

The Liminal Space of Design:

Exploring Creation For Reproduction

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ii. Author's Declaration

I hereby declare that I am the sole author of this Major Research Paper (MRP).

This is a true copy of the MRP, including any required final revisions, as accepted by my examiners.

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iii. Abstract

Design is a highly dynamic, contested, ill-defined and powerful space for creation that shapes human life and the natural world in myriad ways. Drawing on Kurt Lewin's Field Theory, the domains of Professional Design, Design Thinking and Critical Design have been examined as a field, defining the boundaries of what constitutes design. This investigation was initiated to serve as a provocation to prompt reflection and organization of the field, making it more accessible beyond itself and more consistent within its boundaries. Themes were generated from comprehensive search and synthesis of the literature and then organized using a Concept Mapping approach. Findings were complemented by a personal autoethnography documenting the development process for this project. A model is presented and discussed with recommended steps for practice and research considerations to aid development of curricula and communications about design within and beyond its field boundaries.

iv. Acknowledgements

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v. Dedication

To my parents: Garry and Naomi Norman.

Thank you for instilling in me the passion and love of creating things and a respect for quality, effort, good design and craftsmanship from my earliest days.

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viii. Abbreviations

AIGA - The Professional Association of Design

DMI - Design Management Institute

HDL - Helsinki Design Lab

IDSA - Industrial Designers Society of America

IWB - Institute Without Boundaries, George Brown College, Toronto, Ontario

MRP - Major Research Paper

OCADU - OCAD University, Toronto, Ontario

RGD - Association of Registered Graphic Designers

SFI - OCAD University's Master of Design (MDes) program in Strategic Foresight and Innovation

ix. Preface

Like many, my initial understanding of the term design as a kid was largely confined to domains of fashion, furniture, interiors or architecture. Growing up, the term *design* was something that was an elite concept that was used to describe expensive furniture, luxury goods and high-end automobiles. It wasn't something that seemed accessible or relevant to me in my everyday life. When viewed as a creative act however, design is something that has been with me most of my life and was inspired in me from an early age.

My understanding of design was transformed by a few loosely connected events. One could look to my childhood and see the influences from my mother who was a multidisciplinary artist, crafter, gardener and interior decorator and my father who was an all-round handyman, carpenter and amateur landscape architect. Both my parents were lively 'creators' and, at various times in their adult life, channeled this interest into making a living from their creations. I was given the tools to create early in life (paint brushes, craft supplies, sketchpads, and a toolbox) and used them whenever I could all through grade school and into my teen years. While I never expected or aspired to become a professional artist, I had enough interest and talent to engage creatively with materials beyond when many of my peers stopped doing so. Even as an undergraduate student I would doodle and draw things for fun.

During those undergraduate years I started to engage with more expanded social systems and to apply creative energies to shaping them. Through active involvement in student government, starting a psychology students' association with my peers and founding a campus peer support centre I began creating

programs and services and thus started to shift my creative applications from art to design. This meant creating things that were likely to have some life into the world and would be likely to reproduce. This shift continued through my graduate training in psychology and in working as a special education support for a high school program where I contributed to the design of programs and services for high-risk youth. This program afforded me the opportunity to assess the impact of these designs on the wellbeing and health of young people and their support systems. Here, design mattered a great deal and whether it made a difference or not literally shaped the lives of people directly. Design was suddenly revealed as something of importance.

My doctoral studies looked at how the (then nascent) technology of the World Wide Web and the personalized, networked tools it spawned could be used in health promotion with youth. This involved years of development, programming and thinking about the usability, technical specifications, attractiveness and sustainability of the programs as much as it did about the principles of behaviour change and public health evidence. It was an interdisciplinary endeavor that forced me to work with programmers, graphic designers, educators, and myriad other specialists.

In the process of doing this work, I first encountered the work of those designers whose careers had been started or at least furthered by working with computers and technology, but very often went well beyond that. One influential designer was Richard Saul Wurman, the founder of the TED conferences who opened my eyes (and millions more) to the idea that design was something that went beyond making just “things” and that it was a way to approach the concept of

making altogether. Another influence was the design firm IDEO and its founding partners. I had been exposed to the near-mythical shopping cart project¹ highlighted on ABC's Nightline, which elevated IDEO's status in the business world and introduced what would be later called 'design thinking' to the world.

This set the stage for the start of a promising career in academia that would eventually be transformed (and oddly, shortened), by design. While doing my post-doctoral work in Vancouver I had the opportunity to experience the *Massive Change* exhibit, which lived up to its billing as far as its effect on me. I was studying and working on issues of complexity, systems and knowledge translation in healthcare and this exhibit inspired more (and better) conversations about these issues than anything that was emerging from the health system. The release of John Thackara's *In The Bubble* (2005) around the same time provided me with a systems-oriented lens in which to view design and inspired me to start thinking like a designer. This systems approach to design led me to Herbert Simon's (1969/1996) seminal work, *The Sciences of the Artificial*, which led me to first *seeing* myself as a designer. I had trained as a psychologist in public health specializing in behaviour change and the moment I read Simon's definition of a designer² I saw my work differently. It was the start of a renaissance in my thinking, research and action as I began envisioning what working as a 'health designer' might be like. That mode of thinking and the

¹ The Nightline episode entitled "The Deep Dive" profiled IDEO's approach to design and how it had evolved its approach to problem-solving to include programs and services. The 20-minute segment follows a multidisciplinary design team at IDEO through the process of developing a new type of shopping cart. The episode goes through the research, ideation, observation, prototyping and solution generation process that would eventually be called 'design thinking'.

² "Everyone designs who devises courses of action aimed at changing existing situations into preferred ones".

insights and aspirations it invoked would eventually be my undoing as a traditional academic in public health.

This new way of engaging my work -- which was part professional-oriented design, part design thinking, and part critical design -- brought insights about how to design for change. Many of these insights served me well in attracting excited students to my research lab, eager community partners, and good funding, but alas the system I was in (academic public health) was unable to adequately absorb the variety that design brought forth and the influence on my professional and personal life was a cost I no longer wished to incur. After years of trying to make it work I decided the best way to change that system was to operate outside the health systems' core and in the liminal spaces between it and fields like design. That is the space of innovation and that was where I felt most comfortable and derived the most pleasure from my work. Yet, it was also a space that was poorly defined and positioned relative to many disciplines and fields. It certainly wasn't the fit with public health that I thought it was even if it was sorely needed.

While I started seeing myself as a designer, my professional experience with fields like psychology and ongoing research into interdisciplinary collaboration (e.g., Norman et al., 2010) gave me enough insight to know that professional knowledge and practice exists on a wide spectrum. There are designers who are trained in a method and theory and those who are not and within each of those groups some are excellent at their craft and others are not. Complicating this further is that a designer's professional designation or stated domain of practice was only partly related to quality.

In 1969, George Miller, the president of the American Psychological Association, implored the field of professional psychology to ‘give psychology away’, meaning that it was too important of an issue to be restricted to psychologists and of benefit to all of humanity (Miller, 1969). The field listened and over the next 50 years we’ve seen a proliferation of psychology’s methods, theories and models into management, medicine, economics, education, artificial intelligence, and nearly every human-focused field practice, improving human performance, learning and wellbeing along the way. The upside is that much more of what we do and how we organize ourselves as humans is guided by sound research, theory and practice because psychological knowledge is available to everyone. The downside is that there is an enormous amount of pop- and pseudo-psychology that is at best misleading and at worst dangerous for the same reasons. There are professional, licensed psychologists and psychiatrists, partly regulated fields like social work, and others that are para-professional and non-professional that all play important roles in supporting mental health, human performance, learning and creativity. I believe that the proliferation of better theories, models and science of psychology has had far more benefits for society than drawbacks and have come to believe the time has come for design to follow suit.

I believe we have come to our ‘Miller’ moment with design. The needs, demands and opportunities are greater than ever, yet unlike psychology was in the 1960’s, there is no one voice for design and even within design disciplines there is wide disagreement and, as we shall see in this paper, little clear definition of what many of the characteristics of the field are from a professional practice standpoint. This became apparent when I began writing and studying design. If I was indeed a

designer (as Herb Simon suggested), was I a good one? How would I know? What markers would I use to assess quality and capability? How would I know what I needed to know? If one wanted to become a designer, what would they need to know, do, study and practice to earn the title?

Further, if I opted to take design into my home space of health, how would I do it if I could not answer these questions for an audience that was accustomed to asking such detailed, inquisitive questions about everything it does? And if I were to engage the community of learners and practitioners already engaged in design what would I use to mark my place (my bearings) within it as I sought knowledge, skills and a change in mindset? If I am to be a Miller-esque ambassador for design into the fields like health and human services where I worked I needed answers to these questions.

The next step on this journey was to immerse myself in a space where design was considered in the broader category in which I was seeing it. I sought to experience learning in it firsthand and see how it was taught (and the content learned by its students) and to further enhance my own ways of finding, seeing and tackling problems. That led me to enroll in the Strategic Foresight and Innovation (SFI) graduate program at OCADU where I did my own 'deep dive' into the methods, tools and ways of approaching design/innovation writ large. In the process of learning more about design, design thinking and artful approaches to design I've come to learn some of the norms, cultures and predilections of those inside and outside the field including those who align themselves more tightly with one of the three domains identified as part of this project (labeled as: Professional Design, Design Thinking, Critical Design). These perspectives can sometimes be extreme and

often puzzling, yet all inspired much curiosity about their nature and validity. It also has encouraged me to step back and forward within the field and explore those areas between the extremes that reside closer to a perspective that resonate with my experience and perceptions.

This paper represents the culmination of that thinking and an exploration of the three domains that inspired my interest in design in the first place with the hope that I can contribute to the inspiration and learning about design for others.

