of potential “users” of this curriculum so that I can position this curriculum in an appealing way to 1) prospective students and 2) organizations that may want to offer it either in an academic institution or in a corporation.</p>	<p>-By attending the conference on design research, I will become a student of design thinking and can gain a perspective as a “user” of a class.</p> <p>- I will also take advantage of my Chicago visit to attend the Chicago Institute of Design open house and get a better feel for the experience that they offer their students.</p> <p>-I will look back at my diaries from the class I took at the d.school last fall to remind myself of my experience taking a class as a student of design thinking.</p> <p>-I will create a point of view, which is a description of the “user” of the curriculum, her/his needs and key insights, so I can design the class with the user in mind.</p>
<p>Gaining insights and developing multiple pathways to receive on-going feedback on this project.</p>	<p>-I will develop lists of ideas for elements that could be integrated in the curriculum and use feedback to help select some of the ideas.</p> <p>-I will also create mini-prototypes, such a half page description of an activity that people can try at home, a mini-video of myself doing the activity or trying it with some friends, or just trying the activity myself and reflecting on it. This will help ensure that I receive on-going feedback, which is a characteristic of design thinkers.</p> <p>-I will look at curriculum development standards, such as the Bloom taxonomy as described in Krathwohl, 2002, and consider developing my own grid for doing a self-evaluation of the curriculum.</p> <p>-I will get feedback from several groups:</p> <ul style="list-style-type: none"> <li>• The “Design Thinking Advisory Board” yahoo group that includes a mix of professors, students and practitioners of CPS and/or design thinking</li> <li>• Potential students, using my cohort as well as students enrolled in the master project with me</li> <li>• My advisors at the ICSC: Professor Cabra and Professor Keller-Mathers</li> </ul>
<p>Increasing my meta-cognitive</p>	<p>I will apply the design thinking process to create the</p>

understanding of the design thinking process.	curriculum by including the steps of the process (understand, observe, point of view, ideate, prototype and test) as well as the mind sets (using visual thinking and prototyping, and adopting a “human centered” approach focused on the “users” of the curriculum). I will also reflect on my learnings about using the design thinking process in the Key Learnings section of my master project.
Finding ways to create connections between team work and creative leadership	Time permitting, and with the help from experts, I will consider ways to integrate creative leadership, or some sub-segment of this skill, as the creative skill used throughout the class of the class.
Examining ways to integrate design thinking within the CPS framework	-I will ensure that this curriculum is building on the previous CPS knowledge of the participants. - I will also continue to work on evaluating and possibly improving a model that integrates DT and CPS which was created during my independent study project (see Appendix).

### **Evaluation:**

I am planning to obtain feedback by asking different constituents what they think of the possible curriculum at different stages of the projects. My goal is to get feedback regularly and incorporate the feedback to improve the outcomes. The feedback will be qualitative and based on discussions either in person, on the telephone or on the Internet. I will keep track of all the discussion of the “Design Thinking Advisory Board” yahoo group, as well as emails or notes from other discussions. I will try out some of the activities myself or with people around me to get a feel of their impact and reflects on the results. I am hoping that I will receive feedback from at least four of the members of the “advisory board” on the strengths and areas for improvement in the curriculum. I will also consider whether I should develop a grid that may help me evaluate the curriculum and/or the appropriate use of the TIM model.

If I am able to successfully “prototype” the program, my goal would be to obtain feedback on the curriculum to help improve the content. To ensure this feedback, I am planning to do a PPCo at the end of the training focused on the content and the pedagogy.

### **Prepare Project Timeline:**

<b>Activity</b>	<b>Timing</b>	<b>Estimated number of hours</b>	<b>Outcome</b>
<b>Concept paper preparation:</b> -Discussion with Sue Keller Mathers and John Cabra	<b>August 25 September 17</b>	<b>40 hours</b>	<b>Approved concept paper</b>

<ul style="list-style-type: none"> <li>-Review class requirements</li> <li>-Review literature</li> <li>-Review information regarding course proposal at the ICSC</li> <li>- Review articles</li> <li>-Draft paper to post on 9/12</li> <li>-Chat on Angel on 9/13</li> <li>-Finalize draft paper based on feed-back</li> <li>-Create an Yahoo group that will serve as an advisory panel</li> <li>-Share concept paper with Deborah Clifford for her perspective on leadership</li> <li>-Share paper with Randah Taher to see if her organization is interested in testing a “prototype workshop”</li> </ul>			
<p><b>Design research conference</b></p> <ul style="list-style-type: none"> <li>-Attend conference</li> <li>-Look for opportunities for ideas and concepts to be integrated in the curriculum</li> <li>-Gain knowledge of the state to design thinking research</li> <li>-Reflection on my learnings</li> </ul>	<p><b>September 18-20</b></p>	<p><b>30 hours</b></p>	<ul style="list-style-type: none"> <li>-Better understanding of design thinking</li> <li>-Understanding of current issues related to research in design thinking</li> <li>-New ideas for elements to integrate in the curriculum</li> <li>-Networking opportunities</li> </ul>
<p><b>Work on section 1-3 of the master project:</b></p> <ul style="list-style-type: none"> <li>-Write section 1</li> <li>-Review design thinking literature, literature around the Torrance Incubation Model and secondarily literature on Creative leadership, team and organize learnings by themes</li> <li>-Write section 2</li> <li>-Write section 3</li> <li>-Finalized draft</li> </ul>	<p><b>September 20 to October 27</b></p> <ul style="list-style-type: none"> <li>-September 22 to 30</li> <li>-October 1<sup>st</sup> to 15</li> </ul> <p>October 16 to 21 October 22 to 27</p>	<p><b>40 hours</b></p>	<p><b>Draft for half the project</b></p>
<p><b>Draft elements of the</b></p>	<p><b>September 20 to</b></p>	<p><b>30 hours</b></p>	<p><b>Course proposal</b></p>

<p><b>curriculum</b></p> <ul style="list-style-type: none"> <li>-Course proposal</li> <li>-Details of the first two (or three days) with a detailed class plan for each session including objectives, description of all the activities, material and instructors directions</li> <li>-Obtain feed-back on both documents</li> <li>- Discussion with Sue Keller Mathers and John Cabra</li> <li>-Class Chat</li> </ul>	<p><b>October 15</b></p> <ul style="list-style-type: none"> <li>-Week of October 6</li> <li>-Week of October 18</li> </ul>		<p><b>and instructional material</b></p>
<p><b>Finalize and possibly “prototype” the curriculum</b></p> <ul style="list-style-type: none"> <li>-Revise curriculum based on feed-back from description</li> <li>-Chat with class</li> <li>-Chat with Sue Keller-Mathers and John Cabra</li> <li>- Create and deliver a “prototype of the class” if possible</li> <li>-Finalize curriculum based on feedback</li> </ul>	<p><b>October 20 to November 10</b></p> <ul style="list-style-type: none"> <li>-October 20 to 27</li> <li>-November 1st</li> <li>-Week of November 3rd</li> <li>- Week of November 3rd</li> <li>- Week of November 10</li> </ul>	<p><b>20 to 50 hours (depending if I can deliver the prototype).</b></p>	<p><b>Improved curriculum based on feedback</b></p>
<p><b>Draft second section of the project</b></p> <ul style="list-style-type: none"> <li>-Draft Section 4 to 6 of the project</li> </ul>	<p><b>Week of November 10</b></p>	<p><b>30 hours</b></p>	<p><b>Draft of the complete project write up</b></p>
<p><b>Finalize master project write up:</b></p> <ul style="list-style-type: none"> <li>-Discussion with John Cabra and Sue Keller Mathers</li> <li>-Make revision to write up</li> <li>-Final version due</li> </ul>	<p><b>November 17 to December 1<sup>st</sup></b></p> <ul style="list-style-type: none"> <li>-Week of November 24<sup>th</sup></li> <li>-Week of November 17 and 24</li> <li>-December 1st</li> </ul>	<p><b>30 hours</b></p>	<p><b>Final project write up completed</b></p>
<p><b>Presentation and last details:</b></p> <ul style="list-style-type: none"> <li>-Presentation to class</li> <li>-Get final version bounded and sent to the ICSC</li> </ul>	<p><b>Week of December 2nd</b></p> <ul style="list-style-type: none"> <li>-December 6<sup>th</sup></li> <li>-By December 8th</li> </ul>	<p><b>20 hours</b></p>	<p><b>All class requirements completed</b></p>

## **Identify Pertinent Literature or Resources:**

### **Visual Thinking and Prototyping**

- Arnheim, R. (1969). *Visual thinking*. Berkeley: University of California Press.
- Edwards, B. (1999). *The new drawing on the right side of your brain* (Rev. and expanded ed.). New York: Penguin Putnam Inc.
- Hanks, K., & Belliston, L. (2006). *Rapid viz* (3<sup>rd</sup> ed.). Boston: Thomson Course Technology.
- Moore, K. (2005). Visual thinking: hidden truth or hidden agenda? *Journal of Visual Art Practice*, 2, No. 2 and 3, 177-192.
- Roam, D. (2008). *The back of the napkin*. New York: The Penguin Group.
- Schrage, M. (1999). *Serious play*. Boston: Harvard Business School Press.

### **User Centered Design**

- Buxton, B. (2007). *Sketching user experiences. Getting the design right and the right design*. San Francisco: Morgan Kaufman.
- Norman, D.A. (2004). *Emotional design*. New York: Basic Books.
- Rodriguez, D., & Jacoby, R. (2007). Embracing risk to grow, learn and innovate. *Rotman Magazine*, Spring 2007, 55-58.

### **Design**

- Lawson, B. (2004). *What designers know*. Burlington, MA: Architectural Press.
- Lawson, B. (2006). *How designers think. The design process demystified* (4<sup>th</sup> ed.). Burlington, MA: Architectural Press.
- Moggridge, B. (2007). *Designing interactions*. Cambridge, MA: The MIT Press.

### **Design Thinking**

- Beckman, S.L. & Barry, M. (2007). Innovation as a learning process: Embedding design thinking. *California Review Management*, 50(1), 25-56.
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- Kelley, T. (with Littman, J.) (2001). *The art of innovation*. New York: Currency Books.
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- Merholz, P., Wilkens, T., Schauer, B., & Verba, D. (2008). *Subject to change: creating great products and services in an uncertain world*. Sebastopol, CA: O'Reilly Media, Inc.
- Owen, C. (2005) *Design thinking: What it is, why it is different, where it has new value*. Paper presented at the International Conference on Design Research and Education for the Future, South Korea. Available from the Chicago's Institute of Design, ITT web site, <http://www.id.iit.edu/141/>
- Owen, C.L (2007). First thing's first. *BMP Institute*, February 16, 2007. Retrieved from <http://www.bmpinstitute.org/articles/article/article/first-thing-s-first.html>



Owen, C.L. (2008). Design thinking: On its nature and use. *Rotman Magazine*, Winter 2008, 26-3.

Pink, D. H. (2005). *A whole new mind*. New York: The Penguin Group

Wise, S. (2007). Interview with Bill Moggridge. *Ambidextrous*, 6. Retrieved from <http://www.ambidextrousmag.org/issues/06/moggridge.html>

### **Design and Business**

Wu, R. & McMullin, J. (2006). Investing in design. *Ambidextrous*, 5, 33-35.

Martin, R. (2006). Designing in hostile territory. *Rotman Magazine*, Spring/ Summer 2006, 4-9.

### **User Research**

Fulton Suri, J. (2008). Informing our intuition. Design research for radical innovation. *Rotman Magazine*, Winter 2008, 53-57.

Fulton Suri, J. + IDEO (2005). *Thoughtless acts*. San Francisco: Chronicles Books.

Kumar, V., & Whitney, P. (2003). Faster, cheaper, deeper user research. *Design Management Journal*, 14(2), 50-57.

Leonard, D., & Rayport, J.F. (1997). Spark Innovation through empathic design. *Harvard Business Review on Breakthrough Thinking*. Boston: Harvard Business School Press, 29-55.

Young, I. (2008). *Mental models. Aligning design strategy with human behavior*. New York: Rosenfeld Media.

### **Education**

Krathwohl, D. (2002). A revision of Bloom's taxonomy: An Overview. *Theory into Practice*, 41(4).

Murdock, M. & Keller-Mathers, S. (2002). The foundation of the Torrance Incubation model: Identifying and using creativity skill set. *National Association of Gifted Children Newsletter*, 13(2), 5-6, 13

Murdock, M. & Keller-Mathers, S. (2002). Teaching for creativity: Where there's a will, there's a way. *National Association of Gifted Children Newsletter*, 13(2), 3,4,10-12

Schön, D.A. (1987). *Educating the reflective practitioner. Toward a new design for teaching and learning in the professions*. San Francisco: Jossey Bass.

Torrance, E.P., & Safter, T.H. (2005). *Making the creative leap beyond...* Hadley, MA: Creative Education Foundation Press.

### **Design Education**

Christiaans, H., & Venselaar, K. (2005). Creativity in Design engineering and the role of knowledge: Modelling the expert. *International Journal of Technology and Design Education*, 15, 217-236.

Cross, N (2007). *Designerly ways of knowing*. Basel, Switzerland: Birkhäuser Verlag AG.

Perkins, D.N. (1984). Creativity by design. *Educational Leadership*, Sept 84, 18-25.

### **Video**

A song about design thinking: <http://www.youtube.com/watch?v=JrlSHZ0anAM>

Example of students using design thinking for a project at the d school:

<http://www.youtube.com/watch?v=JZH70qhmEso> :

Innovation through design thinking: speaker Timothy Brown, CEO of Ideo.