1. Introduction

“Design is one of the basic characteristics of what it is to be human, and an essential determinant of the quality of human life. It affects everyone in every detail of every aspect of what they do throughout each day. As such, it matters profoundly” - John Heskett

Design is the manifestation of a creative act; an activity that brings imagination, ingenuity, craft, execution and aesthetics together into planning and developing a product, service or policy. Human beings are the only known animals that create things intentionally and have appreciation for the potential consequences connected to an object of creation, including how others might perceive it (Goleman, 2013). This profoundly human act is what allows us to exercise directed influence over the natural world, create artificial worlds, and bridge the two in ways that serve our needs while introducing new ones. As Barnwell (2011) states: “design is what human beings do” (p.21).

Our influence is not without consequence as witnessed through humanities’ contributions to climate change, mass human migration, urbanization and our unique ability to transcend time-space boundaries through social communications technologies that have disrupted commerce, social exchange, and education on a global scale. These changes have been facilitated through human-designed products, services, and policies and each has brought benefits and harms simultaneously on a

scale never before seen in human history. Such problems are not just byproducts of their design, they are manifestations of a complexity that emerges from social diversity and geographic movement, cognition, and economic and technological means (Gunderson & Holling, 2002; Westley, Zimmerman, and Patton, 2006). Just as design helped create these problems, design is poised to remedy them - if channeled appropriately.

However, channeling design's potential is connected to the way it is organized. Those in health and human services, government, and education are not demanding design *per se*, they want solutions to complex problems. Professional designers, design thinkers and critical designers offer strategies and tools that are poised to provide what they need if their talents and tools are made accessible beyond the design world.

Indeed, understanding the way design influences what we humans do, is organized as a practice and is taught may be the key to marshalling its benefits widely enough to ensure our species' collective survival, resilience and potential to thrive in complex conditions. Some believe that design is something for everyone to engage with and that we are all designers in some capacity when we seek to transform things (Simon, 1969; Norman, 1989). These advocates believe the thinking and development process used by designers can be applied to problems everywhere by anyone (even if the quality of such designs might be highly variable). Others assert that design is too important to be left to the 'everyman' and that there is benefit in having clear boundaries around the practice lest it lose its meaning and value in pedestrian discourse. A third strand of scholarship draws from both design

practice and design thinking with the more oblique form of art to shape the minds and intentions of others under the name of Critical Design (Dunne, 2006).

Design work in all three conditions seeks instigation of change in some capacity through shaping of ideas and the development of products, programs, policies or social structures. What this creative act is and how it is organized is of concern for those seeking to use design as an engine of innovation to help find, frame and address the complex problems that present themselves in this interconnected world. Design has been described as the discipline of innovation (M. Neumeier, personal communication, February 8, 2012): the structural methods and means by which new ideas get formulated into potential solutions to problems. Designer Kara Pecknold writes about design 'living in the liminal' (Pecknold, 2011), particularly as it pertains to the forms that involve collaborative problem solving and designing:

Liminality (from the latin word limen, meaning "a threshold") refers to the in-between situations and conditions that are characterized by the dislocation of established structures, the reversal of hierarchies, and uncertainty regarding the continuity of tradition and future outcomes. Pecknold refers to liminality as describing "the threshold of dislocation and uncertainty", which is ideally suited to the creative act, which is at the epistemological root of design (Wang and Ilhan, 2009). Social psychologist Kurt Lewin developed Field Theory in the 1930's as a way to explain how social grouping formed, were maintained and the motivation to bring and keep them together (Burnes, 2004; Burnes & Cook, 2013; Lewin, 1997). Thus, the concept of 'field' was developed and transferred into common parlance when

speaking of areas of practice. By considering this liminal space as a field we can better understand the elements that unite it and the areas of tension within it.

This paper will explore the space of design as a field and the debates, dilemmas and discourse around how we can organize, understand and manifest the creative act within this context. The paper will examine the liminal space between the design professions, design thinking and critical design. These three domains will be defined and rationalized for their implication in defining the space where design is manifest and the creative act takes place. Drawing on examples, the three spaces will be explored in detail supported by an extensive review of the literature across each domain. This journey will be supported by data from autoethnographic self-study by the investigator. The paper will conclude with a presentation of a model for understanding design and its structure as a provocation for future research, design education and practice based on the synthesis of findings.

Through a series of arguments, presentation of data, and synthesis of findings, the author aims to provoke thought and illuminate the problems and opportunities within a field of design, not to resolve these tensions.

1.1 Problem Statement

We are facing ever-greater complexity in the composition and scope of our social, environmental and economic problems and require the kind of individuals, organizations and institutions that know how to understand complex problems and the means to address them. A society dealing with increasing complexity requires its citizens to see such problems in systems terms; uncover their root causes and myriad consequences; work with constraints and diverse constituencies

collaboratively; organize complex and divergent information in visual and understandable forms; elicit and develop creative ideas and solution proposals; and work with appropriate concepts and raw materials to synthesize, prototype, produce and assess products that adequately address all of these considerations for the present and project this into shaping our collective future. Design is the field where all of this takes place. Thus, understanding how design is (or could be) organized and its central tenets is a critical step towards making it available as a means for social benefit for anyone motivated to use it – whether they self-describe themselves as a designer or not. For if design is to be of use to society it must be as accessible to those who are capable of drawing on its methods, theories, tools and practices. As Berger (2009) writes: “designers believe we have the power and responsibility to create the world that exists around us”. Thus, the understanding of how this power can be effectively and responsibly transferred, cultivated and sustained in creating new designers primed to design for emergence is an important part of fostering that work of world-creation.

What is at stake is a world that is shaped mindfully by a diverse range of citizens from different backgrounds working with design as its ally and guide or one that allows the complexity of our social and environmental world to dictate to us how to live. We can guide change to create a world that is sustainable and reflects our best values or allow emergence to be driven by circumstance. One version of the future works with complexity and designs for beneficial emergence and coherence and one is characterized by a reactive stance that hopes for the best. If design is not clarified and made accessible to the many disciplines and perspectives that are brought to bear on tackling the complex, dynamic problems we face in health,

education, economics, environmental stewardship, and the arts then we surrender our guidance to other forces.

At present, the concept of design is generally treated as *exclusive* within the domain of professional design, with design thinking treated as *inclusive* (but limited in its scope), while the emergent practice of critical design is *elusive* and less known outside of design circles. Raising awareness of their fundamentals, distinguishing their differences and similarities, and illustrating the gaps that exist within all three between their activities and outcomes provides a space to organize the field for others to bear witness to. In doing so, we create a foundation for broader design education and expose the need for a literacy to understand this new field. Just as prose literacy and numeracy were seen as essential skills for every citizen, not just an elite few, it may be that we require widespread design literacy if we are to innovate, adapt, thrive and survive in a world of increasing complexity.

What this could look like depends on how we organize a field of design and its products. Human learning requires organization of information, whether through formal disciplines, accepted practices, development of tools and production of related media forms (Bransford, 2000). Through unpacking how this organization is currently taking place with design, identifying the gaps and concepts that lay within the liminal spaces of the field, and developing a coherent model of what that looks like allows for development of a coherent foundation for design literacy.

This project seeks to dive into design as a field to ask questions of the way it is organized, expresses itself and manifests its ideas into roles, practices, and institutions as evident by the professional artifacts (scholarly work, theories, models, products and organizations) it generates.

1.2 Background

Design professionals, design thinkers and critical designers work with the raw material of data and ideas to produce their products, services and policy innovations. Innovation is the means by which we channel intentions into new products and services that have value, serve us and facilitate our social evolution³ and is essentially the expression of design into the world. The concept of design is a relatively modern phenomenon having first been introduced as an activity separate from ‘making’ in the mid-18th century (Sparke, 2010). The widespread availability of mass manufactured, low-cost goods coupled with rising household incomes and increased leisure time in the post-war era led to a form of *passive* consumption, which distanced people from the creation of products. Indeed, creativity itself became marginalized through passive consumption in everything from goods and services to education (Robinson, 2001). Increasing social complexity has made passivity a liability as the dynamic problems that come with these systems requires novel, active solutions and thus, innovation. It also requires mindsets, toolsets and skillsets that enable intelligent, mindful creations that shape the future. Active creation – design – is needed for us to adapt and thrive in a state of ongoing high complexity.

Most detailed inquiries looking at a human activity start with exploring its epistemological foundations. However, Wang and Ilhan (2009) suggest that approaching design from an epistemological starting place is problematic, arguing

³ It is debatable whether human’s evolution has beneficial net benefit to our social, economic and ecological wellbeing as a system, however as our technical skills have outpaced our biological changes and indeed now contribute to them through activities like corrective eye surgery, organ transplantation, *in vitro* fertilization, hormone therapies, and genetic testing.

for using a sociological distinction instead. They start from the exploration of the 'creative act', which they define this way:

A creative act is characterized by the imaginative and original generalization -- with aesthetic value as a high priority - of utilitarian objects, usually first expressed in figural representations such as sketches, working drawings, physical or computer models, and the like, but ultimately produced (i.e., fabricated, assembled, constructed) because they have cultural value. The provenance of a creative act is the ability to reproduce the moment of creation, or the empirical attributes of what is created, by pre-determined formulations or frameworks. (Wang and Ilhan, 2009, p.8).

The latter part of this definition focuses on the explicit intent of the creator and distinguishes the creative act from discovery. The use of formulation and frameworks refers to the reliance on established methods of inquiry and creation, rather than having the creative act be something born of happenstance.

The authors note that this definition fits with Richard Buchanan's theory of general design activity (Buchanan, 1992), which involves "signs, things, actions and thoughts" as a "liberal art of technological culture", a well-cited, yet vague description of the field. The authors describe a design profession as "the social entity that gives a community of designers a group identity in the larger culture" (p.9). Identity is the hallmark feature of a discipline (Wang and Ilhan, 2009).

Rather than work from where design is or has been, Van Alstyne and Logan (2007) argue that the field itself requires some redesign to capture the need to address future-oriented problems, not just the ones we inherit today, in a manner consistent with our understanding of complex systems. They argue that emergence is a missing component in our understanding of design, something explored further by Berger (2009). This is one of the few articles in design that takes serious

consideration of complexity and argues for positioning the field in a manner that adequately addresses it.

Van Alstyne and Logan define design succinctly as “creation for reproduction.” They view design as a problem-solving activity that serves the purpose of creating products, services, or organizations that have the capability to reproduce and respond to changing conditions. Perhaps more than any other work, the authors acknowledge the qualities found in the three domains of design discussed here in their redesign of the term. For that reason, this work and the definition of “creation for reproduction” will be used to define a field of design as discussed in this paper. Prior to delving into this definition however, there is a need to look at other ways the term has been defined.

1.3 Defining the Creative Act of Design

A glance at the definition of the word design yields examples like the following from the Oxford English Dictionary:

design |də'zīn|
noun

[1] the art or action of conceiving of and producing a plan or drawing: *good design can help the reader understand complicated information | the cloister is of late-twelfth-century design.*

[2] purpose, planning, or intention that exists or is thought to exist behind an action, fact, or material object: *the appearance of design in the universe.*

Central to this definition is the act of thinking about and realizing a plan of action: the intentional act of creation. Design as presented here is the channeling of creative energies towards generating a product (which could be a material object, a service, a policy or experience).

A review of the literature will find numerous other interpretations of the word design. Ralph and Wand (2011) reviewed the literature and noted a discrepancy between design and *good* design in the way the concept was expressed, providing one of the most comprehensive definitions published. Approaching the problem from the perspective of a software designer and confronted by conflicting and confounding uses of the term in the literature, Ralph and Wand were motivated to comb through the morass of definitions to derive a synthetic definition that would provide greater clarity on the subject. Synthesizing 33 definitions from across the disciplinary spectrum within professional design, Ralph and Wand (2009) used a systematic, synthetic approach to develop the following definition:

DESIGN: (*noun*) a specification of an object, manifested by some agent, intended to accomplish goals, in a particular environment, using a set of primitive components, satisfying a set of requirements, subject to some constraints.

Ralph and Wand's definition ends up similar, if more detailed, to the Oxford English Dictionary one cited earlier. It focuses on an intentional creative act that has some utilitarian purpose, which is what contrasts it with many forms of art, and also implies a set of evaluative principles that the final creation can be judged on. Despite

Ralph and Wand's systematic approach to their search, there are many definitions left out of their review. The absence of many definitions points to larger issues of how design knowledge is organized defined and expressed, as we will see later in this paper. Appendix 1 profiles some of the other definitions of design that have been brought together through the work on this paper and is by no means exhaustive.

Historically, the term design has been associated with the creation of objects. However, in a review of design and the social sector for the Design Observer website, authors Drake, Cerminaro & Drenttel (2012) note that the definition of design has been extended beyond the field original conception state the following in their discussion of what design means in the expanded current context:

Design Thinking, user-centered design, service design, transformation design. These practices are not identical but their origin is similar: a definition of design that extends the profession beyond products. The rise of service economies in the developed world contributed to this movement toward design experiences, services and interactions between users and products. The literature about Design Thinking and contemporary ideas reveals common elements and themes, many of which are borrowed from product design processes. They include abduction, empathy, interdisciplinary teams, co-creation, iteration through prototyping, preservation of complexity and an evolving brief.

Drake, Cerminaro and Drenttel begin their review by acknowledging the role of the term design thinking in their review of the literature. Although the term *design thinking* has gained wide purchase and popularity since it first made its way into the lexicon in the late 1980's (Rowe, 1987), there is little consensus on what it is, what its expected outcomes are, and whether it is a fad, a 'failed experiment' or something more substantive. Writers like Bruce Nussbaum, who is widely credited with having brought design thinking into the mainstream of business consciousness through his

work at Newsweek, assert that design thinking has taken the hue of a fad and failed to deliver on its promise, instead proposing a different concept that builds on it called *Creative Intelligence* (Nussbaum, 2013). Some, like Idea Couture's Idris Mootee, acknowledge that there are problems with design thinking, but argue that it is too early to judge its effectiveness and impact (2011).

A third domain of design activity comes from design's earliest historical connections to art and overlays critical social theory on top of it (Bardzell & Bardzell, 2013). Critical Design is a concept that has affinity with practices like design fiction, speculative design, and purposeful art with critical social theory to expose the values and influences of a product on the maker and the society that uses designed products (Dunne & Raby, 2006). The social and technical tools and approaches that encouraged mass production and the marketing of the products of that production have been harnessed to provoke social change in ways that transcend traditional art. Whereas art critics often bemoan works that include explicit statements about the artists intentions and aspirations for the work Critical Design sees this as critical, even if such intentions are ambiguously presented. Between these three spaces lay a variety of design practices and the potential for design to serve as a vehicle for innovation and practically addressing complexity. Understanding the constructed boundaries that separate these areas and the practices that unite them as a field will enable us to better approach design from a perspective that optimizes innovation, rather than limits it.

3. Research Questions

This project seeks to explore the following domains and questions:

1. Where are the conflicts, connections and intersections that exist within the space created between Professional Design, Design Thinking and Critical Design?
2. What qualities distinguish designers, design thinkers and critical designers working in this field?
3. What are the implications for bringing these three areas into closer alignment?
4. What opportunities exist for fostering connections within this space to enhance the communication of design's value to non-designers and enhance the capabilities of current designers?

The objective of this project is to develop a model that can aid the broader field of design studies to understand itself, its potential impact and to guide further development of the design field as it pertains to social innovation. Further, it is intended to serve as a provocation to consider ways that design might better understand its products and value and communicate that to audiences beyond its present boundaries.

4. Methods

Primary and secondary research was used to produce provocations that address the research questions and generate an organized framework for understanding a design field to enable future study and scholarship. Four methods of data collection and synthesis were used:

1. Resource Review: Academic and professional literature sources were reviewed through a systematic search of key scholarly databases (e.g., *Scholars Portal*, *Google Scholar*), review of known web resources including public Internet discussion areas on the three domains of design being covered (Professional Design, Design Thinking, and Critical Design) secondary hand searching of key journals (e.g., *DMI Review*, *Design Issues*, *Design Studies*) and bibliographies from key texts related to the topic as uncovered through the search.

2. Concept Mapping: Products of the synthesis were coded and organized via a qualitative concept mapping process that plotted each data point across design domains according to a rating score determined by the investigator. Each of the emergent categories were rated as high, medium and low relative to one another and identical ratings will be permitted where no obvious quantifiable differences are present. Concept mapping is a means of visually organizing information to assess patterns of commonality and identify latent relationships between ideas. It is a mixed-methods approach to data organization that provides a transparent vehicle

for developing codes in complex, multi-faceted data sources, particularly those that are opinion-driven (Kane & Trochim, 2007; Trochim & Kane, 2005). Much like network mapping shows connections between people, concept mapping shows connections between ideas and the domains in which they exist (McLinden, 2013). As a method it is well suited to drawing out hidden relationships between ideas and for this project will be used to organize the content with the liminal space between the domains of Professional Design, Design Thinking and Critical Design.

3. Autoethnography: Autoethnography is a structured, self-reflective approach where the researcher is also the subject (Davis & Ellis, 2008; Holman Jones, 2008). Using systematically collected, reflective notes based on personal practice and observation, a qualitative content analysis was conducted to generate insights and themes. The researcher explored his own process of applying design concepts, design thinking and the tools design to his work and this project systematically. The data was coded for themes and juxtaposed to the findings from the concept mapping process and literature review.

4. Model Development: A conceptual model will be developed based on the findings from the previous three methods that will explore the intersections of Professional Design, Design Thinking and Critical Design. Conceptual models allow for the visualization of systems of ideas, providing accessible means for other professionals to critique and further develop within a scholarly domain.

5. Three Vehicles for the Creative Act: Professional Design, Design Thinking and Critical Design

A review of the literature and observation of the practice of design in various forms finds three clusters of activity that will be referred to in this paper as comprising a *field of design* (drawing on Kurt Lewin's original definition of the term): Professional Design, Design Thinking and speculative or Critical Design. It is referred to as a field based on Lewin's original theory and recognition that design is not independent, but interconnected to other disciplines and practices such as engineering, business, psychology, and art.

Professional Design refers to the practicing disciplines organized under the term design. While some of the activities within these professional design disciplines are performed by non-professionals (e.g., graphic design), the focus of the literature and available public discourse on design is centred on the creative act as performed by professionals. For this reason, non-professional design activity will be excluded from this analysis.

Design Thinking refers to the emergent area of practice that draws from the initial work of Rowe (1997), the design firm IDEO and its leaders (e.g., Brown, 2008; Brown & Wyatt, 2010; T. Kelley, 2001, 2005; T. Kelley & D. Kelley, 2013; Moggridge, 2007), and the scholarship on the topic by designers using the term explicitly (e.g., Buchanan, 1992; Cross, 1982, 2001, 2011).

Critical Design was initially put forth by Dunne & Raby (2006, 2013), who define it as a space that "uses speculative design proposals to challenge narrow assumptions, preconceptions, and givens about the role that products play in

everyday life". Critical design builds on social theory and design methods to create provocative products and services aimed at critically investigating the foundations of design and its implications into the world (Bardzell & Bardzell, 2013).

The ways in which design is practiced in the world exists within a space that is hypothesized to exist within three different domains: Professional Design, Design Thinking and Critical Design. Within this space exists a range of creative acts that are aimed at intentional creation of new ideas or products aimed at moving individuals to act differently in some capacity. Design is as much about creating products and services for the present moment and shaping the future through those objects of creation. As Barnwell (2011) states:

"Designers, by the very nature of what they do, are future forecasters, always concerned with things, events, situations, that have yet to happen. One of the supplementary roles of design is to enrich our world while remaining true to human instinct; at the same time being acutely aware of environmental dangers that threaten our continued existence on this planet. Design has been, is, and will be, a process, a matter of informed choice and knowledgeable selection" Barnwell (2011), p.20.