<http://mitworld.mit.edu/video/357/>

### **Web sites**

About designing better libraries: <http://dbl.lishost.org/blog/page/2/>:

A complement to Bill Moggridge's book: [www.designinginteractions.com](http://www.designinginteractions.com)

AIGA (professional association for design): <http://www.aiga.org>

A peer written on-line journal devoted to the practice, innovation, and discussion of design: <http://www.boxesandarrows.com>

“Mini classes” on visual thinking as well as reading suggestions and links: <http://www.squidoo.com/communicationnation>

Rotman School of Management magazine: <http://www.rotman.utoronto.ca/news/magazine.htm>

The d.school web site: [http://www.stanford.edu/group/dschool/big\\_picture/our\\_vision.html](http://www.stanford.edu/group/dschool/big_picture/our_vision.html)

## **Blogs**

Adaptive path blog <http://www.adaptivepath.com/blog/>

Ambidextrous magazine blog: <http://www.ambidextrousmag.org/blog/>

Institute for the Future blog: <http://www.iftf.org/futurenowblog>

Metacool: thoughts on the art and science of bringing cool stuff to life by Diego Rodriguez <http://www.metacool.typepad.com/>

The Back of the Napkin blog: <http://www.digitalroam.typepad.com>

The blog of the design planning demo course at the IIT Institute of Design:  
[http://instituteofdesign.typepad.com/d\\_log/2007/04/the\\_design\\_plan.html](http://instituteofdesign.typepad.com/d_log/2007/04/the_design_plan.html)

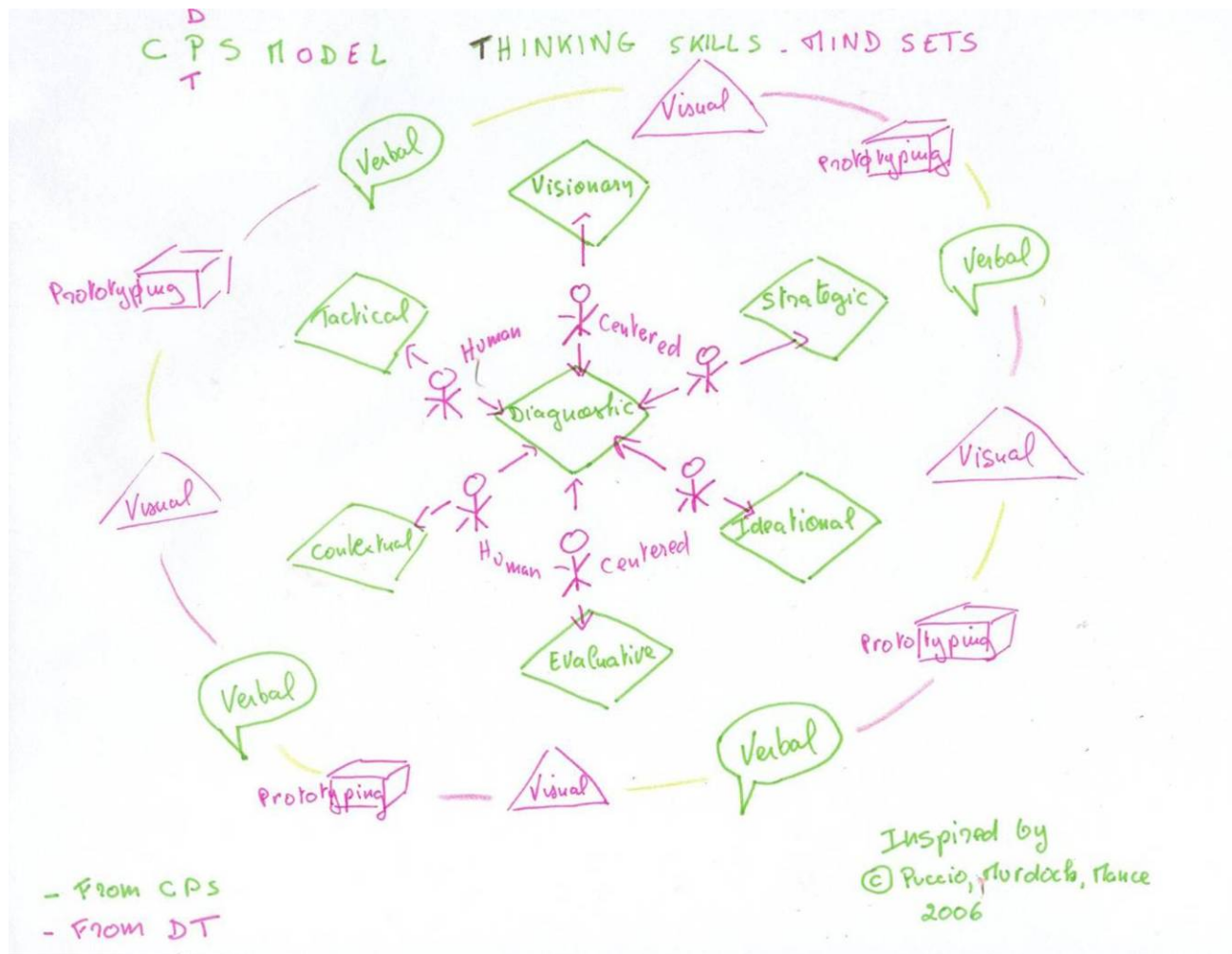
## **Podcasts**

<http://iinnovate.blogspot.com>

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Appendix: The CPS- DT combined model



## **APPENDIX B**

### **List of the Web-Sites with Information Regarding Design and Design Thinking Classes**

List of Websites with Information  
Regarding Design and design thinking Classes

Classes

Ambidextrous Thinking- Gayle Curtis, Bob Adams, Bruce MacGregor,

Darren Kim. <http://www.gaylecurtis.com/garden/313syllabus.html>

Design for Landscape architects. Professor Shenglin Chang, University of

Maryland. <http://www.larch.umd.edu/classes/larc/1141/Syllabus.htm>

Design Thinking course taught by Professor Marvin Malecha, FAIA, at NC  
State University's College of Design. Podcast:

<http://d100designthinking.mypodcast.com/>

Design Thinking Workshop at the Hasso Plattner Institute in Germany:

<http://www.hpi-potsdam.com/index.php/categories/hpi-school-of-design-thinking/>

Design- UK Open University

<http://openlearn.open.ac.uk/course/view.php?id=1329>

Innovation, Problem Solving and Design. Warton MBA class- Professor  
Karl Ulrich.

<http://karlulrich.pbwiki.com/OPIM+651++Innovation,+Problem+Solving,+and+Design+-+Fall+2008>

People Centred Designing. UK Open University

<http://openlearn.open.ac.uk/course/view.php?id=2830>

Universities with Design Programs or Design Thinking Classes:

Carnegie-Mellon : <http://design.cmu.edu/>

Chicago Institute of Design : <http://www.id.iit.edu/98/>

Rotman School of Management. <http://www.rotman.utoronto.ca/index.html>

Stanford d.school

<http://www.stanford.edu/group/dschool/participate/classes.html>

## **APPENDIX C**

### **Extended Bibliography**



## Bibliography Master Project

### Design Thinking

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- Owen, C. (2004, December). *Responsible design: Achieving living excellence: Implications, warnings and a call to action*. Paper presented at the eDesign: International Conference on Environmental Design for Living Excellence, Selangor, Malaysia. Retrieved May 5, 2008, from the Chicago's Institute of Design web site <http://www.id.iit.edu/141/>

- Owen, C. (2005). *Design thinking: What it is, why it is different, where it has new value*. Paper presented at the International Conference on Design Research and Education for the Future, South Korea. Retrieved May 5, 2008 from the Chicago's Institute of Design web site <http://www.id.iit.edu/141/>
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- Rae, J. (2008). P&G changes its game. How Procter & Gamble is using design thinking to crack difficult business problems. *Business Week*, July 28, 2008. Retrieved August 1<sup>st</sup>, 2008, from [http://www.businessweek.com/innovate/content/jul2008/id20080728\\_623527.html](http://www.businessweek.com/innovate/content/jul2008/id20080728_623527.html)
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A song about design thinking:

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Example of students using design thinking for a project at the d school:

<http://www.youtube.com/watch?v=JZH70qhmEso> :

Getting People to Talk (about ethnography by ID students):

<http://www.id.iit.edu/externalID/index.php?id=858> Martin, R. (2008).

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About designing better libraries: <http://dbl.lishost.org/blog/page/2/>:

A complement to Bill Moggridge's 2007 book *Designing Interactions*

[www.designinginteractions.com](http://www.designinginteractions.com)

AIGA (professional association for design): <http://www.aiga.org>

A peer written on-line journal devoted to the practice, innovation, and

discussion of design: <http://www.boxesandarrows.com>

Business Innovation and Design section of Business Week

<http://www.businessweek.com/innovate/> "Mini classes" on visual thinking as well as reading suggestions and links:

<http://www.squidoo.com/communicationnation>

Design Council in the UK <http://www.designcouncil.org.uk/>

Rotman School of Management magazine:

<http://www.rotman.utoronto.ca/news/magazine.htm>

The d.school web site:

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### **Blogs**

Adaptive Path blog <http://www.adaptivepath.com/blog/>

Ambidextrous magazine blog: <http://www.ambidextrousmag.org/blog/>

Design thinking Thoughts by Tim Brown <http://designthinking.ideo.com/>

Design Thinking Digest. Curation and Punditry on design and technology  
<http://www.designthinkingdigest.com/>

Institute for the Future blog: <http://www.iff.org/futurenowblog>

Metacool: thoughts on the art and science of bringing cool stuff to life by  
Diego Rodriguez <http://www.metacool.typepad.com/>

The Back of the Napkin blog: <http://www.digitalroam.typepad.com>

The blog of the design planning demo course at the IIT Institute of Design:  
[http://instituteofdesign.typepad.com/d\\_log/2007/04/the\\_design\\_plan.html](http://instituteofdesign.typepad.com/d_log/2007/04/the_design_plan.html)

Innovation blog: <http://iinnovate.blogspot.com>

### **Podcast**

Podcast from D100 design thinking class taught by Professor Marvin  
Malecha, FAIA, at NC State University's College of Design  
:<http://d100designthinking.mypodcast.com/>

**APPENDIX D**

**Flyer for the Toronto Workshop**



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Workshop:

## Design Thinking for Social Innovation

Dates: November 10 and 11

Time: Monday from 5pm-9pm and Tuesday from 9am-5pm -

Location: Downtown Toronto - TBD

Cost: \$100.00 **REGISTER**

Course code: DesignThink.2008.A

Are you charged with introducing innovation and change in your organization? Do you wrestle with finding the "right" idea and managing the risk of failure? Design Thinking is a creative problem solving approach that can help you and your organization feel more confident about trying new solutions. Design Thinking is now taught to graduate students at Stanford and The Rotman School of Management. It is relevant to businesses and to nonprofit organizations. And now is your chance to learn it too! Design thinking applies some of the principles and mind-sets used by product designers to other fields such as new products, services or re-organization. It is a human-centered, prototype driven approach and iterative process. Being a design thinker will make you aware and interested in the needs and behaviors of those affected by the changes, help you adopt a "prototyping attitude" and test your new solutions quickly and cheaply. As a result the solution you choose to implement is much more likely to succeed. In this experiential workshop, we will introduce the framework around design thinking as it is taught at the Stanford d.school, and then give participants many opportunities to practice their skills. During the two days hands-on workshop, participants will be exposed to a succession of mini labs where they will learn tools and techniques in the areas of needs findings, visualization, ideation, rapid prototyping, create feedback loops, and then immediately apply them to one or several real case studies in the field of social innovation, in a team environment. At the end of this workshop, participants will be able to understand and use the design thinking process on their own projects and become aware of the key mind-sets used by design thinkers. In addition the participants will become more conscious of the power and the challenges of working in a multifunctional team and raise their self awareness about being a creative leader and a team member. Food will be provided.

Instructor: Helene Cahen; Deborah Clifford and Randah Taher

Instructor's Bio: The facilitators for this workshop are all graduates of the International Center for Studies in Creativity and bring a combined experience of more than 20 years of organizational leadership. Their passion is innovation; change leadership and facilitating transformative thinking that help organizations successfully meet current business challenges.

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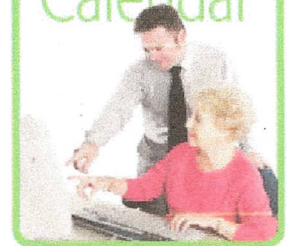
Design: [Dreamstream](#)

ANOTHER PROJECT OF:



A Social Enterprise Family

Course  
Calendar



Hottest



Newest



## **APPENDIX E**

### **Agenda for the Toronto Workshop**

# Design Thinking Workshop

## Agenda Day 1

Welcome  
Review agenda  
Introduction and Goals  
Discussion on Characteristics of Design  
Mini Design Thinking Experience

### **Break**

Design thinking framework presentation  
Create teams and team building exercise  
Introduction to tomorrow's challenge  
Debriefing  
Optional "awareness building" exercises

# Design Thinking Workshop

## Agenda Day 2

Welcome and warm up  
Review Agenda  
Review learnings from day one  
Share initial observations on the challenge  
Introduction to Ethnography and practice in mini-labs

### **Break**

Applied ethnography and summary of observations  
Point of View: learn and apply  
Ideation: review guidelines and ideate

### **Working Lunch**

Explore the ideas further (sketch, prototype and test)  
Prepare and present recommended outcome

### **Break**

Q&A  
Debrief: individual, in your team and the whole group

## **APPENDIX F**

### **Workflow and Time Line for the Toronto Workshop**



Design Thinking Workshop  
Toronto November 10 and 11, 2008

# *Workflow and Timeline*

# Design Thinking Experience- A Day and 1/2 Workshop

## Pre work: Heightening Anticipation

### Suggested Readings

### Homework

### Other?

### Hands-out

#### **Suggested pre-work:**

#### **Read:**

Brown, T. (2008). Design thinking. *Harvard Business Review*, 86(6), p. 84-92 .

Downloadable at

<http://www.ideo.com/press/it em/design-thinking/>

#### **Watch:**

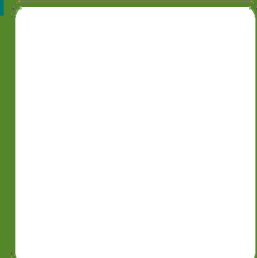
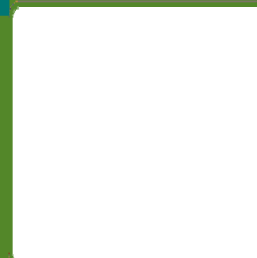
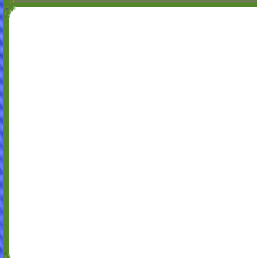
Tim Brown video

Innovation through design thinking

<http://mitworld.mit.edu/video/357/>

Bring an object (or a picture of an object) that you care about.

Send an email with details of readings and assignments and agenda



## Session : Evening Class (4 hours)

Goals: Heightening anticipation and Deepening Expectations

Create a team with people from diverse background, Understand key principles of design thinking and become mindful of the critical importance of “human factors”

Activities	TIM	Time	Facilitator Notes
<b>Welcome: logistics, presenters (with a picture/object)</b>	HA	5 min.	-Explain logistics (bathroom, breaks, food, hours)
<b>Warm-up</b>	DA	10 min.	-Presenters to model the warm-up that will be done in pair
<ul style="list-style-type: none"> <li>Introduce yourself using the object or picture of object you brought or one you have in your purse or draw... : explain why you like it and why it is important to you (write it down on post-its)</li> <li>What do you expect to get out of this class?</li> </ul>	HA- DA		-Facilitator to write down expectations on a chart
<b>Review Agenda for workshop</b>	DA	5 min.	Prepare agenda prior (chart or pp.) Ask if there are any questions
<b>Characteristics of meaningful design:</b>	DA	15 min.	-Teaching team to listen to groups
<ul style="list-style-type: none"> <li>In group of 3, talk about the characteristics of the objects you brought</li> <li>=&gt;what are the characteristics?</li> <li>=&gt;What are the common themes?</li> <li>Share back with larger group</li> </ul>			-Write the group answers on a chart (to be used later)
<b>Mini-experience in design thinking: Design an alarm clock (includes individual debriefing in hands-out)</b>	HA	1 hour	Go over the hands-out step by step as they do it
<b>Break</b>		15 min.	See Activity sheet “Designing an Alarm Clock”

# Session 1: Evening Class (4 hours)-Continued p.2

**Goals** Heightening anticipation and Deepening Expectations

Create a team with people from diverse background, Understand key principles of design thinking and become mindful of the critical importance of “human factors

Activities	TIM	Time	Facilitator Notes
<b>Introduce the frame-work</b> <ul style="list-style-type: none"> <li>Present the d.school framework and relate back to alarm clock exercise</li> <li>Q&amp;A</li> </ul>	DE	25 min.	Use pp.presentation: Introduction to Design Thinking
<b>Create the teams and team building exercise:</b> <ul style="list-style-type: none"> <li>-’And’ vs. ‘but’ activity</li> <li>-Put people in their group</li> <li>-In your group find as many things in common as possible</li> <li>-find a name for your group</li> <li>-Debrief</li> </ul>	HA	10 min.	
<b>Introduce the challenge for tomorrow</b> <ul style="list-style-type: none"> <li>Client video introducing the issue (or other format)</li> <li>Sheet of basic data</li> </ul>	DE	3 min	See Activity sheet “And vs But”
	DE	5 min.	
	KG	2 min	
<b>Start research and experience:</b> <ul style="list-style-type: none"> <li>Distribute relevant articles and post learnings on post its</li> </ul>	DE	20 min	Use pp.”Debriefing” Take note on charts or better on computer while being projected
<b>Debrief learnings and workshop format (PPCO)</b>	KG	15 min.	

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# Session : Session 1: Evening Class (4 hours)-Continued p.3

Goals: Heightening anticipation and Deepening Expectations

Create a team with people from diverse background, Understand key principles of design thinking and become mindful of the critical importance of “human factors”,

Activities	TIM	Time	Facilitator Notes	
Optional: Awareness building list	HA	2 min.	Give hand-out for participants called “Optional activities to help increase awareness...” and read over briefly. Insist it is optional	

# Session1 Evening class

## Materials and handout list

### Materials

**Materials:**

1. 2 Flipchart and paper pads (sticky ones preferred)
2. Computer and projector
3. Post-its and thin and thick markers (for participants and for flip charts)
4. White paper
5. Material for making alarm clock prototypes: box, scissors, glue, craft paper, markers, ribbons, miscellaneous art and crafts

**Bibliography: see pre-work**

1. Books
2. Website
3. Video

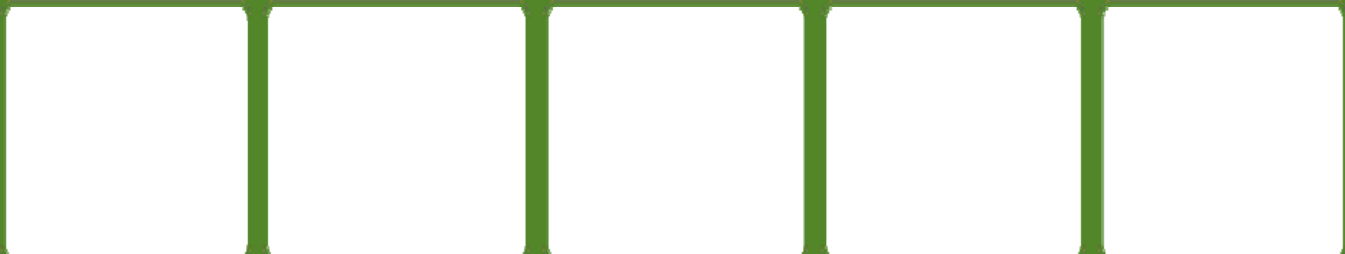
### Handouts

Hands-out

1. The Alarm Clockpractice booklet
2. The introduction to design thinking slides
3. The “Optional activities to help increase awareness” hand-out

Power-points

1. The introduction to design thinking slides
2. Debriefing slides



## Session : Day 2 morning (3 hours)

**Goals:** Deepening Expectations.

Learning the basics of user research and apply it to our case study

Activities	TIM	Time	Facilitator Notes
<b>Welcome back:</b> -Temperature check <b>Review Agenda for the day</b> <b>Discuss learnings from previous day in pair then share with group</b> <b>Share observations from home work:</b> <ul style="list-style-type: none"> <li>describe what you have seen, done</li> <li>each group to write some conclusions (in an headline form on a post-its)</li> </ul> <b>Ethnography training</b> <ul style="list-style-type: none"> <li>Presentation of the principles</li> <li>Mini-labs:                             <ul style="list-style-type: none"> <li>-interview each other (practice 2x5minutes)</li> <li>-Look at pictures of magazines and write observations</li> <li>-Role play : a day with no trash</li> </ul> </li> </ul> => Write learnings on post-its  <b>Break</b>	  HE DE- KG DE  HA  DE    DE	  10 min. 5 min. 10 min. 10 min.  20 min 10 min  10 min 10 min  10 min. 10 minutes	See Temperature check activity sheet Use initial agenda: review what was done and what will be done. Ask if there are any questions If people have observations to share  Use "Introduction to Ethnography training" pp.

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## Session 2: Lunch and afternoon day II (4 ½ hours)

**Goals:** Deepening Expectations and Extending the Learning.

Learn how to explore and test ideas so you can convince others. Reframe the learnings in a way to become relevant to participants unique situation

Activities	TIM	Time	Facilitator Notes	
<p><b>Applied ethnography</b>            Do the following activities in your team            (whole or break in pairs)</p> <ul style="list-style-type: none"> <li>-interviews (stores, restaurants, streets)</li> <li>-Observations (stores, restaurants, streets)</li> </ul> <p><b>Come back and write down observations on post-its</b></p> <p><b>Create a Point of View</b></p> <ul style="list-style-type: none"> <li>• Present POV pp.</li> <li>• Review all the observations you have written on post-its. Think about specific people you encountered (directly or via pictures,web site) or type of people</li> <li>• Create a story for that person with the model user + need+ insights (create at least 4 for your group)</li> <li>• Select one that you group is interested in (vote)</li> <li>• Transform in a How to question</li> </ul>	<p>DE</p>	<p>30 min.</p> <p>10 min.</p> <p>10 mn 10 min</p> <p>15 minutes</p> <p>5 minutes 5 minutes</p>	<p>May need to skip this part all together</p> <p>Reuse chart from alarm clock booklet</p>	



## Session 2: Lunch and afternoon day II (4 ½ hours)

**Goals:** Deepening Expectations and extending the learning

Learn how to explore and test ideas so you can convince others. Reframe the learnings in a way to become relevant to participants unique situation

Activities	TIM	Time	Facilitator Notes
<p><b>Ideation</b></p> <ul style="list-style-type: none"> <li>-Remind rules of ideation</li> <li>-Ideate answers to your question</li> <li>-Each pick 3 ideas (votes using dots)</li> <li>-Select one to move forward</li> </ul> <p><b>Working lunch (or break if extra time) : Exploring the ideas</b></p> <ul style="list-style-type: none"> <li>-Do 6-8 sketches, select 4 (one per team member)</li> <li>-Regroup as a team and decide two sketches to prototype</li> <li>-Prototype the sketches (do 1-3 prototype)</li> <li>-Prepare a short story and share story and prototype with non-team members (twice) 2x2x2</li> <li>-Finalize one prototype based on feedback</li> </ul> <p><b>Break and preparation</b></p> <ul style="list-style-type: none"> <li>-Each group has 20 minutes to prepare a presentation: story, insight and prototype</li> </ul>		<p>45 min. tot</p> <p>20 minutes</p> <p>20 minutes</p> <p>10 minutes</p> <p>10 minutes</p> <p>30 min. tot</p>	<p>Use "Ideation guidelines" pp. Teaching team to lead ideation session (given time constraints). Use "Hit" slide to help with selection</p> <p>Show SUCCESS chart in the introduction to DT presentation</p>

## Session 2: Lunch and afternoon day II (4 ½ hours)

**Goals:** Deepening Expectations and extending the learning

Learn how to explore and test ideas so you can convince others. Reframe the learnings in a way to become relevant to participants unique situation

Activities	TIM	Time	Facilitator Notes
<p><b>Presentation (10 minutes per team):</b></p> <ul style="list-style-type: none"> <li>-Presentation 5 minutes</li> <li>-All participants write comments on post-its while listening</li> <li>-Feedback from teaching team and participants. 5 minutes</li> </ul> <p><b>Fun pause (cookies and ...)</b></p> <p><b>Q&amp;A about what happened in the workshop</b></p> <p><b>Debrief</b></p> <ul style="list-style-type: none"> <li>• <b>For yourself (use hands-out)</b></li> <li>• <b>In your group</b></li>   <li>• <b>As a whole group about learning, content and format</b></li> </ul>		<p>30 min. total</p> <p>10 minutes</p> <p>20 min. 20 min.</p> <p>20 min.</p>	<p>Use the “personal debrief hands-out to help the participants”</p> <p>Use Debriefing pp. Take time to work on concern and overcome</p>

## Session 2: Morning and Afternoon

### Materials and handout list

#### Materials

##### **Materials:**

1. Walls cover with paper pad
2. Computer and projector
3. Post-its and thin and thick markers (for participants and for flip charts)
4. White paper and pencils for sketching
5. Material for prototyping

##### **Bibliography:**

1. Books
2. Website
3. Video

**Homework: None**

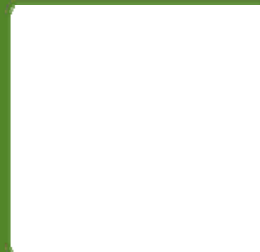
#### Handouts

##### Hands-Out

1. Ethnography slides or hand-outs
2. POV slides/hand-out
3. Personal debrief word doc

##### Power-point

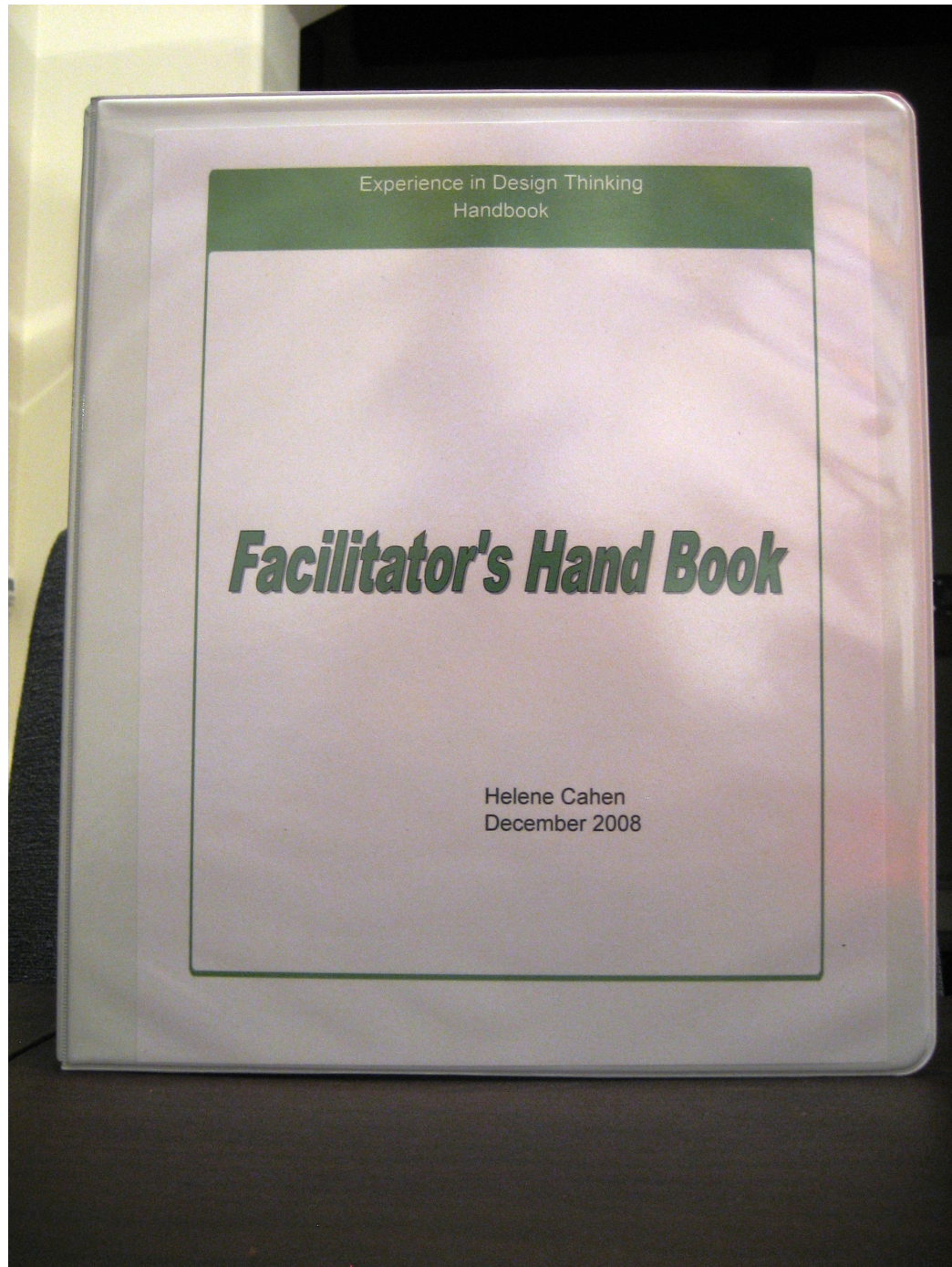
1. Introduction to Ethnography
2. POV pp
3. Ideation guidelines
4. Debriefing (PPCo)