What further complicates any field that frames the creative act like design is that it is a complex phenomenon operating within a set of complex environmental conditions. Complexity refers to conditions that are dynamic, multi-causal, non-linear, mutually influencing, and operating with layers of order and disorder simultaneously (Mitchell, 2009). Although the term has been used in speaking of matters of Professional Design (e.g., D. Norman, 2011), the manner in which it has been used often doesn't reflect the scientific definition of complexity with the exception of work done on wicked problems (Buchanan, 1992; Kolko, 2012). Labels or structures like those imposed by academic or professional discipline are fraught

with complication because in practice they -- like any rigid boundary in a complex system -- fail dramatically. Klein (2004) writing on interdisciplinary interactions describes the relationship with complexity as evolving and challenges the linear representation of discipline in professions as problematic in an age where problems are often located within the complex domain.

Flexible boundaries acknowledge complexity and create liminal spaces between the domains created by Professional Design, Design Thinking and speculative or Critical Design. Pecknold (2011) sees designers asking four questions in navigating the liminal space in their work:

- Posture: Why do we do what we do?
- Process: How do we do what we do?
- Patterns: What do we do or make?
- Presence: Who do we do it with and how much face time is required to understand the liminal space?

The answers to these questions lay at the heart of each of the three forms of design.

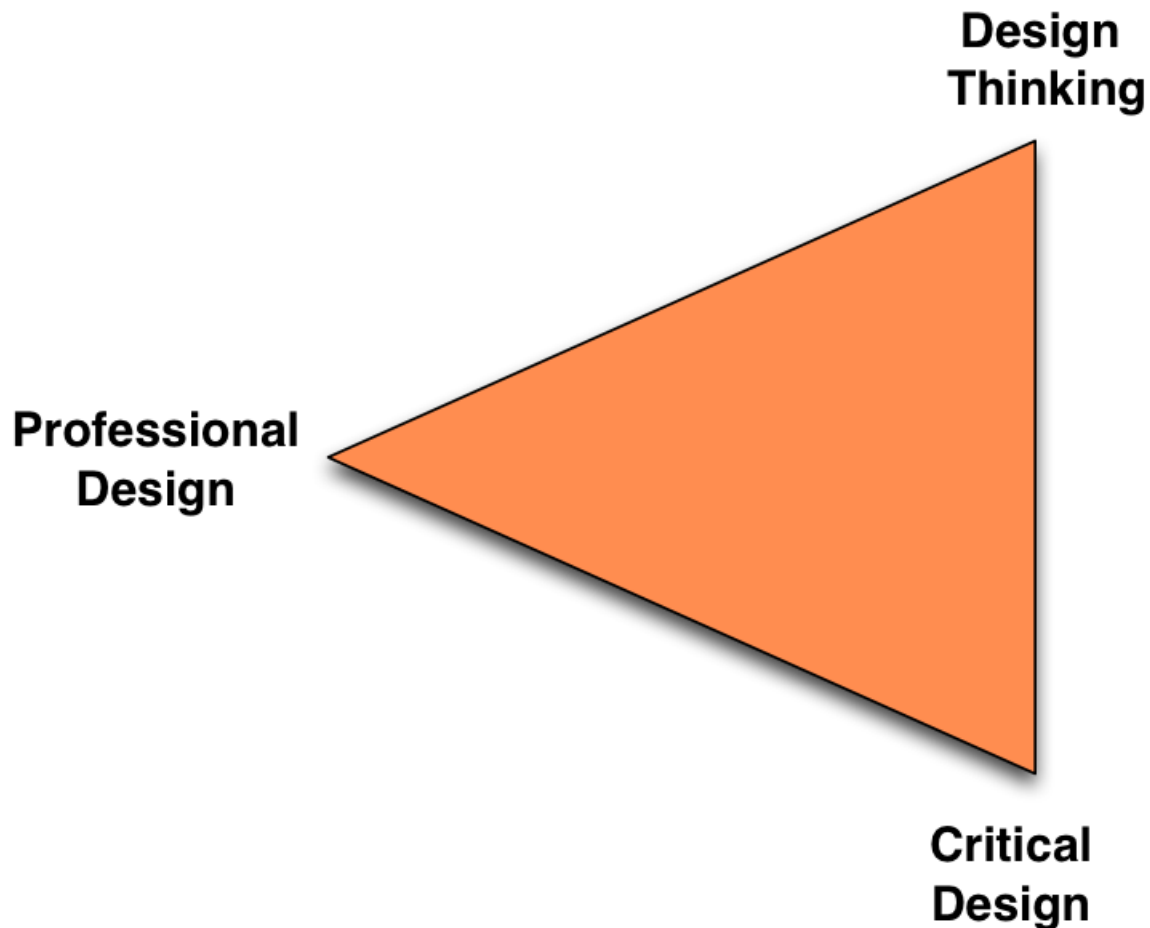
The liminal space of design is related as much to the “things, events, situations” that Barnwell (2011) writes of in describing design’s domains, but also to the space between the approaches to organizing this activity of the creative act. Answering these questions requires paying attention to the domains and what lies between them.

5.1 The discomfoting space of liminality

In a public interview with author and design professor Bruce Nussbaum, Saul Kaplan from the Business Innovation Factory Network, asked the question: “*What is it with designers, (do) they have a persecution complex?*” (Business Innovation Factory, 2011). Kaplan was referring to the vociferous debate that has emerged between those in the design field about the boundaries, skills and abilities required to do design, including the definition itself. A review of the online dialogue on design, designers, and design thinking finds heated rhetoric about the role of design and the definitions of each term and who is deserving of particular titles. How these boundaries are set and negotiated is critical towards understanding what comes between them and what is considered valid and appropriate knowledge.

Lewin’s Field Theory views groups as dynamic, yet normative, in the manner by which they shape and are shaped by the group’s membership. Fields have flexible, negotiable boundaries with a sense of cohesion that allows identities to form and grow. Fields in academic and professional communities function at a fractal level, replicating structures at different levels of abstraction. A review of the taxonomy of academic disciplines might find first level disciplines defined by their role as an art, science or humanity and then further as something else. A field of design is no different. For this project, we will explore a field of design that exists between the domains of Professional Design, Design Thinking and Critical Design (Figure 1).

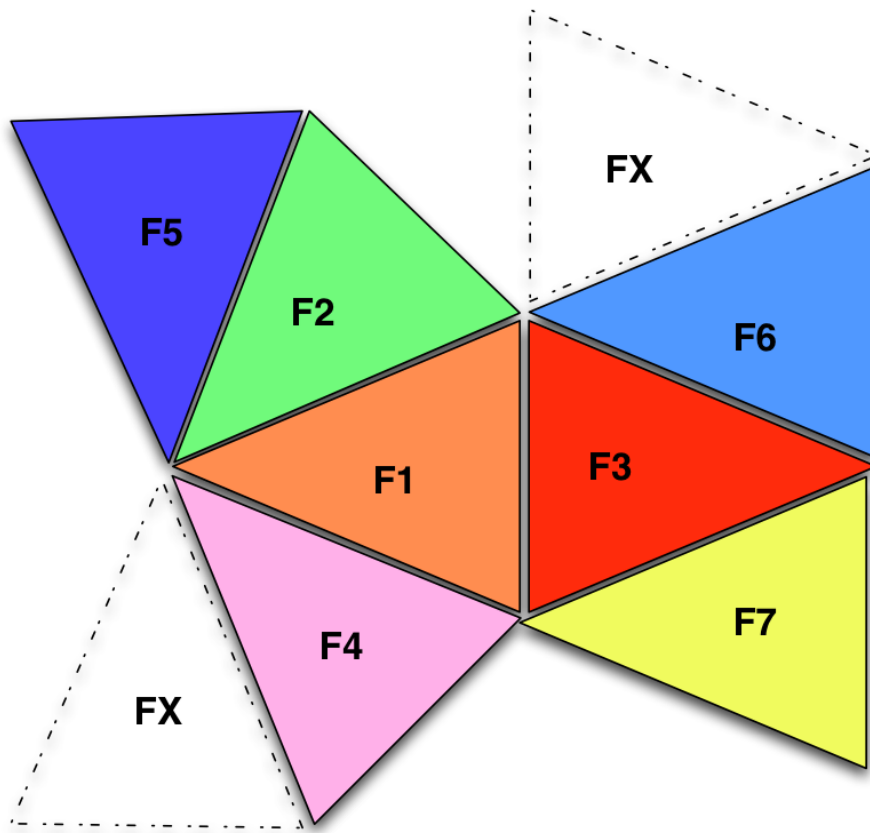
Figure 1: Design field triad



Within each of the three domains in this model (Professional Design, Design Thinking and speculative or Critical Design) lays a field. This field is connected to other fields that are related to design creating a larger tapestry of interconnected practices and theories across a spectrum of creation and science. Figure 2 illustrates how this might look with the designation of F1 to FX illustrating possible speculative fields that design might be connected to. These could comprise areas like engineering, psychology, geography, art, and basic sciences. F1 represents a design

field as envisioned in this project and F2 to F7 represent possible affiliated fields comprised of similarly structured relations. The FX field represents potential additional fields. This model suggests that the tapestry of geometric-like relations could extend indefinitely.