## **APPENDIX G**

### **Pictures of the Facilitator's Kit Binder**

# The Facilitator Handbook Pictures



Experience in Design Thinking  
Table of Contents for Day One and Day Two

Section 1: Overview  
Agenda for Day One and Day Two  
Workflow and Timeline

Section 2: Power Point Presentations and Hands-Out  
Design an Alarm Clock Booklet (workbook)  
Introduction to Design Thinking (PowerPoint)  
Assessing Expertise (PowerPoint)  
Introduction to Ethnography/User Research (PowerPoint)  
Ideation guidelines (PowerPoint)  
Point of View (PowerPoint)

Section 3: Detailed Activities with logistics  
Design an alarm clock  
Hand vs. Bit  
Screen On  
Temperature Check

Section 4: Case Study  
Trash facts

Section 5: Debriefing  
PPCo power point  
PPCo booklet  
Individual Reflective Questionnaire

Section 6: Pre-Work and Home Work  
Pre-work  
Home-work Day One  
Home-Work Day Two

Experience in Design Thinking  
Agenda Day 1

Welcome  
Introduction and Goals  
Review Agenda  
Discussion on Characteristics of Design  
Mini Design Thinking Experience

Break  
Design Thinking Framework Presentation  
Create Teams and Team Building Exercise

Team Lunch  
Review Syllabus  
Introduce the Challenge  
Presentation Regarding Expertise and mini-labs

Break  
Introduction to Ethnography and mini-labs  
Preparation for Applied Ethnography  
Debriefing  
Review Home-work

Experience in Design Thinking  
Handbook

**Detailed Activities**

Experience in Design Thinking  
Practice Booklet

**Design an Alarm Clock**

Adapted from the d school  
Boot Camp

Design Thinking Case Study  
A few trash facts

- Garbage in the US is 100 million tons a year in 1997 (source: wired magazine)
- A guy in California lived with his own trash for a year at <http://www.yourtrash.tyepad.com/tyepad/tyepad.cfm?article=7670671239BAFF4483E111>
- Americans generate 251.3 million tons of garbage per year and the amount has tripled since the 60's
- San Francisco's diversion rate is the highest in the nation at 69 percent as of fall 2007
- One million plastic cups: the number used on active rights in the US every six hours (source: Chris Jordan [http://www.chrisjordan.com/cvmmnt\\_sst2.php](http://www.chrisjordan.com/cvmmnt_sst2.php))

Experience in Design Thinking

**Debriefing**

Experience in Design Thinking  
Pre-work and Home-work

**Homework**

## **APPENDIX H**

**Facilitator Kit Cover page, Table of Content and Agenda for Day One and Two**

Experience in Design Thinking  
Handbook

# ***Facilitator's Hand Book***

Helene Cahen  
December 2008



# Experience in Design Thinking

## Table of Contents for Day One and Day Two

### Section 1: Overview

- Agenda for Day One and Day Two
- Workflow and Timeline

### Section 2: Power Point Presentations and Hands-Out

- Design an Alarm Clock Booklet (workbook)
- Introduction to design thinking (PowerPoint)
- Acquiring Expertise (PowerPoint)
- Introduction to Ethnography/User Research (PowerPoint)
- Ideation guidelines (PowerPoint)
- Point of View (PowerPoint)

### Section 3: Detailed Activities with logistics

- Design an alarm clock
- And vs. But
- Either/Or
- Temperature Check

### Section 4: Case Study

- Trash facts

### Section 5: Debriefing

- PPCo power point
- PPCo booklet
- Individual Reflective Questionnaire

### Section 6: Pre-Work and Home Work

- Pre-work
- Home-work Day One
- Home-Work Day Two

# Experience in Design Thinking

## Agenda Day 1

Welcome

Introduction and Goals

Review Agenda

Discussion on Characteristics of Design

Mini Design Thinking Experience

*Break*

Design Thinking Framework Presentation

Create Teams and Team Building Exercise

*Team Lunch*

Review Syllabus

Introduce the Challenge

Presentation Regarding Expertise and mini-labs

*Break*

Introduction to Ethnography and mini-labs

Preparation for Applied Ethnography

Debriefing

Review Home-work

## Experience in Design Thinking Agenda Day 2

Welcome back and warm up  
Review Agenda  
Review learnings from day one  
Share and Post all the Data From Ethnography  
Point of View: Learn

### *Break*

Point of View: Apply  
Ideation: review guidelines, ideate and select

### *Lunch*

Explore the Ideas Further (sketch, prototype and test)  
Prepare and Present Recommended Outcome  
(*Break included*)

Presentation (5 minutes per team and 5 minutes for feedback)

Presentation Debrief: individual, in your team and the whole group

Session PPCo

Optional: Dinner with special guests

## **APPENDIX I**

### **Workflow and Timeline for the First Two Days**

# *Workflow and Timeline*

# Design Thinking Experience

## Pre work: Heightening Anticipation

### Suggested Readings

### Homework

### Other

### Hands-out

#### **Suggested pre-work:**

#### **Read articles (two out of three)**

Brown, T. (2008). Design thinking. *Harvard Business Review*, 86(6), p. 84-92 .

Downloadable at

<http://www.ideo.com/press/it-em/design-thinking/>

- Owen, C.L. (2008). Design thinking: On its nature and use. *Rotman Magazine*, 26(3), p.26-31

- Wise, S. (2007). Interview with Bill Moggridge. *Ambidextrous*, Issue 6.

#### **Read book:**

-Kelley, T (2001). *The Art of Innovation*

#### **Watch:**

Tim Brown video

Innovation through design thinking

<http://mitworld.mit.edu/video/357/>

#### **Post reaction to articles on Angel**

#### **Do a mind-map of the key learnings (using Mindomo)**

Share with another student (via Skype or white board discussion)

=> What new learnings did you get from the readings and watching the video?

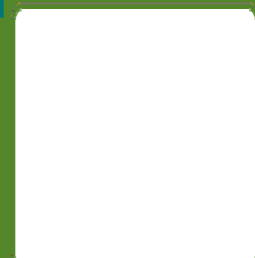
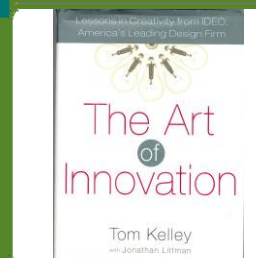
=> How does these learnings relates to CPS and creativity?

#### **Take FourSight thinking profile test (logistics TBD)**

**Write a short essay** describing reasons for enrolling in the class and skills

**Bring an object** (or a picture of an object) that you care about.

**Send an email** with details of readings, and homework and/or syllabus



## Session : Day One Morning

- Goals: Heightening Anticipation (HA) and Deepening Expectations (DE)**
- Setting up the principles and experimenting design thinking first hand
  - Raising initial awareness about groups

Activities	TIM	Time	Facilitator Notes
<b>Welcome and logistics</b> <b>Warm-up</b> In pair then report to group <ul style="list-style-type: none"> <li>• Introduce yourself (who you are, what you do, what you are passionate about)</li> <li>• Using the object or picture of object you brought or one you have in your purse or draw... : explain why you like it and why it is important to you (write it down on post-its)</li> <li>• What do you expect to get out of this class?</li> </ul>	HE  HE DE	10 min. 20 min.	-Explain logistics (bathroom, breaks, food, hours)  -Facilitator to write down expectations on a chart Prepare agenda prior (chart or pp.)
<b>Review Agenda for workshop (pp.)</b> <b>Characteristics of meaningful design:</b> <ul style="list-style-type: none"> <li>• In group of 3, talk about the characteristics of the objects you brought</li> </ul> => why are they important? How do they make you feel? => What are the common themes? <ul style="list-style-type: none"> <li>• Share back with larger group</li> </ul>	HA  DE	15 min.  15 min.	-Ask if there are any questions -Teaching team to listen to groups -Write the group answers on a chart (to be used later)
<p style="text-align: right;"><b>Stretch break</b></p> <b>Mini-experience in design thinking:</b> <b>Design an alarm clock (includes individual debriefing in hands-out)</b>	HA- DE	10 min. 2 min. 1 hour	-Distribute hand-out <i>Design an Alarm Clock</i> and go over the steps as they do it
<p style="text-align: right;"><b>Break</b></p>		15 min	-Check Activity sheet for details

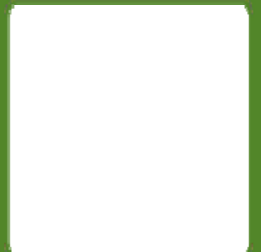
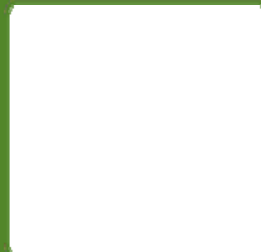
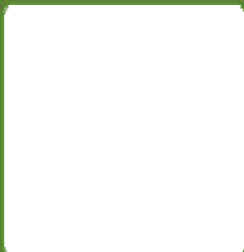


## Session : Day One Afternoon

### Goals: Heightening anticipation and Deepening Expectations

- Setting up the principles and experimenting design thinking first hand
- Raising initial awareness about groups

Activities	TIM	Time	Facilitator Notes
<p><b>Debrief</b></p> <p>⇒ each team will introduce their name and briefly describe what they have in common</p> <p>⇒ ask: what did you think of the assignment</p>	HA DE	10 min.	Find out the process they use to look at common elements. Also watch for comment on how hard it may be to talk about yourself rather than the usual social conversations
<p><b>Team building exercise:</b></p> <p>-And' vs. 'but' activity</p> <p>-Debrief</p> <p>=&gt;how is this similar to situations happening in a work environment?</p>	HA DE	15 min.	See Activity sheet <i>And vs. But</i>
<p><b>Syllabus</b></p> <p>Review curriculum and clarify homework</p>		15 min.	
<p><b>Introduce the challenge: <i>Redesigning the trash experience</i></b></p> <p>Share basic facts</p>	DE	5 min.	Write challenge on a board Use <i>Trash Facts</i> hand-out
<p><b>Gain expertise on the topic</b></p> <p>Presentation on how to gain expertise</p> <p>Mini-labs:</p> <p>⇒ Do internet search</p> <p>⇒ Call experts</p> <p>⇒ Role play</p> <p>⇒ post learnings on post its and share with everybody</p>	DE	1 hour	Use <i>Expertise</i> pp.  Mini-labs hands-out ?
<b>Break</b>		15mn	





## Session: Day One Morning -Continued p.2

### Goals: Heightening anticipation and Deepening Expectations

- Setting up the principles and experimenting design thinking first hand
- Raising initial awareness about groups

Activities	TIM	Time	Facilitator Notes
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**Introduce the frame-work**

- Present the d.school framework and relate back to alarm clock exercise
- Q&A

DE

35 min.

Use pp..presentation:  
*Introduction to Design Thinking*

10 min.

**Create the teams and lunch team building**

- Announce the teams and ask participant to get together with their team
- Over lunch time, the group has three tasks:
  - ⇒ find as many things in common as possible
  - ⇒ find one thing in common about you (not family, job, education or house)
  - ⇒ find a name for your group
- Debrief

HA

10 min.

Facilitator will have created the teams prior to the class (using FourSight or mixing skills)

1 hour

DE

DE



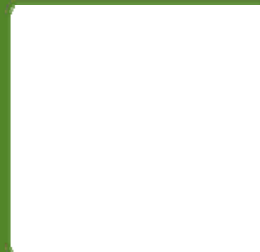
## Session : Day One Afternoon- Continued p.2

### Goals: Heightening anticipation, Deepening Expectations and Keeping it Going (KIG)

-Start building team collaborative attitude;

- Learn about the *Understanding* and *Observing* steps of design thinking and being mindful of the “human factors”

Activities	TIM	Time	Facilitator Notes
<p><b>Ethnography training</b></p> <ul style="list-style-type: none"> <li>• Presentation of the principles</li> <li>• Mini-labs:</li> </ul> <p>⇒ look at pictures of magazines and write observations</p> <p>⇒ interview each other (practice 2x5minutes)</p> <p>⇒ Write learnings on post-its</p>	<p>HA</p> <p>DE</p>	<p>20 min.</p> <p>5 min.</p> <p>15 min.</p> <p>10 min.</p>	<p>Use <i>Introduction to Ethnography</i> pp.</p> <p>Give the guidelines as a hand-out</p>
<p><b>Preparation for outside ethnography research:</b></p> <p>Each group will discuss and prepare real ethnographic research outside the classroom for that evening, both observations and interviews</p> <p>⇒ Prepare plan to do interviews and observation after class</p> <p>⇒ prepare questions for interviews</p>	<p>HA</p> <p>DE</p>	<p>30 min</p>	<p>Point out the need to deal with logistics (camera, field notes, recorders), roles (interviewer versus note taking or recording) and decide if the group want to split in two pairs</p>
<p><b>Debrief learnings and workshop format (PPCo)</b></p> <p>⇒Use debriefing pp.</p>	<p>KIG</p>	<p>20 min.</p>	<p>Use pp. <i>Debriefing</i></p> <p>Take note on charts or better on computer while being projected</p>
<p><b>Homework</b></p>		<p>5 min.</p>	<p>See <i>Homework</i> section</p>



# Day One

## Materials and handout list

### Materials

#### Materials:

1. Name tags
2. 2 Flipchart and paper pads (sticky ones preferred)
3. Computer and projector
4. Post-its and thin and thick markers (for participants and for flip charts)
5. White paper
6. Material for making alarm clock prototypes: box, scissors, glue, craft paper, markers, ribbons, miscellaneous art and crafts

#### Bibliography:

1. Books
2. Website
3. Video

### Handouts

#### Hand-out

1. Design an Alarm Clockbooklet
2. The trash facts
3. Mini-lab?
4. Interview guidelines

#### Power-point

1. Agenda
2. The introduction to design thinking slides
3. Expertise
4. Ethnography
5. PPCo

#### Charts to prepare

Agenda (optional)

List of questions for introduction

Questions for the characteristics of objects exercise

Team lunch exercise

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# Session : Day Two Morning

## Goals: Deepening Expectations.

- Review and deepen learnings from day one
- Learn about creating a point of view and taking it into the Ideation phase

Activities	TIM	Time	Facilitator Notes
<b>Welcome back</b>		5 min.	
<b>Warm up: <i>Either/or</i></b> Get to know the other participants better =>What did we learn	HA	10 min.	See <i>Either/Or</i> activity Emphasis on challenges of working with similar and different people
<b>Discuss learnings from day one</b> in pair then share with group =>review framework => Q&A => pair discussion using diary entry => group summary	DE	30 min.	
<b>Review Agenda for the day</b>	HA	5 min.	
<b>Share observations from home work:</b> <ul style="list-style-type: none"> <li>• describe what you have seen, done</li> <li>• each group to write some conclusions (in an headline form on post-its)</li> </ul>	DE	15 min.	
<b>Presentation on Point of View (POV)</b>	DE	15 min.	Use pp. <i>Point of View</i>
<b>Break</b>		15 min.	

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## Session Day Two Morning-Continued p.2

### Goals: Deepening Expectations and Extending the Learning.

- Review and deepen learnings from day one
- Learn about creating a point of view and taking it into the ideation phase

Activities	TIM	Time	Facilitator Notes
<p><b>Create a Point of View</b></p> <ul style="list-style-type: none"> <li>• Review all the observations you have written on post-its. Think about specific people you encountered (directly or via pictures, web sites, etc) or types of people</li> <li>• Create a story for that person with the model user + need+ insights (create six to eight for your group)</li> <li>• Select two that your group is interested in (vote if necessary)</li> <li>• Write an ad (such as a classified ad) for each of them providing more information about the user</li> <li>• Select one POV to take forward</li> </ul>	DE	40 min.	Reuse chart from alarm clock booklet
<p><b>Transform in a How to...?( or other statement starter) Question</b></p> <p>Create a least 10 questions and select one</p>	DE	15 min.	Post statement starters on a chart
<p><b>Introduction to Ideation (diverge)</b></p> <ul style="list-style-type: none"> <li>• Show Amazon no-mess package video</li> </ul>	HA	2 min.	<p>Example of a solutions</p> <p><a href="http://www.amazon.com/gp/mpd/permalink/m1THTXLYALTON1">http://www.amazon.com/gp/mpd/permalink/m1THTXLYALTON1</a></p>

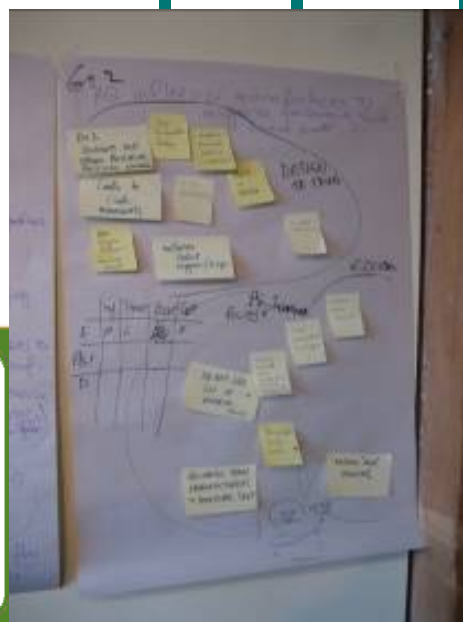
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## Session Day Two Morning-Continued p.3

### Goals: Deepening Expectations and Extending the Learning.

- Review and deepen learnings from day one
- Learn about creating a point of view and taking it into the ideation phase

Activities	TIM	Time	Facilitator Notes
<p><b>Ideation (diverge)</b></p> <ul style="list-style-type: none"> <li>Remind the participants of the rules of ideation (pp.) including “be visual”</li> <li>Ideate using words and visuals as the outcome</li> <li>Use brainstorming with post-its, add visual connection if needed</li> </ul>	DE	45min.	<i>Ideation Guidelines</i> pp. Teaching team may lead ideation session (depending on participants ability).
<p><b>Ideation (converge)</b></p> <ul style="list-style-type: none"> <li>Each participant identifies their top idea in each of the following category: smart choice, holy grail, darling and most unexpected</li> <li>Combine ideas if possible and keep two idea</li> </ul>	DE	20 min.	Coach to help to be sure decision is made
<b>Lunch Break</b>		1 hour	

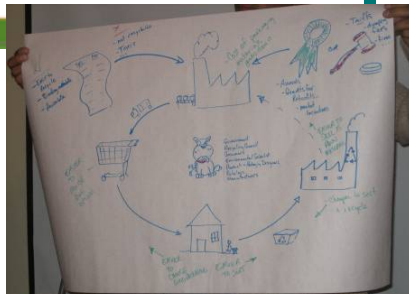


## Session: Day 2 Afternoon

### Goals: Deepening Expectations and Extending the learning

-Learn to use sketching, prototyping and testing to help develop

Activities	TIM	Time	Facilitator Notes
<p><b>Exploring the ideas</b></p> <ul style="list-style-type: none"> <li>Do 6-8 sketches, select 4 (one per team member)</li> <li>Show sketches to members of other groups and select one sketch to prototype based on feedback</li> <li>Do 2-3 prototypes</li> <li>Get feedback on your prototypes from at least one user outside the classroom (present story and prototype)</li> </ul> <p>-Finalize one prototype based on feedback</p>	DE	25 min. 15 min. 15 min. 20 min. 10 min.	Emphasize quantity rather than quality of sketches  Mention the iterative nature of the process
<p><b>Break and preparation</b></p> <ul style="list-style-type: none"> <li>Each group has 20-30 minutes to prepare a presentation: story, insight and prototype</li> </ul>	DE	30 min.	Suggest that the teaching team is some kind of board they are trying to convince
<p><b>Presentation story, insight and prototype</b></p> <p>-Presentation 5 min.</p> <p>-All participants write comments on post-its while listening</p> <p>-Feedback from teaching team and participants 5 min.</p>	DE	45 min.	Assume 4 groups.
<p><b>Fun pause (cookies and ...)</b></p>	KIG	10 min.	Feedback focused on clarification questions, how convincing and why.



## Session: Day 2 Afternoon- Continued p.2

### Goals: Deepening Expectations and Extending the learning

-Learn to use sketching, prototyping and testing to help develop

Activities	TIM	Time	Facilitator Notes
<p><b>Debrief</b></p> <ul style="list-style-type: none"> <li>• For yourself (use hands-out)</li> <li>• Discuss in your group</li> </ul> <p>⇒ what did we learn today?</p> <p>⇒ how did you feel about the outcome of the project?</p> <p>⇒ how did we worked as a group: Likes, Potentials, Concerns,</p> <p><b>PPCo: as a whole group about learning, content and format</b></p> <p><b>Homework</b></p> <p><b><u>Optional:</u> Dinner with designers or other design related activities</b></p>	KIG	<p>10 min.</p> <p>5 min.</p> <p>10 min</p> <p>20 min.</p>	<p>Use the <i>Personal Debrief</i> hands-out</p> <p>Use <i>Debriefing</i> pp.</p> <p>See <i>Homework</i> section</p>



# Session: Day two

## Materials and handout list

### Materials

#### Materials:

1. Walls cover with paper pad
2. Computer and projector
3. Post-its and thin and thick markers (for participants and for flip charts)
4. White paper and pencils for sketching
5. Material for prototyping

#### Bibliography:

1. Books
2. Website
3. Video

**Homework: None**

### Handouts

#### Hands-Out

1. POV slides and/or hands-out
2. *Personal debrief* Word document

#### Power-point

1. POV pp
3. Ideation guidelines
4. Debriefing (PPCo)

#### Charts:

1. Statement starters
2. Agenda



## **APPENDIX J**

### **Design an Alarm Clock Booklet**

Experience in Design Thinking

Practice Booklet

# *Design an Alarm Clock*

Adapted from the d.school  
Boot Camp



Draw your Ideal Alarm Clock

5 minutes to draw (You can also use words to explain some of the features)

## Interview Notes



*You have 2 minutes to summarize what you learn in your interview*

Who is your user?

What do they need (function, esthetic and emotionally)?

Why to they need this (rational and emotional support)?

When do they need their alarm?

Where do they need their alarm?

What are the issues with their current alarm system?

## Interview Notes Summary



*You have 5 minutes each then switch*

When do you use your alarm clock?

What functions do you use? Never use?

What would you want your alarm clock to do?

What do you likes or dislike with your current alarm clock?

Other comments?

## Create a point of view : What is the story?

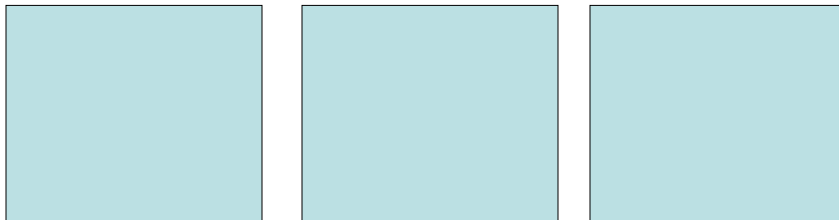
User + Need + Insight

Example: *Janet the busy mom needs an alarm clock that is her trusted companion to start the day happily.*

User                      needs    Insight  
\_\_\_\_\_ needs an alarm clock  
that \_\_\_\_\_

## Draw your Ideal Alarm Clock

Draw 3 sketches of alarm clocks *5 minutes*



Get feedback *5 minutes each*

Ask      =>What do you think? Does would this do for you?  
          =>Which one do you prefer and why

_____	_____	_____
_____	_____	_____
_____	_____	_____

## Finalize one of the sketches

**Based on the "customer's" feedback, take 2 minutes to finalize one of the sketches**



## Prototype your final sketch

**You have 10 minutes to use all the material available to you to prototype your final sketch**



## Debrief

*Take five minutes to reflect on this exercise and write down your thoughts*

What did you learn doing this activity?

How similar/different was it when you did it for yourself or for somebody else? Why?

What did you learn from sketching?

What did you learn from testing?

What did you learn from prototyping?

What was challenging for you?

## **APPENDIX K**

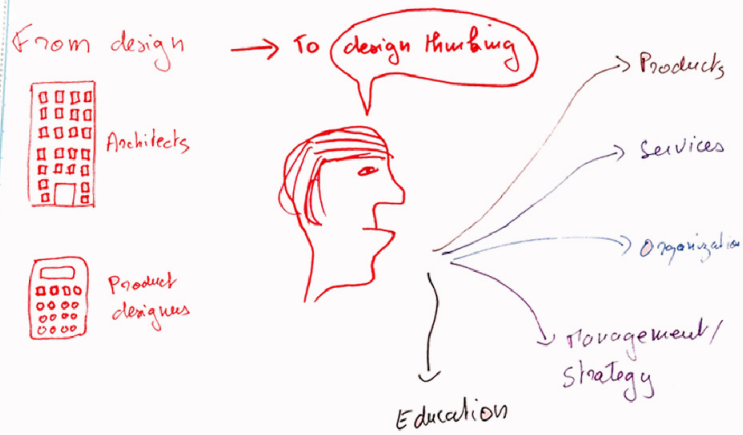
### **Introduction to Design Thinking**



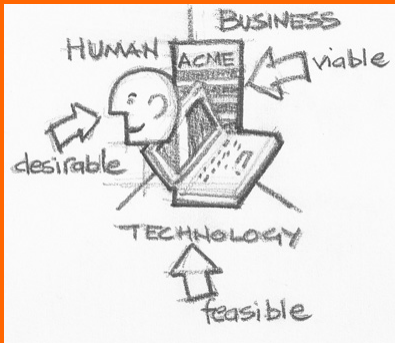
# Introduction to Design Thinking

Presented by Helene Cahen

Design thinking is design applied to the broader world



## Brown's Visual Definition of Design Thinking



Source: <http://designthinking.ideo>

### Design Thinking and How it Will Change Management Education: An Interview and Discussion

DAVE HENSE  
Derek L. Brown School of Management

Roger Martin, dean of the Rotman School of Management, University of Toronto, is interviewed on the subject of design thinking—approaching management problems as designers. Design thinking is defined as a process that is interdisciplinary, iterative, and human-centered. It is a process that is used to solve complex problems. The process is used to solve complex problems. The process is used to solve complex problems.

**INTRODUCTION**  
The design of products and services is a central component of business success. In the past, the design process was often a linear and sequential process. However, design thinking is a process that is iterative and human-centered. It is a process that is used to solve complex problems. The process is used to solve complex problems.

Design thinking is a process that is used to solve complex problems. It is a process that is used to solve complex problems. The process is used to solve complex problems. The process is used to solve complex problems.

**“Design thinking - approaching management problems as designers approach design problems - may have important implications for management, an emerging prospect that has begun recognition in both academic literature and business press.”**

-Roger Martin

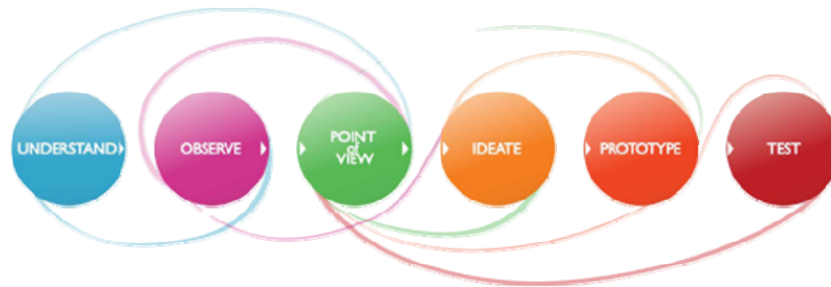
# The d.school model

Expertise

Empathy

Exploration

Execution




To learn more about the d.school <http://www.youtube.com/watch?v=Sql-bZRmlbw>



The Ramen noodle experience

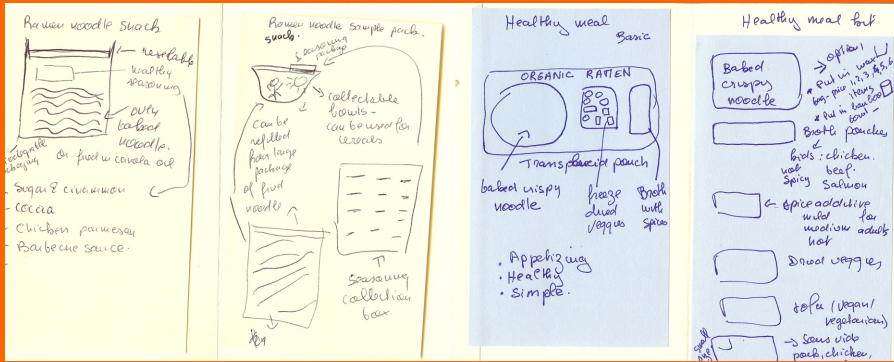


**Point of View (POV)**

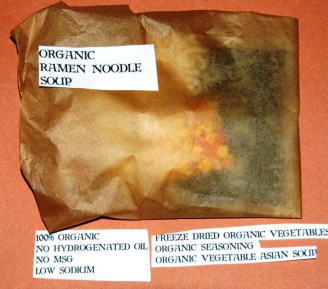
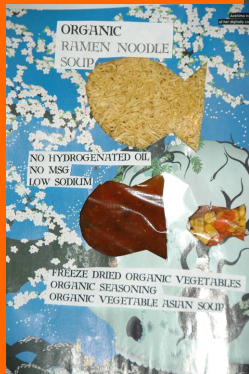