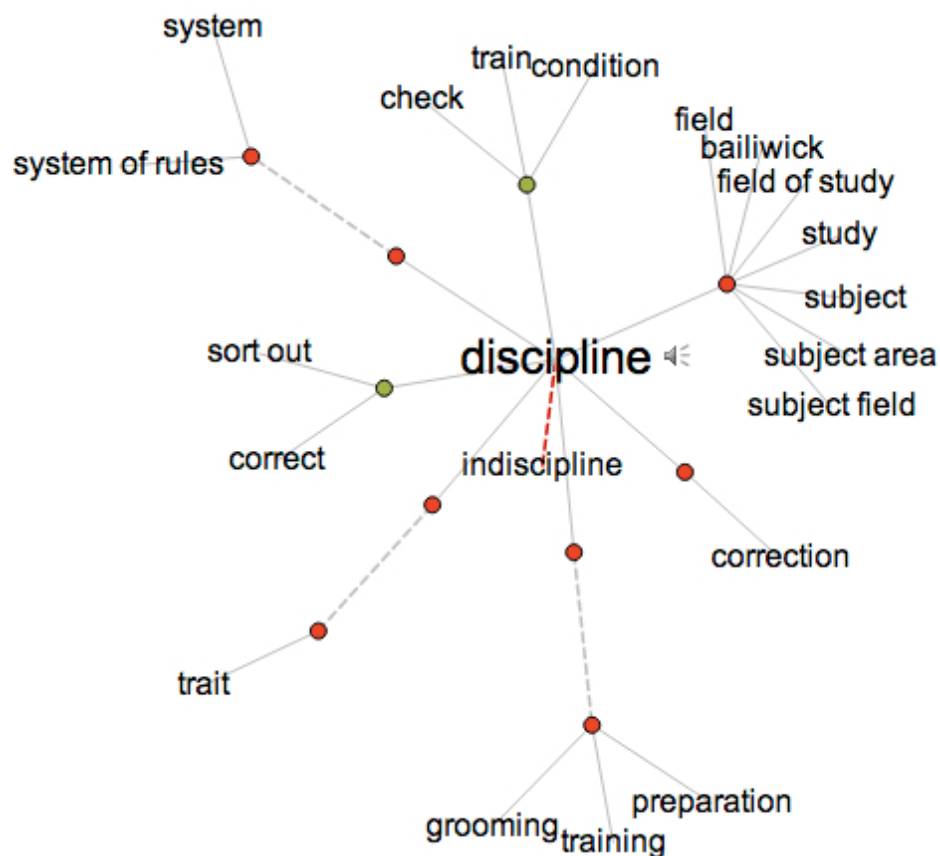
Figure 2: Schematic of potential field relations



Within this field are sets of disciplines, which are organizational systems for practice (see Figure 3).

While this model of a field of design is convenient, it imposes suggestions of simplicity and relational structure that is, like any model, somewhat false. Each of the points on the triangle (domains) are made up of dynamic, overlapping clusters of smaller units that together make a form of subfield. The liminal space between these clusters is also not linear, but amorphous and dynamic, too. A more visual representative model of this relationship of the design field will be discussed in later chapters. The representation presented in Figure 2 is also subject to such transformations as well, however these will not be discussed in this paper.

Figure 3: Discipline and related terms



Design is a peculiar field in that there are outward claims of interdisciplinarity built into its structure and professed 'charge'. Thus, practitioners from one area of design may work closely with others within the field and beyond it. Discipline is a default way of approaching a problem and a set of standard mindsets, toolsets and skillsets that are applied to solving a problem. Understanding these default settings is critical to our understanding of how design is organized and manifest as a creative act.

Klein, Kessel, Rosenfield and others have explored the nature and structure of discipline-based relationships as they are expressed in the scientific, technical and health domains (Kessel, Rosenfield & Anderson, 2003; Kessel & Rosenfield, 2008; Klein 1996, 2001, 2004; Klein et al. 2001; Rosenfield, 2001). These relationships help explain how diverse groups work together to address common problems within or between different fields.

Discipline-related structures are seldom problematic until they encounter boundaries with others and the negotiation for the means of working takes place. Questions about the nature of the work itself, who performs the work, how it is done, the barriers, and power relationships between disciplines in and outside a field can be complicated depending on the structure of the interaction and the level of regulation.

Design frequently crosses into this territory, which is why there is such debate over issues around identity, role and professional responsibilities within this field. It is why the arguments around the term 'designer' and who is entitled to claim such a title are perhaps so enthused. Rosenfield (1992) outlined a taxonomy of collaboration between disciplines, defining what mutidisciplinary, interdisciplinary

and transdisciplinary interactions comprise of (Table 1). Understanding these types of relations can help us frame the state of things in design.

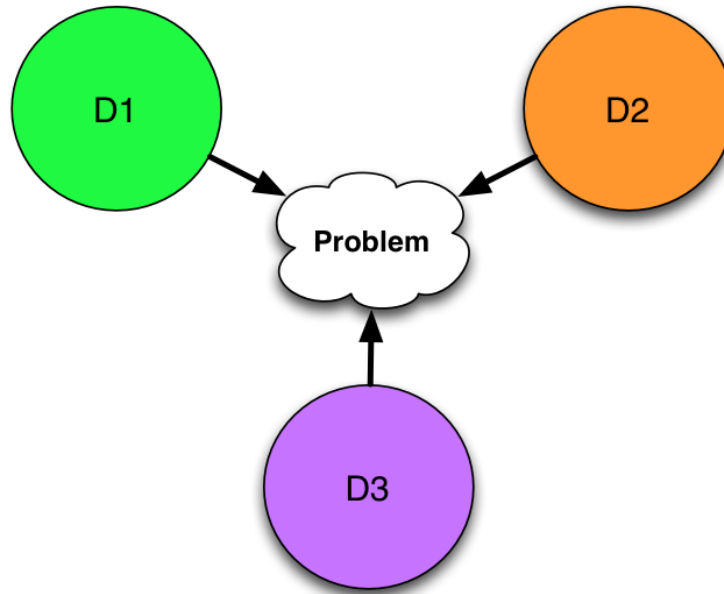
Table 1: Disciplinary collaboration qualities

	Expertise	Collaboration Across Disciplines	Synergy
Multidisciplinary	X		
Interdisciplinary	X	X	
Transdisciplinary	X	X	X

Whether the collaboration is between two or more people who are of formal disciplines or identified practices, the shared experiences come down to whether there is an exchange of expertise, work across disciplines, and level of synergy between the differences. These three forms of collaboration are: multidisciplinary, interdisciplinary and transdisciplinary. In the following figures the notations D1, D2, D3 refer to different disciplines.

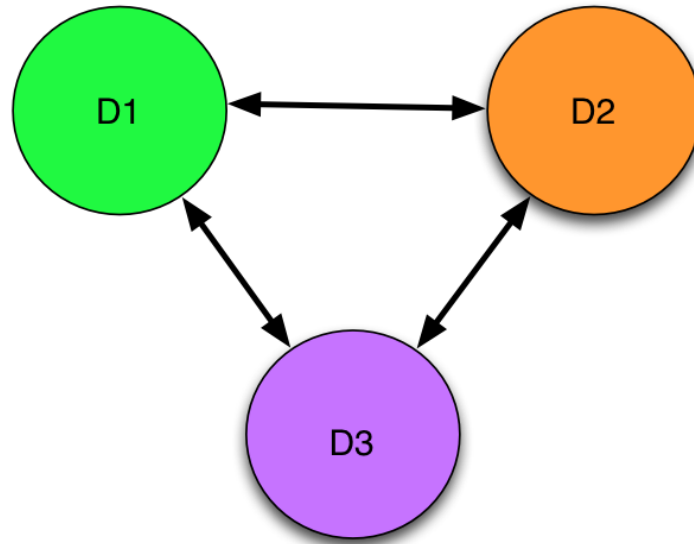
1. Multidisciplinary: –Researchers in different disciplines work independently, each from within their own disciplinary specific perspective, to address a common problem in the centre (Figure 4).

Figure 4: Multidisciplinary collaboration relationships

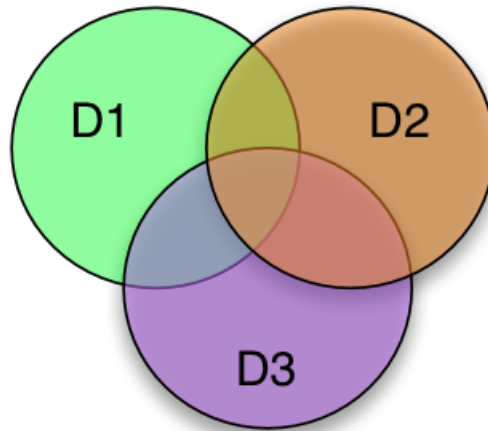


2. Interdisciplinary: Researchers in different disciplines work jointly, but each from within their own disciplinary specific perspective, to address a common problem (Figure 5). The interactions exist within a larger problem domain where the problem is not viewed as a separate entity.

Figure 5: Interdisciplinary collaboration relationships



3. Transdisciplinarity: Researchers in different disciplines work jointly, using a shared conceptual framework that draws together disciplines, to address a common problem that goes beyond what could have developed within a single discipline (Figure 6). Like with interdisciplinarity, the intersection between disciplines takes place within a problem domain and does not view the problem independently.

Figure 6: Transdisciplinary collaboration relationships

Bremner and Rogers (2013) build on this idea, adding to the discussion the concept of cross-disciplinarity and focusing their efforts on a field of design itself. They characterize the designer in a variety of new disciplinary dissolves beyond the forms mentioned earlier (Table 2):

Table 2: Similarities and differences among the disciplines (dissolve)

Inquiry	Character of the Designer	Character of the Discipline
Pluridisciplinary	This problem-solving mode combines disciplines that are already related, such as design and engineering. Some of the various domains in design itself involve pluridisciplinarity.	An understanding is demonstrated of a combination of disciplines that are already related in the various domains within design itself.
Metadisciplinary	This mode connects history/theory and practice so as to overcome specialization; it seeks to develop an overarching framework that differs from disciplinarity in that it does not address single problems.	An understanding is demonstrated that shows an effort to overcome disciplinarity by using methods to construct overarching frameworks to connect practices and their histories to new problems.

Alterdisciplinary	Globalization and the proliferation of the digital results in connections that are no longer “amid” systems, cannot be measured “across systems, and do not encompass a “whole” system. Instead, the digital has generated an “other” dimension so that we might now need to consider “alter-disciplinarity.”	An understanding is demonstrated that shows an ability to make connections that generate new methods to identify “other” dimensions of design activity and thought.
Undisciplinary	Practice shifts from being “discipline-based” to “issue- or project-based.” “Undisciplined” research straddles the ground and relationships between different idioms of distinct disciplinary practices. Here a multitude of disciplines “engage in a pile-up of jumbled ideas and perspectives. Undisciplinarity is as much a way of doing work as it is a departure from ways of doing work.” It is an approach to creating and circulating culture that can go its own way without worrying about what histories-of-disciplines say is “proper” work. In other words, it is “undisciplined.”	An understanding is demonstrated that purposefully blurs distinctions and has shifted from being “discipline-based” to “issue- or project-based;” an ability to mash together jumbled ideas and methods from a number of different, distinct disciplinary practices that can be brought together to create new unexpected ways of working and new projects. Displays an “anything goes” mindset that is not inhibited by well-confirmed theories or established working practices.