Busy mom's guilty tip to feed kids and herself and make her kids happy

# Ideate



# Prototype



# Test



## ***The Key Elements of Design Thinking***

## Being Human-centered with a focus on empathy

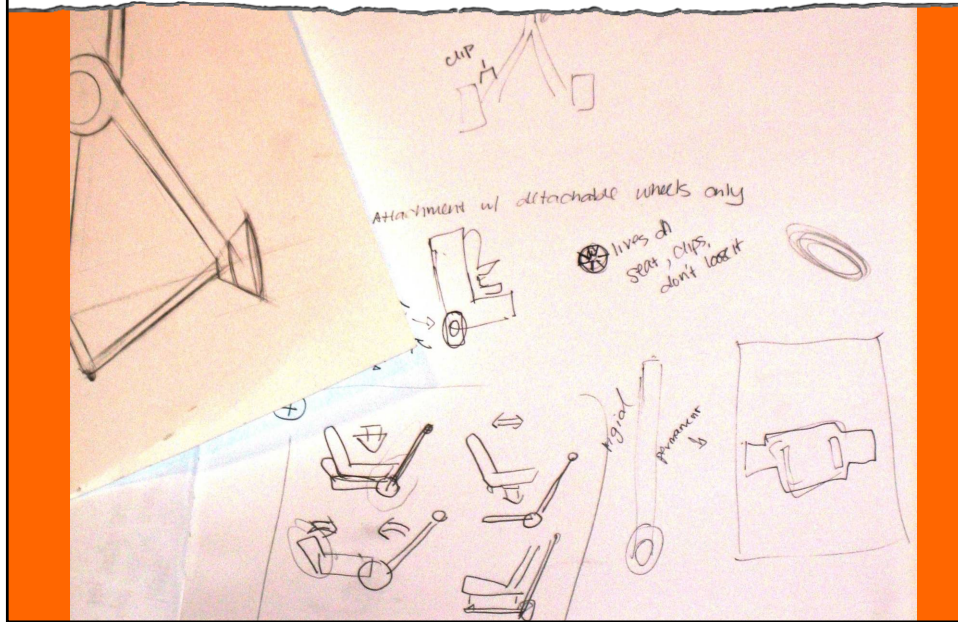


"If you are not in the jungle, you're not going to see the tiger" (Kelley, 2001)



**Knowing  
your users  
desires!**

## Visual thinking and sketching



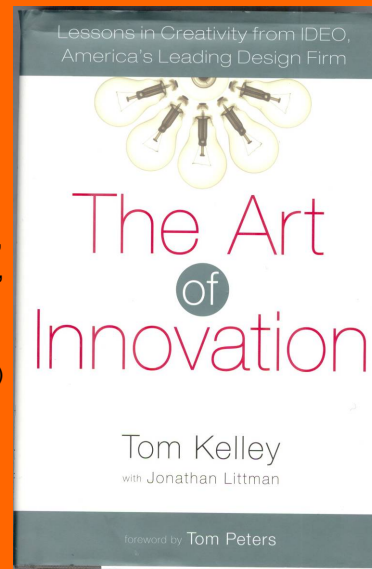
## A prototyping attitude!





Prototyping is problem solving...  
What counts is moving the ball forward,  
achieving part of the goal."

-Tom Kelley (P. 103)



stories and story-telling



## Stories and story-telling

“For sale: baby shoes, never worn.”  
*Hemingway*

TIME MACHINE REACHES  
FUTURE!!! ... nobody there ...  
*Harry Harrison*

A bias towards action: Let's just try



Designers prototyping at the Stanford School of Design

## The six Principles of sticky ideas: SUCCESS

Simple: Find and share the core  
Unexpected: get and hold attention  
Concrete: help people understand and remember  
Credible: Help people believe and agree  
Emotional: make people care  
Stories: get people to act

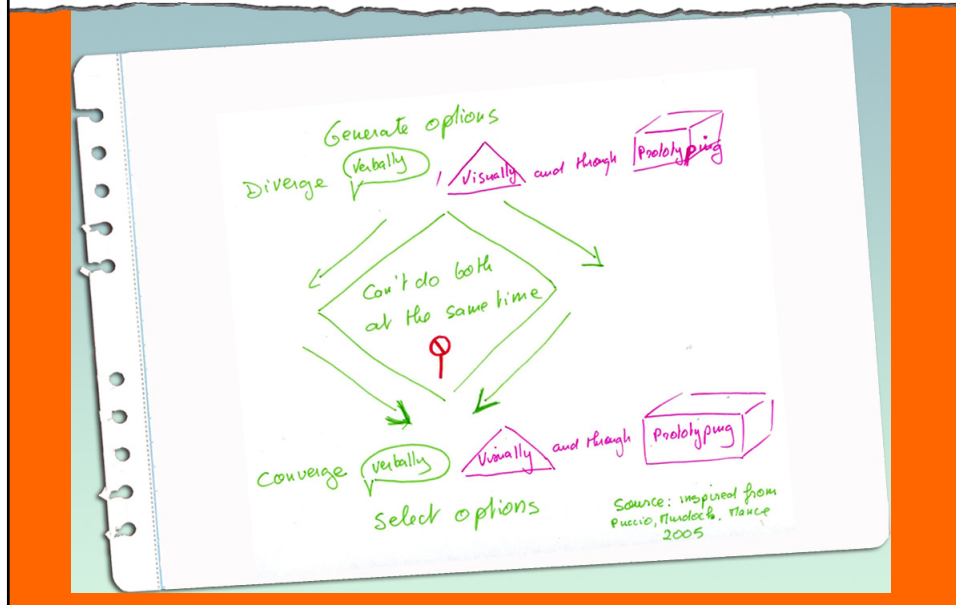
Source: *Made to Stick*  
Heath and Heath (2007)

## Multidisciplinary teams



“The shared mind is  
more powerful than  
the individual mind “  
(Moggridge, 2007)

## The Dynamic Balance (from creative Problem solving)



## The mindsets and activities associated with design thinking



## A few references to dig deeper

### Books and articles:

- Brown, T. (2008). Design thinking. *Harvard Business Review*, 86(6), p. 84-92.
- Brown, T. (2008, September 7). Definitions of design thinking. *Design Thinking Thoughts by Tim Brown*: <http://designthinking.ideo.com>
- Buxton, B. (2008). Sketching, prototyping and “design thinking”. January 2008. Retrieved from <http://trex.id.iit.edu/events/strategyconference/2008/perspectives.php>
- Fraser, H. (2008). How design thinking enables personal growth and enterprise success. *Rotman Magazine*, Winter 2008, 79-82.
- Kelley, T. (with Littman, J.) (2001). *The art of innovation*. New York: Currency Books.
- Kelley, T. (2001). Prototyping is the shorthand of design. *Design Management Journal*, 12(3), p. 35-42.
- Liedtka, J. (2006). If managers thought like designers. *Rotman Management*, Spring/Summer 2006, 14-18.
- Wise, S. (2007). Interview with Bill Moggridge. *Ambidextrous*, Issue 6. Retrieved from <http://www.ambidextrousmag.org/issues/06/moggridge.html>

### Video:

- Brown, T. (2008) Innovation through design thinking  
<http://mitworld.mit.edu/video/357/>

## Design Thinking Workshop

Toronto November 10 and 11, 2008

For more information you can contact

Helene Cahen: [Helene@StrategicInsights.biz](mailto:Helene@StrategicInsights.biz)

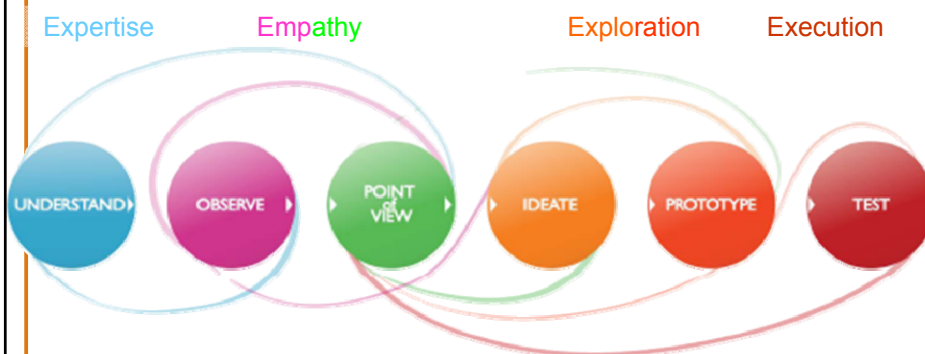


**APPENDIX L**

**Acquiring Expertise**

## *Acquiring Expertise*

## The d school model



To learn more about the d school: <http://www.youtube.com/watch?v=Sql-bZRmlbw>

Purpose: To understand the challenge better

How does it work?

Where?

How much?

Who?

How big?

How important?

What are the numbers?

Experience in Design Thinking

*Tools for gaining understanding*



## Secondary Research

Secondary research= research that already exists

- ⇒ Internet: google search, blogs, magazine and journal articles (free and for a fee)
- ⇒ Libraries (physical or on-line)
- ⇒ Paying research already published: for instance  
<http://www.marketresearch.com/>
- ⇒ Chamber of commerce, unions, industry-based data, etc...

## Secondary Research The Ramen Noodle Example

For Ramen noodles:

- 13 meals a year per person in the US (3.9 billion meals), 45 in Japan
- The basic Ramen noodle contains 49% of the daily ration of sodium and 35% of the saturated fat
- There are 22 styles of ramen noodles in Japan and it involves complex manufacturing...

## Discussion with experts

- Experts are people that have a special experience with the challenge considered.
- They are not only technical experts,

*For example for Ramen noodles:*

A waiter at a Japanese restaurant

A dietetician

A cashier at Safeway

The marketing director at Kraft

A friend who used to live in Korea

## Personal experience

Goal: To ensure that you understand the experience through your own perspective.

Working on Ramen noodles, that would mean

- ⇒ Try different varieties of the product
- ⇒ Go to a restaurant that serve ramen noodle
- ⇒ Serve them to your kids or friends
- ⇒ Try them as a snack! ...

## Let's practice

*Do individually and/or as a team*

Mini-lab One: Secondary Source Information- 10 minutes

-Go on the internet or the library and find information regarding trash

-Write down learnings on post-its, one idea per post-its

Mini-lab Two: Information from *Experts*- 10 minutes

-Call *experts* in organizations to find out more information

-Write down learnings on post-its, one idea per post-its

Mini-lab Three: Personal Experience- 10 minutes

-Look in the room and the building and notice any information related to trash and how it makes **you** feel about it

-Write down learnings on post-its, one idea per post-its

## **APPENDIX M**

### **Introduction to Ethnography/User Research**

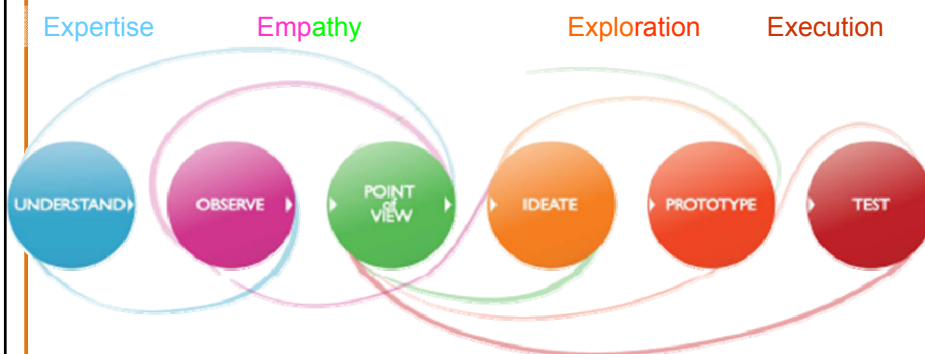
Experience in Design Thinking

## *Introduction to Ethnography/ User Research*

Presented by Helene Cahen

Empathy is the core of ethnographic research

## The d school model



To learn more about the d school: <http://www.youtube.com/watch?v=Sql-bZRmlbw>

What do you see?



The problem is not always what you think



## Principles of Ethnography

- The subject is in his/her natural environment
- Data is gathered by looking, listening and asking
- Anything in and about the setting is relevant data



## Principles of Ethnography

Data can be collected in a variety of format: field notes, tapes, video, photographs, etc.



## Goals of ethnographic research

- In depth understanding of the “users” (i.e anybody that may be affected by the issue)
- Seeing things from the user’s point of view
- Being open
- Searching for feeling and emotions behind people’s behavior
- Describing attitudes and behaviors with as much relevant details as possible
- Not assuming that you know

## The researcher frame of mind

- Objectivity
- Direct and specific
- Non-judgmental attitude
- Good listener
- Sensitive to body language
- Friendliness
- Professionalism
- Reciprocity
- Respect
- Flexibility
- Creativity



## Type of research

- Pure observation
- Interaction between the observer and the subject

## What we are observing

- Behavior (ritual, roles, activities, play, diversions, etc...)
- Meaning (symbols, signs, language, beliefs and values, attitudes and opinion, interpretation, feelings, relationships, etc)
- Tools (broadly defined it may include space, technology, rules, techniques...)

## Observations: framework and practice

=>Where do you think the people are?

=>What are people doing?

=>What is their relationship with the space and objects around them?

=>How do you think they feel?

=>Based on the observations and thinking from the users' perspective, identify possible gaps in use and usability









## Interaction/interview

The purpose is to interact with “users” in their natural environment to better understand how they think, what is important to them.

Remember that often what they say is very different than what they do.

## Interview guidelines

- Introduce yourself in a friendly way and let people know that their perspective is important
- Start with easy questions to help build trust
- Focus on the respondent: be open, do not assume you know what they do or feel so ask about the details
- Show them you are interested but do not make judgment
- Ask questions in a neutral way
- Ask open-ended questions rather than yes/no
- Ask from the more detailed questions to the broader philosophical questions
- Ask why? Tell me more...? Do you have examples?
- Look for stories
- Look for inconsistencies
- Look for non-verbal cues
- Be Ok with silence
- Do not answer for the respondents
- Be flexible: let the respondent go to an unexpected direction at least for a while

## Interaction/interview

### Do

I am interested in understanding...  
What do you do about recycling...?  
What do you think about this idea...?

### Don't

I don't agree with you...  
You are kidding me: you do not recycle anything!  
Don't you think it is a great idea to have ...

## Practice interview

- Pair up with somebody from another group
- Spend 5 minutes interviewing the person about their “trash experience” : understand how they feel about trash, how it may affect the product they buy, the way they behave; understand what they do with trash and waste disposal.  
Learn about their emotions, aspirations, hopes and fears.
- Switch the interviewer role
- Take a minute to review your notes and write your key insights (one per post-it)

## Immersion

Purpose: To put yourself into somebody else's shoes and experience empathy

Exercise: We will use role play to experiment some of the challenges of dealing with the conflicting issues regarding trash and the environment

Create a group of four (different than the group)

Role play one the following scenario

-You are a family with 2 kids at Disneyland

-You have a big party coming up

-The waste disposal company is quadrupling its fee if you have a second can of garbage

You have 2 minutes to choose a role in the scenario and you can role play for 5 minutes, then take 3 minutes to discuss learning and write down on post-its

## Practice

Your homework will be to do some observations and interviews (at least two) in the evening.

=>You can do this as a full group or split in two pairs

=>When you interview, it is best to have one person do the interview and the other person(s) take notes

You have 20 minutes as a group to:

- Work out the logistics (location, team as a whole or split, roles, use of camera or recorders, etc.)
- Prepare some questions for the interview (but be flexible too)



## **APPENDIX N**

### **Point of View**

## ***Point of View (POV)***

### Capturing the essence of the user

- The goal is to create a statement that summarizes the essence of who an user might be, what his/her needs are and the story behind it
- The reason it is so important is that any new design needs to be done with a specific user(s) in mind otherwise the outcome would be meaningless

Example of different points of view for a web-site redesign for a University

Pepito: Long distance foreign student needs a web-site that is a friendly guide to navigate a foreign academic system and make him feel included. Because the American graduate system is so different from the system in Spain he feels overwhelmed and hesitant to apply



Julie: Face-book user needs a highly interactive and fun web-site to make her feel that the program is exciting and that she can connect with others like her.

Examples of phones designed with different users in mind



## Examples of hotels designed with different users in mind



Hotel Kabuki:  
Japanese, serene,  
classic



Hotel Avante:  
warm and  
avant-garde



Ventana Inn: rustic,  
romantic, relaxed,  
luxurious

Source: Joie de Vivre Hotels  
<http://jdvhotels.com/hotels>

## The trash experience: let's capture the meaning

The goal is to create a statement that summarizes what trash means to users.  
This will be the base for redesigning the trash experience

=>What need(s) do these users have regarding trash?

=>What dimension besides information is less obvious but potentially meaningful?

Look for needs that go beyond the obvious and connect emotionally or in some other way. Use all the information from your previous work

Do not hesitate to focus on extreme users (the concept will naturally become more mainstream as we move along the process).

Write several point of views, then select one for the next step.

### Point of View- Work sheet

User + Need + Insight.  
Tell their story-  
Write 6 to 8 points of view in your team

### Point of View- Work sheet- Selecting a User

- As a team, pick two points of view and them down. Then transform into a classified type of ad
  
- Transform the POV in a question that will be used for ideation starting with How to...? How might...? What might be all the ways that...?  
*Example: How might we create a website that will help foreign students feel invited to study in the University and confident that he/she navigate through the application process successively.*

Point of View- Work sheet-  
Selecting a User

- As a team, pick two points of view and write them down. Then transform into a classified type of ad.

*Example:*

*“Face-book user needs a highly interactive and fun web-site to make her feel that the program is exciting and that she can connect with others like her”  
becomes*

*Young outgoing female face-book user wants to find-out a creativity program that would be fun and exciting program and where she can meet new friends. Boring, out-fashion and too scholarly do not apply.*

Point of View- Work sheet-  
Selecting a User

Select one of the two point of views to move forward

## **APPENDIX O**

### **Ideation Guidelines**

# *Ideation Guidelines*

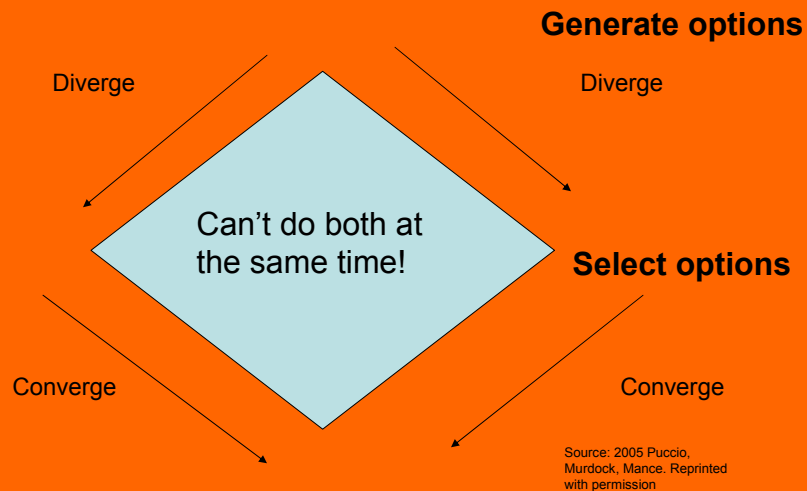


Less packaging; Amazon Frustration-free package

<http://www.amazon.com/ap/mpd/permalink/m1THTXLYALTON1>



## Converging and Diverging: the Dynamic Balance



## Divergent Guidelines

- ✓ Defer Judgment
- ✓ Strive for quantity
- ✓ Seek wild and unusual ideas
- ✓ Build on other ideas
- ✓ Be Visual

## Convergent Guideline

- ✓ Be affirmative
- ✓ Be deliberate
- ✓ Check objectives
- ✓ Improve ideas
- ✓ Consider novelty

### Selecting your ideas: The Hit Tool

A simple technique where:

- Each team member takes 3 dots and select 3 ideas
- When voting keep in mind the converging criteria including novelty
- Group review the ideas selected and decide on one to move forward
- In this process, the ideas can be combined or improved and the group does not have to select the one with most vote

## **APPENDIX P**

### **Detailed Activities**

# *Detailed Activities*

## Design Thinking Workshop

List of activities not detailed in general flowchart  
or Power Point slides

- Design an Alarm Clock: also see Power Point
- And vs. But:
- Either/Or
- Temperature Check
- Good and Bad Interviews- Skit

## Activity: Design an Alarm Clock

Learning Goals: Understand the key principles of design thinking: human-centered, prototyping and testing

Activities	TIM	Time	Facilitator Notes
<ul style="list-style-type: none"> <li>Distribute the booklet</li> <li>Ask people to draw their ideal alarm clock in their booklet</li> <li>Explain the pair exercise, step by step</li> </ul>		5 min.	<ul style="list-style-type: none"> <li>Emphasize that it is OK if you do not know how to draw.</li> <li>Distribute the hands-out and review with participants (all the details are written out in the booklet)</li> </ul>
<ul style="list-style-type: none"> <li>Ask people to pair up and taking turns interviewing each</li> <li>Use the questions in the interview hands-out to help the interview</li> <li>Create a point of view</li> <li>Draw 3 drawings of an alarm experience</li> <li>Share the 3 drawings with your partner and ask =&gt;What do you think? =&gt;Which one do you prefer and why?</li> </ul>		2 min.  5X2 min. =10 min.	
<ul style="list-style-type: none"> <li>Take one of the drawings and create a prototype</li> <li>Debrief the activity</li> <li>What did you think of this activity?</li> <li>What did you learn doing this activity?</li> <li>How similar/different was it to do this for somebody else compares to doing it for yourself?</li> <li>What was challenging?</li> </ul>		5 min. 5 min. 2x5 min. =10 min.  10 min. 10 min.	Can use words in the drawings
		1 hour total	



# Activity: Design an Alarm Clock-

## Logistics

### Materials

#### Materials:

1. Card box of various sizes  
[http://www.papermart.com/templates/07-0-15.htm#GO\\_07015](http://www.papermart.com/templates/07-0-15.htm#GO_07015)
2. Scissors, tapes, markers (thin and thick)
3. Craft paper of different colors, print, material
4. Miscellaneous art and craft

#### Preparation:

- Prepare all the material
- Create some working area to work on prototype (tables or desks, will need a flat area)
- Have people sit by pair at the tables (or possibly in another area so the “prototyping” area can be prepared ahead of time)

### Handouts, and references

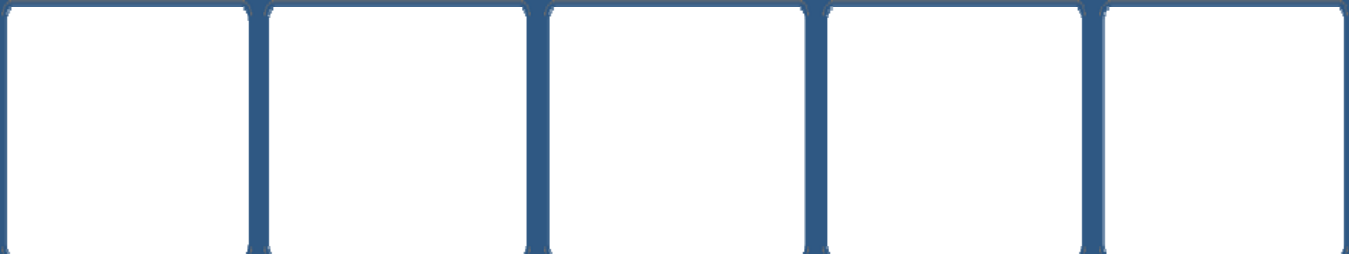
#### Hands-out and presentation

1. Design an alarm clock Activity booklet

#### Bibliography: None

#### Reference:

Based on material from the Stanford d.school



## Activity: Yes and But...

Learning Goals: Becoming more conscious of the climate of a group and the importance of accepting other's suggestions

### Details of the activities

### TIM

### Time

### Facilitator Notes

**Overview:** two groups are planning a company party. The first must start each sentence with the words, "yes, but...", the second group with the words, "yes and..."

**Details: Round 1:**

- Ask for 3 to 5 volunteers
- Tell the group they are in charge of the company office party
- Each person must contribute an idea, there are no specific order but no one may contribute more than one idea in a row.
- Anyone may start and each successive idea must begin by YES, BUT...
- Stop after 2 to 3 minutes (or if it degenerates beyond repair)

• **Round 2:**

- Same directions with a new group of volunteers
- This time each sentence must start with YES, AND...

**Debrief:**

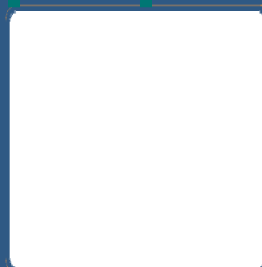
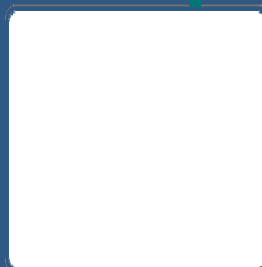
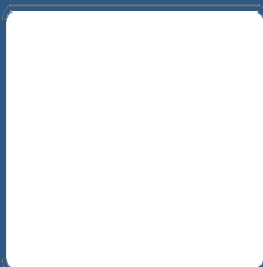
- ⇒ What did it feel being in group 1? Group 2?
- ⇒ How is the experience compared to real life?
- ⇒ How is this relevant to work in a team?
- ⇒ Why do we block other people's ideas?
- ⇒ How can we increase our willingness and ability to accept ideas?

HE

10  
min.  
total

The first group will struggle and the second create much more easily.

- Continue to remind the participants to use "yes, but..." and "yes, and..."
- End the rounds when the ideas trail off (usually the first round) of an explosion of approval (second round)
- Pay attention to the intention of the statements. If the game does not work, it may be because the participants are actually blocking, even if they are saying yes, and (or vice versa).
- Write debriefing questions on a chart ahead of time





# Activity: Yes and But...

## Logistics

### Materials

#### Materials:

One sheet of paper pad

#### Preparation:

- Create space so the 4-5 volunteers can be upfront and seen by all
- Write debriefing questions ahead of time on a chart

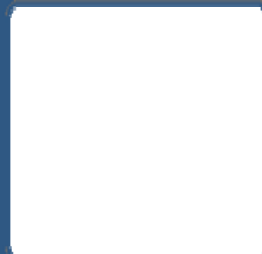
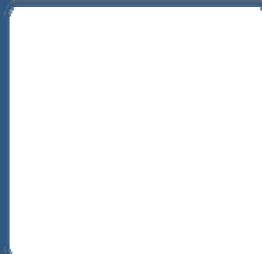
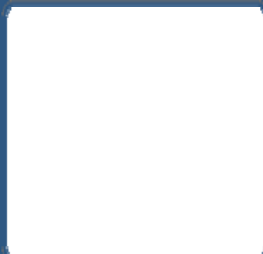
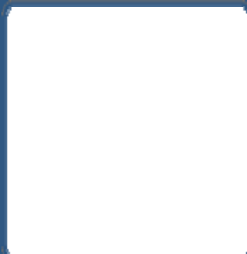
### Handouts and references

#### Hands-out

#### Bibliography

#### Reference

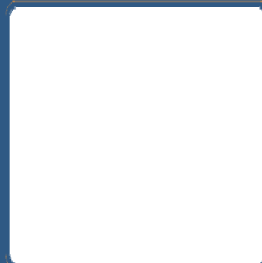
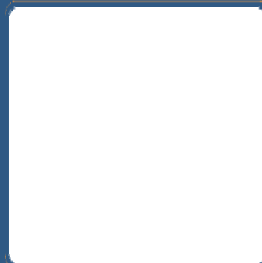
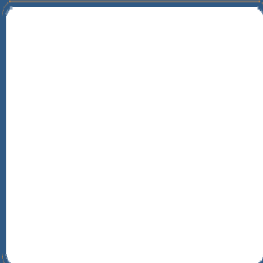
1. Books:  
Koppett, K (2001).  
*Training to imagine.*  
Sterling, VI: Stylus  
Publishing, p.107-108



## Activity: Either/Or

**Learning Goals:** Becoming more conscious of the climate of differences in interests, style, values, taste, etc. that may affect working together in a group

Details of the activity	TIM	Time	Facilitator Notes
<ul style="list-style-type: none"> <li>Ask people to stand up in the center of the room and explain the rules</li> <li>Post 2 large signs with opposite concepts on each side of the room and ask people to go to the area that best represents them</li> <li>When people have chosen their side, ask them to go back to the center and start again</li> <li>Do at least 10 iterations of the game</li> <li>Examples of opposites:                             <ul style="list-style-type: none"> <li>-Coffee/tea</li> <li>-Morning person/night person</li> <li>-Mountain/sea</li> <li>-Work better under deadline/without deadline</li> <li>-Like speaking in public/hate to speak in public</li> <li>-Talk/listen</li> <li>-Serious/Playful</li> <li>-Work by yourself/ work in a team</li> <li>-Generalist/Specialist</li> <li>-Easiness making decision/difficulty making decisions</li> <li>-Like certitude/Like ambiguity</li> <li>-Extrovert/Introvert</li> </ul> </li> <li>Debrief:                             <ul style="list-style-type: none"> <li>⇒ What did you learn?</li> <li>⇒ How is this relevant to work in a team?</li> </ul> </li> </ul>	HA	2 min.	Facilitator may model. Explain that it is about preference not ability
	DE	10 min	
	EL	5 min.	