Bremner & Rogers (2013, p.12).

These new ‘dissolves’ might prove to be uncomfortable for many in the Professional Design field. It is difficult to imagine a faculty of design organized around an undisciplinary structure for example, leaving questions about what should be taught, how to evaluate the products, and what to call graduates. Similarly, problems persist with the approach to design that holds disciplinary rigor strong at all cost risking training designers to use a narrow band of methods, tools and approaches

that are ill-suited to the complexity of many of the current social problems they might face beyond the classroom now and in the future. This adherence to orthodoxy might ensure control and a high degree of predictability in the product, while risking doing what Russell Ackoff calls “the wrong things righter” (Ackoff and Greenberg, 2008) and producing poorly adapted practitioners.

Discipline is a means of organizing a field or sub-field and provides language, context, shared tools and solidarity and a sense of identity for those who subscribe to it. Archer (2007) argues that the field itself is a discipline, however the diversity of perspectives within the field suggests that it is many different disciplines. Bremner and Rodgers (2013) assert that this field fits into many different organizational structures, complicating efforts to define and organize it. Whether the organizing structure of design is appropriate or whether it requires a new lens on the domain as suggested by the concept of *metadesign* (Farson, 2008) is something worthy of debate. What is clear is that the concept of design as a discipline as denoted by an established body of knowledge, practice and shared repertoire is in itself problematic. It may be resolvable, but as Richardson (2013) has noted, this is not a new issue, rather one that has gone on unaddressed. The consequences of this might have been confined to the various design domains, however as design language and thinking moves beyond its original fuzzy borders the implications for miscommunication, mis-specification, and wholesale appropriation of design to other fields are tremendous.

We now shift our gaze to understanding the first of the three domains in the field of design as discussed here: Professional Design.

6. Professional Design

Depending on the interpretation, design is either an ancient practice (Barnwell, 2011) or a modern human invention (Sparke, 2010). Such interpretation depends on whether one defines design by what someone does or by the qualifications and practice of the designer as organized by professional guilds, language, disciplines and regulatory bodies. The formal concept of design as we know it today emerged from Great Britain in the mid-18th century when the practice of ‘design’ was first distinguished from ‘making’. The concept was born from the radical changes in manufacturing that were brought on by the industrial revolution and reflected a decoupling of the planning from the construction of an object. Demands for standardization that came from the means associated with mass production required some form of consistency that was not attached only to craft, but to good plans and clear intentions.

Lou Danzinger described design as a “problem-solving activity” and as “intelligence made visible”; comments which reflects this early shift towards exposing the planning and project management associated with making objects (or services). As mass production methods expanded beyond industrial products and materials like steel and stone to textiles, wood, paper, plastics, and electronics the limits to design seemed almost endless and the complications with planning, scoping and envisioning solutions to problems rose along with it. With this expanded set of human capabilities came the need to refine and specialize the mindsets, toolsets and skillsets associated with each product grouping and the skills

required to bring them to realization, giving rise to Professional Design and the disciplines within it.

A look at various taxonomies of practice finds many disciplines of design.

The Design Council in the UK classifies design into the following categories:

- Graphic design
- Brand design
- Packaging design
- Product design
- Furniture design
- Interior design
- Fashion and textile design
- Interaction design
- Website design
- Transportation design
- Service design
- Retail design
- Building design / Architecture

Wikipedia lists even more disciplines under the rubric of design, including: applied arts, communication design, instructional design, game design, process design, transition design, urban design, landscape architecture, information architecture, engineering design, lighting design and visual design.

Many of these areas have affiliated professional associations and within those sections and working groups. These are all characteristics that are associated with the term discipline. While disciplinary structures served to organize activities within the broader Professional Design domain, the problems associated with the increasing complexity of the problems designers were dealing with and the multi-, inter-, and transdisciplinary collaborations required to address complexity created rifts in the professions.

Richardson (1993) looked at how these changes were impacting the field of industrial design, one of the few design disciplines that have most of the requirements necessary to define oneself as a profession (like external regulation and national or international standards). As Richardson wrote: “the death of the designer is upon us and has been for some time” (p.34), pointing to the changing identity that industrial designers were undergoing at the time. He added:

“This crisis of identity is simply that industrial designers do not do what they generally say they do. That is, they have much less control over the process of product development than one might be led to believe by the common rhetoric. In addition, how users and cultures respond to the products which designers help create is not well understood. Most conventional theories tend to exaggerate the designer’s influence over these interactions, and exactly what the designer’s responsibilities are towards the culture as a whole must be given closer consideration” (p.34)

Although written twenty years ago, Richardson’s proclaimed death is clearly a long, drawn-out one. Examining the rhetoric emerging from the major conferences and events focused on design it is clear to see that the exaggerations persist. One example of this is with the field of graphic design, which has sought to portray itself as the home of change leaders and social innovators above its role as graphical storytellers, digital artists and brand-makers. Unlike any other domain of design, graphic design has explicitly claimed to be changing the world.

This perceived over-extension is highlighted in a book by Simmons (2010) which points to ways in which thoughtful graphic design is making a tangible difference to people while remarking how its power is often over-stated at the same time. To illustrate the potential disconnect, the case study of the RGD Design Thinkers Conference is presented in the next section.

6.1 Case study: Design Thinkers Conference & the professional identity of graphic designers

Design Thinkers is the name of the annual conference of the Association of Registered Graphic Designers (RGD) of Ontario. The conference serves as a showcase for graphic design products and services and features numerous keynotes that explore the broad domain of Design Thinking beyond just graphic design. In the 2013 edition of the conference, speakers like Bruce Nussbaum (professor and journalist), Bruce Mau (multimedia designer), Elizabeth Pastor (organizational performance consultant) and Frog Design's Robert Fabricant were on the agenda to speak to the audience. The conference resembles what any industry conference might: there are specific talks focused on craft, technology and trends in the industry along with a trade show where product suppliers display their wares. All of this is focused on graphic design. And yet, the conference title (and domain URL of designthinkers.com) with keynote program billing is aimed at Design Thinking; something that is related to, but not exclusively part of graphic design.

Although the conference is open to everyone, to be an RGD member one has to be a registered graphic designer. There is a distinctive gap between what RGD does and what Design Thinking is even though there is overlap. RGD seems to have capitalized on the interest in Design Thinking and used that to illustrate the importance of what it does, even subtly (or not so subtly) suggesting that they are the home for Design Thinking. Adding to this potential mismatch is the fact that RGD is focused on supporting Ontario-based graphic design, not just graphic design on its own.

This is no better exemplified by the RGD-sponsored competition for the 2013 Design Thinker of the Year award, a partnership between Rotman School of Business at the University of Toronto and RGD. The principal purpose of the award is recognition of a corporate leader in Canada who: *must demonstrate an appreciation of—and an effective use of—creativity and Design Thinking to drive innovation and business success.* No additional criteria is stated for the competition. The judging panel for the 2013 competition was comprised of:

- Alan Dye, executive creative director, Apple, San Francisco, CA
- Mark Leung, director, DesignWorks, Rotman School of Management, Toronto, ON
- Bruce Nussbaum, author, Creative Intelligence, New York, NY

None of the judges in 2013 were graphic designers and yet this is the award granted by an organization that is explicitly about graphic design. The competition illustrates the highly problematic logic that RGD applies when considered against its description of itself.

The RGD describes itself as: *The Association of Registered Graphic Designers (RGD) is a hub for the graphic design community, promoting knowledge sharing, continuous learning, research, advocacy and mentorship. We work to establish professional standards, best practices and innovative thinking within our industry and beyond.*

It is important to note the language around commitment to the profession and representation. A profession implies a particular set of entry points and work expression defined by formal qualification. These qualifications imply standards,

specific training, and create barriers to entry as well as control over whom is included among the roster of professionals. These are techniques used to entrench discipline-specific value into a system and regulate what that system produces. However, the argument for professionalization for graphic design is tenuous. Unlike medicine that requires years of extensive and costly training using specialized equipment and knowledge that cannot be accessed by laypeople by law and international practice, many have acquired the knowledge and skills for graphic design through self-teaching, short courses and practice. Indeed, one can easily find highly accomplished graphic design practitioners and instructors doing professional-quality (and leading) work without a professional designation. Registration as a professional designer does not assure that someone is not qualified to perform excellent graphic design work.

Graphic design is also limited by the absence of legislation, which is what distinguishes and governs those in the fields of law, nursing, many allied health professions, and engineering through a licensure system. Design has few professions governed under legislation; however there are many designed products that are. Thus, industrial designers and architects must adhere to strict codes of product safety, quality, materials and construction in producing products even if the professionals doing the design themselves are not necessarily certified under any regulated body⁴.

⁴ In Canada architects are certified through provincial professional bodies, however the practice of architecture as a whole is not itself restricted to certified architects. Sub-disciplines like landscape architecture do not require licensure to practice. In both cases, the choice for certification is voluntary. A list of the various activities that are described as falling under architecture illustrates the breadth of the field, posing challenges for it to completely regulate itself: http://www.raic.org/architecture_architects/becoming_an_architect/

While RGD uses the term *professional* as a means of gate keeping and, presumably, quality assurance, others have used it to denote a stance not defined by regulation, but by domain of practice. The AIGA in the United States fits this role. Originally titled the American Institute of Graphic Arts, AIGA shed its original name and adopted only the acronym in 2005 to become *AIGA, the professional association for design*. AIGA's mission is about being committed to "advancing design as a professional craft, strategic advantage and vital cultural force." Gone are any references to graphic design in the mission, although its key programs such as the annual book design awards still hint at the AIGA's graphic design past. AIGA seeks to advance a more generalized approach to fostering a professional culture for designers as a whole and seeks to recruit members based on self-presentation and self-identification with design practices.

Likewise, the Industrial Designers Society of America (IDSA) appears to be working to enhance a broad appeal for its work, too. A visit to their website finds advertisement for products, people and even the MBA training program at the California College of the Arts, exposing a broad professional perspective.

Combing through these professional organizations it becomes less clear what a designer is all about if one was to create a label for the practice. Bremner and Rogers (2013) argue that professional design's deviations from the original meaning of the word suggests that it is losing what discipline it had and suggests that the conventional approaches to understanding disciplinary overlap like the definitions proposed by Rosenfield (1991) are equally problematic, if at least limited in describing the way designers work.

Whether professional design is able to protect itself and define itself independently remains to be seen, however that hasn't changed the debate that has emerged about the use of design language and tools outside of this domain. We now shift our attention to one area where much debate among professional designers has centred: Design Thinking.

7. Design Thinking

Design thinking has made its way into the discourse of professions and disciplines that once rarely used the concept of design explicitly, introducing non-designers to many of the principles of practice that are familiar to professional designers. In adopting the term *design thinking* much debate and discussion has emerged on whether design thinking is really about design itself or something else, how it is about making ideas visible (doing) and not just about thinking, whether it is a method, approach or discipline, and whether engaging in design thinking is something that qualifies a person as a designer. To understand these questions we first need to look at where the domain of Design Thinking came from.

7.1 Background

The absence of control in the design process within complex systems is reflected in the concept of design thinking, which emerged from Professional Design practice as a means of engaging people in the creative act and visioning process. The first documented use of the term *design thinking* can be traced to a book by architect Peter Rowe in 1987 (Rowe, 1987). The book outlines the thought process that architects and urban planners use to approach design-related problems in their work. At the same time this book was produced there had been a strong surge in activity in Silicon Valley in developing the next-stage of computer programs and peripherals that were geared towards connecting people together through the World Wide Web. The information technology revolution led to new ways of designing interactions for the clients as well as those doing the designing. The

intersection of engineering, graphic design, computer programming, human factors, communications studies and psychology created the optimal conditions for a new form of collaboration that recognized constraints, but saw new forms of value being created from processes used by professional designers (M. Neumeier, personal communication, February 8, 2012). This process of creating computer-related projects was soon transferred to human services and systems and design thinking as it is known today began to take shape.

The design firm IDEO and its founding partners that include Tom and David Kelley and the late Bill Moggridge are widely credited for popularizing the term *design thinking*. Much like design itself, design thinking has myriad definitions and its structure, applications and user qualifications are widely debated in the literature and professional fora⁵. Unlike many of the theories and disciplines in Professional Design, the spread of design thinking has been attributed to professional and non-professional designers. While proponents like Tim Brown, the Kelley brothers, the Austin Center for Design's Jon Kolko, and Frog's Harmut Esslinger have backgrounds in design-related disciplines, advocates like Bruce Nussbaum, Roger Martin, Jeanne Liedtka, and Roberto Verganti do not. Indeed, the latter group are connected to business, management or strategy, not design. Further complicating this, design professionals like Bruce Mau are often seen as ambassadors for 'design thinking', yet use business and marketing language to define his firm's work, focusing on terms like identities, environments and experiences.

⁵ Two of the most lively fora for these debates is the Design Thinking LinkedIn group and the PhD Design listserv, which have leading scholars in the area such as Roger Martin, Don Norman and G.K. van Patter actively involved.

A review of the published literature (grey and academic) and multimedia sources finds an enormous gap between rhetoric and evidence, process and outcome. A review of the academic literature on design thinking using Scholars Portal (and confirmed by Google Scholar) finds a paucity of relevant publications examining design thinking systematically either through primary or secondary research (81 confirmed articles in total). A Google N-Gram finds that growth in the use of *design thinking* as a title term, while popular in grey literature, has plateaued since 2004. Problems with the literature include mis-specification of the term (i.e., many false positives in the literature), and poor definitions of the term when used in a design / creative act context (See Appendix 2).

7.2 Present context

Liedtka (2013) notes that while there has been an increase in the number of practice-based works on Design Thinking, the scholarly treatment of the concept has been minimal. In her review of the field, Liedtka (2013) found much uniformity across the various processes and tools that were described as being part of an *approach* called design thinking. Her review found that this approach called design thinking commonly included four main processes:

- Exploratory data gathering
- Idea gathering
- Prototyping
- Testing

A later review by Seidel and Fixson (2013) looked at how these approaches were used in practice through purposeful analysis of 14 case studies. In their review, Design Thinking was classified into three processes - needfinding, brainstorming, and prototyping -- and mapped on to formal and informal design methods. They found that novice professionals were successful in implementing design-oriented tools into most of their work, suggesting that Design Thinking can be taught and successfully implemented among non-designers. Caruso and Frankel (2010) propose a framework for understanding design as design thinking and viewing it as a social, rather than technical concept. They argue that the ways of thinking about problems is what fundamentally defines the new designer and design thinking, something that gels with the view that design thinking is an *approach*, something that has wide purchase in the literature.

There is also little support for calling design thinking a discipline even if that is something that many in online discussions vociferously advocate for. One of the areas that is contested is the role of tools and whether they are shared with designers or rendered off-limits, thus, opening the possibility that non-professional designers are worthy of being called designers. Toolkits are among the most common method of communicating design thinking and realizing its value in practice.

7.2.1 Case study: Design Thinking toolkits

One of the ways that Design Thinking is manifest is through the development and deployment of toolkits. The emphasis on method as a means of making thinking explicit is a core feature of Design Thinking. Among the most widely used and

documented toolkits is the Human Centered Design Toolkit developed by IDEO and distributed globally through its website for free in electronic form (or paid hard copy). The toolkit originally was designed to support the use of Design Thinking generally and has evolved into a focus for application of the approach to work in the developing world, even prompting the re-branding of the toolkit as a resource for Non-Governmental Organizations. With the initial success of the toolkit, which has been downloaded more than 100,000 times according its website, IDEO developed a second toolkit, *Design Thinking for Educators* (now in its second edition) (IDEO, 2012). In both cases, Design Thinking is framed as human-centred design, which is a “design process specially focused on socially responsible design, with the end aim of responding to basic human need”. IDEO has since developed a set of methods cards that build from this original toolkit, which are available in hardcopy or via iPhone app.

Brown and Wyatt (2010) introduce the toolkit in a Stanford Social Innovation Review article that illustrates how such resources can be used to support Design Thinking applications in different settings. One of the cases profiled in the article is the work of Kara Pecknold and her efforts in Rwanda working with underserved communities to aid them in community economic development and social planning. The case, described in greater detail elsewhere (Pecknold, 2009), is one of many that illustrates how the use of tools as probes support the kind of dialogue that extends the creative problem finding, framing and solving capabilities of both individuals and communities. Pecknold developed a set of aspiration cards that served as a probe for exploring the issues present in that community. “By offering the visual tools to the women, I aimed to shift the power dynamic away

from me (as the presumed expert) and provide them with the opportunity to identify their own narrative and meaning rather than have me attempt to create or decipher it” (p.243). This shift of power between the designer and those who are the focus of the design by shifting their participation, learning, and leadership in the project is something that distinguishes Design Thinking from the other domains. It does, as Thackara suggests, reverse “the dominant linear model of communication that privileges the artist (or designer) as the codifier of messages” (Thackara, 2005 as cited in Pecknold, 2009).

Tools and toolkits are means of facilitating engagement in a design activity, particularly where design is not a familiar *language*. Sanders and Dandavate (1999) argues that people cannot describe unmet needs with words alone and that they must be visualized through some other form; a toolkit provides the means for expression. This builds on Illich’s (1973) belief that such tools provide individuals with a guarantee of their rights to work and share with independence from prevailing power structures. In this sense, toolkits provide the means to make thinking visible from which action can emerge. Indeed, Sanders’ later design toolkit work was inspired by Illich’s position and was aptly named *The Convivial Toolbox* (Sanders and Stappers, 2013).

Toolkits produce less in the way of products than artifacts of mind, both individual and shared. The practice-oriented nature of Design Thinking means that a great deal of the literature on Design Thinking involves discussion of methods and toolkits. Works like Ambrose and Harris’ (2010) *Design Thinking*, Vijay Kumar’s (2013) *101 Design Methods: A structured approach for driving innovation in your organization*, and Liedtka and Oglive’s (2011) *Designing for Growth: A Design*

Thinking toolkit for managers, and the recent collaboration between David and Tom Kelley (2013) on *Creative Confidence* all include exercises and ‘tools’ for channeling Design Thinking, while focused on business innovation.

In his profile of Bruce Mau and introduction to design thinking concepts, Berger (2009) illustrates how design tools can be applied well beyond business and products, but to the self and nearly anything. This emphasis on tools as a vehicle for personal, social and product transformation is congruent with Illich’s concept of designing for conviviality by inverting the “deep structure” of tools to transform self and society, not just use tools in service of products; “People need new tools to work with rather than tools that “work” for them”. Illich adds:

“Individuals need tools to move and dwell. They need remedies for their diseases and means to communicate with one another....People need not only to obtain things, they need above all the freedom to make things among which they can live, to give shape to them according to their own tastes, and to put them to use in caring for and about others.” (Illich, 1973 - Loc 261, Kindle Edition).

Illich argues for a fundamental rethink about our practices, our tools and the larger structures in which they exist, pointing to the reciprocal nature of our work and our society. Such structures and their role in shaping how we live is the very focus of the third domain in a field of design: Critical Design.