Activity: Either/or

## Logistics

### Materials

**Materials:** Large colored pieces of paper

**Preparation:**

- Prepare each statement on a piece of paper (ideally with a different color for each pair)
- Set 2 areas in the room where people can go towards to indicate their preference
- Have a space in the center when people can go back between decisions
- Have 2 members of the teaching team show their opposite statements at the same time, and people choose
- Move to the next statement

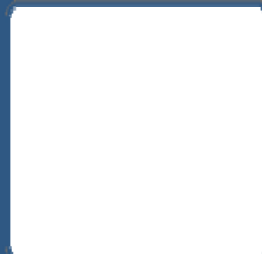
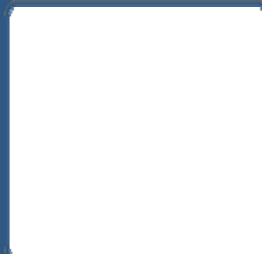
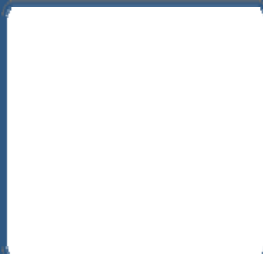
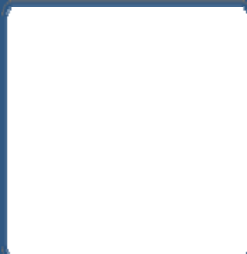
### Handouts

**Hands-out:** none

**Bibliography:**

**Reference:**

Christian S., & LovingTubesing, N. (2004). Ice breakers a la carte. Duluth: MN: Whole Person Associates.



## Activity: Temperature Check

**Learning Goals:** Becoming more conscious of the climate of a group and the importance of personal and professional issues in affecting the environment

Details of the activity	TIM	Time	Facilitator Notes
<ul style="list-style-type: none"> <li>• Ask people to stand up</li> <li>• Ask people to stand on an imaginary scale from 1 to 10: one meaning they are feeling really low and 10 feeling ecstatic about being here,/ life in general.</li> <li>• Have each participant briefly explained why they rate themselves (starting the 10 and 9 then going to the 1, and 2 and then more towards the middle).</li> <li>• Debrief:               <ul style="list-style-type: none"> <li>⇒ What did you learn?</li> <li>⇒ How is this relevant to work in a team?</li> </ul> </li> </ul>	HE	2 minutes  10-30 seconds per participant= 5 minutes  2 minutes  10 minutes total	Facilitator may model or do it too

# Activity: Temperature Check

## Logistics

### Materials

**Materials:** None

**Preparation:**

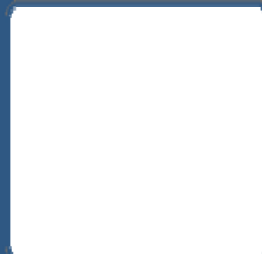
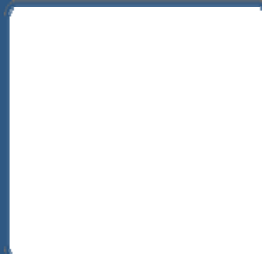
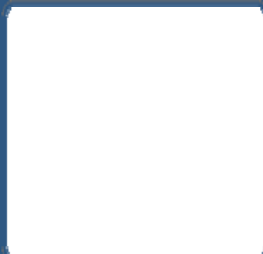
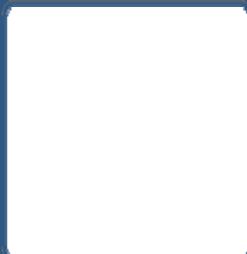
- Ensure there is a space where everybody can stand on and imaginary line

### Handouts

**Hands-out:**none

**Bibliography:** None

**Reference:**



# Activity: Good and Bad Interviews Skit

Learning Goals: Becoming more conscious of errors in interviewing users

Details of the activity	TIM	Time	Facilitator Notes
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**Two members of the teaching team will read the 2 skits**

HA

5 min. total

If only one person in the teaching team do with a students

**Interview (what not to do)**

2 min

- Hello, I am doing an interview today and I selected you because I love your red coat. Do you have a few minutes?
- Ok sure
- Do you agree that the Tell me the most important issue of our time is the amount of garbage our society is creating ?
- Euh..., yes.
- Great answer, I am glad you agree with me! What do you think we should do?
- I think people should be more careful. (as she talks, drop her paper on the floor)
- That is great! Do you think they should always recycle?
- Of course (drop my paper)
- Oh, I am so glad you believe this. Would you want to be my friend on face book!

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## Activity: Good and Bad Interview Skit-Continued

Learning Goals: Becoming more conscious of errors in interviewing users

Details of the activity	TIM	Time	Facilitator Notes
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**Interview (what to do)**

- Hello, how are you doing today?
- Good
- We are doing interviews today and I was wondering if you have a few minutes. We are doing a project on better understanding what people do regarding their garbage.
- Ok
- Tell me what you kind of garbage cans you have at home?
- Well I have a can for compost, one for regular garbage and one for mixed recycle
- Ok
- And how do you do your recycling?
- Well, I usually put everything in the garbage and then I sort before putting in the trash outside.
- Can you tell me more about how you sort it?....

**Debrief**

- ⇒ What kind of mistake did you hear in the first interview?
- ⇒ Q&A

2 minutes

If only one person in the teaching team do with a students

1 min.

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# Activity: Good and Bad Interview Skit-Continued

## Logistics

### Materials

**Materials:** None

**Preparation:**

- Ensure there is a space where everybody can see and hear

### Handouts

**Hands-out:**none

**Bibliography:** None

**Reference:**

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## **APPENDIX Q**

### **Facts Sheet on Trash**

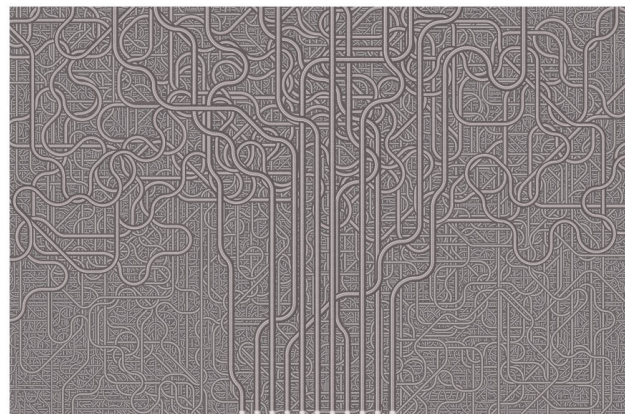
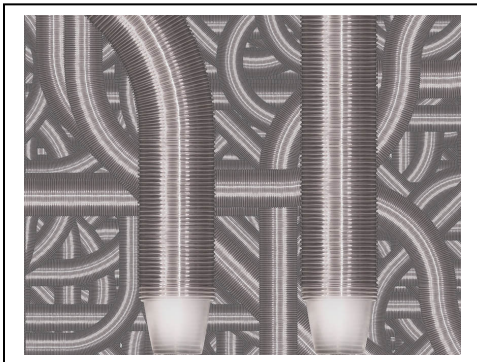


## Design Thinking Case Study

### A few trash facts



- Garbage in the US is 190 millions tons a year in 1997 (source: wired magazine)
- A guy in California lived with his own trash for a year at <http://saveyourtrash.typepad.com/http://links.sfgate.com/cgi-bin/article.cgi?f=/c/a/2007/12/30/BAFFU493E.DTL>
- Americans generate 251.3 million tons of garbage per year and the amount has tripled since the 60's
- San Francisco's diversion rate is the highest in the nation at 69 percent as of fall 2007.
- One million plastic cups: the number used on airline flights in the US every six hours (source Chris Jordan [http://www.chrisjordan.com/current\\_set2.php](http://www.chrisjordan.com/current_set2.php))



**APPENDIX R**

**Debriefing- PPCo**

# Debriefing

## Pluses

*I like .....*



What did you like about today ?  
What worked well?  
What did you learn or relearn?

## Potential



*It might...*

What might this new learning could do for your personally?

For your organization?

Where might this training be useful?

## Concerns



*How to...?  
How might...?  
What might be all the ways...?  
In what ways might...?*

We are transforming the concern into a question:

For instance *I am worried I won't remember* becomes *How to remember it all?*

- How to do this training differently?
- What else would you like to know?

## Overcome



We may select a couple of the concerns and ideate to find some solutions

- What suggestions do you have to overcome the concerns?

**APPENDIX S**

**Individual Debriefing Day Two**

Design Thinking Experience  
Reflection on the  
Redesigning the Trash Experience

*Take a few minutes to reflect back on your experience of the past two days .You can use the following questions as a guideline.*

What are your key learnings?

What was the most interesting part of the case study?

What was the most challenging?

What part of the process comes naturally to you and what was most difficult?

What did you think of the outcome of this case study?

How did you feel working in a team? What did you like? What was challenging?  
What did you learn about yourself as a team member and creative leader?

What can you see yourself doing in the future based on what you learned so far?



## **APPENDIX T**

### **Pre-work and Homework for Day One and Two**

Experience in Design Thinking  
Pre-work and Home-work

***Homework***

# Experience in Design Thinking

## Pre-work

### Assignment

- **Read articles (two out of three):**  
=> post reaction to articles on Angel
  
- **Read book:**
- **Watch:**  
Tim Brown video
  
- => What new learnings did you get from the readings and watching the video?
- => How does these learnings relates to CPS and creativity
- **Do a mind-map of the key learnings (using Mindomo)**
- **Share with another student (via Skype or white board discussion)**
  
- **Take FourSight test**
- **Write a short Essay (2 or 3 paragraph)**  
describing reasons for enrolling in the class and skills

### Sources

- Brown, T. (2008). Design thinking. *Harvard Business Review*, 86(6), p. 84-92 .
- Downloadable at  
<http://www.ideo.com/press/item/design-thinking/>
- Owen, C.L. (2008). Design thinking: On its nature and use. *Rotman Magazine*, 26(3), p.26-31
- Wise, S. (2007). Interview with Bill Moggridge. *Ambidextrous*, Issue 6.
- 
- Kelley, T (2001). The Art of Innovation
- Innovation through design thinking  
<http://mitworld.mit.edu/video/357>

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# Experience in Design Thinking

## Homework Day One

### Assignment

#### Ethnographic Research

Each group will go outside the classroom for that evening and do both observations and interviews (at least two)

#### Diary

Spend 10-15 minutes reflecting on your learnings:

- ⇒ **What did you learn about design thinking today?**
- ⇒ **What was new to you?**
- ⇒ **How is design thinking similar or different from CPS?**
- ⇒ **=>What do you want to learn next?**
- ⇒ **What did you notice about working in your team?**

#### Reading article

### Sources

Use Powerpoint presentation to look at interview guidelines

Kelley, T (2001). *Prototyping is the short hand of design.*

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# Experience in Design Thinking

## Homework Day Two

### Assignment

#### Diary

Spend 10-15 minutes reflecting on your learnings:

- ⇒ What did you learn about design thinking today?
- ⇒ How did you feel about having to sketch? About having to prototype?
- ⇒ How might you use sketching and prototyping in the future?

#### Reading article

### Sources

Rae, J. (2008). P&G changes its game. How Procter and Gamble is using design thinking to crack difficult business problems.

*Business week*, July 28, 2008.

[http://www.businessweek.com/innovate/content/jul2008/id20080728\\_623527.htm](http://www.businessweek.com/innovate/content/jul2008/id20080728_623527.htm)

**APPENDIX U**

**PPCo Toronto Workshop**

Toronto design thinking workshop (November 9 and 10)  
PPCo (Pluses, Potentials, Concerns and Overcomes)  
Day One and Day Two

**PPCo Day One**

Pluses:

New concepts

Playing

Exercises and learning

Group work

Food

People

Finding what we have in common

Posters

Pictures and presentation correlating with content

Mind mapping application

Creative disorder on tables

The environment

Good timing (fung shui look)

Bringing different disciplines together (combining different elements in new ways)

Participants reflect different backgrounds

Potentials:

Mini-prototype at job

Applied to public policy

More open type of leader – allow other ideas

Get away from desk, talk to people and pay more attention

Use some recycling items for prototypes

Might lead to consulting assignment

Get others thinking like this

Integrate as one of the tools I use in coaching

Realizing the stages and having a language to articulate it

Identify this in the future – allow it to grow or take back

Good for creative blocked

Integrate the icebreaker in focus groups productions

Integrate the body and mind in what we do physically

Might bring Helene back to Toronto

Might lead to un-conferences or small groups

Allowing people to express themselves through different means (pictures, meetings, etc.)

### Concerns:

H2 implement this model in service oriented organizations?

H2 foster trust among people to maximize creative potential together?

H might I encourage organization to have more bias towards action?

H2 put together a collaborative team within a bureaucratic organization?

H2 scale up good ideas?

H2 address intellectual property issues?

How might we apply this concept when dealing with audit, regulations and procedures?

How to (H2) use this on real problem (take theory and apply it)?

H2 become comfortable with it?

H2 use this process to bridge language, cultural and disability barrier?

### Overcoming concerns

H2 become comfortable with it?

1. Practice
2. Plan a sketch to apply before we leave
3. Make a promise
4. Accountability
5. Network of support
6. Practice in all opportunities: teaching, talking, ....
7. Share lessons learned
8. Took hers
9. Measure the success not failure
10. Describe the process to someone else
11. Enjoy the failure
12. Read more about IDEO
13. Try different mediums
14. Find a mentor
15. Have fun



## **PPCo Day Two**

### Pluses:

Liked living through the process, experience it and reflect on what we achieved

Good mix of theory and practice

Very compressed from one stage to next

No opportunity for failure

Pacing of the workshop

Apply our learning right away

Validated a lot of things we are doing

Propose a non-linear approach to work

It changes the structure of a team (no leader)

### Potentials

Embracing constraints more strongly

Increases the speed of innovation (try stuff quickly and move on)

Additional tool in the process of designing services

Brings out a different part of creativity

### Concerns

H2 create a more disciplinary team (diverse)?

H2 make the transitions smoother in the workshop?

H2 learn basic graphic design skills (visual)?

How would this methodology could be (what are the propositions are within the model)?

H2 give more information up front?

H2 capture all ideas produced?

H2 continue the learning>

### Overcoming concerns:

H2 continue the learning?

Phase II workshop – 3 months

Group or blog to post similar opportunities

Try an application and come together to debrief

Sending colleagues to apply it office

A client would pitch and we develop the solutions

Where can we study this?