8. Critical Design

Design features a variety of spaces for creative exploration that fit outside of the traditional realm of design in that the products are provocations rather than services, objects or policies. They play with intentions and use objects and processes as vehicles to a larger end rather than ends unto themselves. Unlike Professional Design or Design Thinking, there is a third strand to the creative act experience is what I am referring to as *Critical Design*. The term *critical design* was first put forward by Dunne and Raby and refers to designed creations that have an explicit intended effect on its audience, seeking to impose some form of meaning through the artwork or design. The work of Tyree Guyton, Ai Weiwei, The Yes Men, and the collaboration between Bruce Mau and the Institute Without Boundaries on the project Massive Change (Mau & Institute Without Boundaries, 2004) all represent this new space that connects art, design and Design Thinking.

Critical Design and related approaches to fusing intentions with art establish a provocative starting point from which a design process emerges. It brings in the space for design fiction, speculative design and political art within a design field. Dunne and Raby write about critical and speculative design as a means of promoting debate. This starts from shifting design focus from commercial products and services, where it is mostly applied, to more intellectual, socially relevant issues.

They state:

This shift from thinking about applications to implications creates a need for new design roles, contexts and methods. It's not only about designing for commercial, market-led contexts but also for broader societal ones. It's not only about designing products that can be consumed and used today, but

also imaginary ones that might exist in years to come. And, it's not only about imagining things we desire, but also undesirable things -- cautionary tales that highlight what might happen if we carelessly introduce new technologies into society.

Dunne and Raby further elaborate on their definition of Critical Design, which will be used in this paper, as:

Critical design uses speculative design proposals to challenge narrow assumptions, preconceptions and givens about the role products play in everyday life. It is more of an attitude than anything else, a position rather than a method. There are many people doing this who have never heard of the term critical design and who have their own way of describing what they do. Naming it critical design is simply a useful way of making this activity more visible and subject to discussion and debate.

Its opposite is affirmative design: design that reinforces the status quo.

8.1 Present context

Tyree Guyton and The Heidelberg Project in Detroit represent another example of speculative or Critical Design. The Heidelberg Project began in 1986 as a means for “Using art to provoke thought, promote discussion, inspire action and heal communities” by transforming Heidelberg Street in Detroit into an open-air art and education space. The founder and artistic director, Tyree Guyton, began work with his grandfather reimagining his increasingly dilapidated, neglected and abandoned street with coloured paints, found objects and repurposed materials to serve as representational provocations related to social issues in Detroit like poverty, race, employment, affordable housing and crime. Heidelberg street exists in a part of the city where more than 90 per cent of the population lives below the poverty line and unemployment rates over 75% (Heidelberg Project, 2011). Unlike Professional

Design or Design Thinking, there is often an explicit political intention that comes from Critical Design, even if that intention is vague.

The Toronto-based *ZEDTO* project developed an initial 8-month transmedia project based on a fictional company (*ByoLogyc*) and product portfolio that proposed health solutions through science, provoking questions about the ethics, morality, business case and social mores associated with biological engineering and lifestyle technologies (www.zed.to). Through generation of realistic physical products, design fiction, participatory theatre, and social media campaigns, ZEDTO's team sought to create a life-like experience that blurred the lines between reality and fiction to inspire reflection on the myriad issues that come with biotechnology and lifestyle enhancement now and in potential futures. Bruce Mau and the Institute Without Boundaries' exhibit *Massive Change*, launched a multi-city and online conversation about the role of design in our lives, provoking dialogue about purpose, aesthetics, ethics, sustainability and craft in an age when new materials, technologies and social forms are shaping and being shaped by design (Mau & IWB, 2004). These two projects illustrate the way Critical Design brings different design sensibilities, methods and approaches together to encourage a deeper questioning of important, topical social issues and design's contributions in shaping and reproducing their consequences.

Christopher Simmons (2011) explored the intersection of the social potential and purpose of design through a Critical Design lens exposing some of the pretensions associated with the design discourse that tends to aggrandize its use as a vehicle for change. The front and back covers of his book illustrate this tension clearly (Figure 7 and 8).

Figure 7: Inside front cover of Christopher Simmons' book *Just Design*



Figure 8: Inside back cover of Christopher Simmons' book *Just Design*



David Berman is another designer whose work walks the line between traditional forms of design and Critical Design. Berman's (2009) work *Do Good Design* illustrates the way that marketing and branding serves as a counter-force for social ill and good, depending on the means in which ideas are expressed in the abstract. He points to the rise of sexism in marketing, the role of cultural expropriation, and the devious ways design is used in lifestyle branding that promotes social harm over good. He argues that the artistic, purposive and subtle (and not-so-subtle) use of design to influence what is valued can be channeled equally into positive social goods, just as it can harmful ones.

Interventionists is a term that the Massachusetts Museum of Contemporary Art (MASS MoCA) used to describe the actors in its 2005 exhibit and subsequent publication focused on *art in the social sphere* (which is being considered as Critical Design) (MASS MoCA, 2004). Critical Design interventions include works of speculative fiction, purposeful and political art, and design fiction. Whereas good design can sometimes be lauded for being invisible⁶, Critical Design interventionists seek to disrupt attention and draw it to causes through making things visible through what was once unnoticed.

The *paraSITE* project was developed by MIT researchers and students who developed a means of keeping the homeless warm and sheltered in the cold by

⁶ Wired magazine's August 2013 issue featured a cover story and section on *Invisible Design* profiling the way new technologies were subtly transforming users engagement with their tools and technologies in ways that were unseen and hardly noticed. Behavioural economics researchers Richard Thaler and Cass Sunstein (2008) refer to these design-driven decisions to alter behaviour subtly as 'nudges'. The process of 'nudging' follows similar patterns to Design Thinking where one maps the context, identifies and develops the nudge, and deploys and iterates the design over time (Ly, Mazar, Zhao and Soman, 2013). Dieter Rams has implored designers create "as little design as possible" as one of his 10 principles of good design lest they interfere in the natural beauty and order of things.

fitting an inflatable structure around them and affixing it to external heat vents (Figure 9). The project developers describe the dual play on the products and language used in the design:

1. PARASITISM IS DESCRIBED AS A RELATIONSHIP IN WHICH A PARASITE TEMPORARILY OR PERMANENTLY EXPLOITS THE ENERGY OF A HOST.

paraSITE proposes the appropriation of the exterior ventilation systems on existing architecture as a means for providing temporary shelter for homeless people.

2. PARASITES LIVE ON THE OUTER SURFACE OF A HOST OR INSIDE ITS BODY IN RESPIRATORY ORGANS, DIGESTIVE ORGANS, VENOUS SYSTEMS, AS WELL AS OTHER ORGANS AND TISSUES.

The paraSITE units in their idle state exist as small, collapsible packages with handles for transport by hand or on one's back. In employing this device, the user must locate the intake ducts of a building's HVAC (Heating, Ventilation, Air Conditioning) system.

3. FREQUENTLY A HOST PROVIDES A PARASITE NOT ONLY WITH FOOD, BUT ALSO WITH ENZYMES AND OXYGEN, AND OFFERS FAVOURABLE TEMPERATURE CONDITIONS.

The intake tube of the collapsed structure is then attached to the vent. The warm air leaving the building simultaneously inflates and heats the double membrane structure.

Figure 9: ParaSITE shelter



The term of *parasite* casts light on many social prejudices and attitudes toward the homeless, viewing them as outsiders living off of others. Even the membrane-like structure and materials chosen for use in the construction of the shelters has a quality that resembles a larvae, insect or some other vermin that is typically associated with the term parasite. ParaSITE creates functional, useful tools that serve the dual purpose of addressing a serious social problem (inadequate shelter for the homeless in the winter) while provoking commentary on the larger issue of homelessness, shelter space and social policy.

8.1.1. Case study: Ai Weiwei's *According to What?* exhibition

Ai Weiwei is a multimedia artist, designer and prolific visual documentarian who has gained global notoriety for his assertive stance against many actions by the Chinese government on matters of human rights, safety, and freedom of expression.

In September 2013, The Art Gallery of Ontario became one of only five North American venues to host Ai Weiwei's provocative exhibit: *According to What?* The exhibit included photography, multi-media sculpture (wood, reclaimed metals, plastic), film, and displays of found objects.

In the case of Ai Weiwei, his work has focused on raising awareness of human rights in his homeland of China. Weiwei's *According to What?* highlight some of his activist design works. Through pieces such as *Names of the Student Earthquake Victims Found by the Citizens' Investigation, 2008-11*, which lists the names of children killed by the 2008 Sichuan earthquake, lives lost largely to poorly constructed schools resulting from corrupted contractors. The names are placed on white paper and lists the name, year, class, and sex of each of the victims that were only uncovered because of citizen action. While visitors see dozens of sheets of paper with the details presented in small font a voiceover is played reading each of the names. Weiwei leaves room for the viewer to explore different thoughts and emotions, but is purposeful in using the work to convey a deep sense of what the tragedy meant and encouraging viewers to consider the layers of responsibility that were nearly covered over.

Another related piece is the gigantic *Wenchuan Steel Rebar* (Figure 10), which lays together strips of rebar recovered from the collapsed schools along the floor of the gallery that "serves as a reminder of the repercussions of the earthquake and expresses the artist's concern over society's ability to start afresh "almost as if nothing happened"" (Brougher, p.129).

Ai Weiwei argues that "Everything is art, everything is politics" and that "art is a tool to set up new questions". Yet the material for Ai Weiwei's work is the

designed world and its products. He seeks to use things like the materials we use to build and shape homes and schools, our furniture (Figure 11) and the geometric, scaled relationship we have with the means of transportation (Figure 12) as the fodder for his work as he points to current realities and possible futures at the same time. He is using design, artfully. In Weiwei's work we see a full expression of Dunne and Raby's initial definition of Critical Design by using speculative design proposals to challenge assumptions about things like architecture, human rights, government accountability and citizen action and the preconceptions about what China reproduces in its creation to invert Van Alstyne and Logan's (2007) definition of design.

Figure 10: *Wenchuan Steel Rebar* at the Art Gallery of Ontario



Figure 11: *Grapes* at the Art Gallery of Ontario



Bardzell and Bardzell (2013) looked closely at the “critical” component of Critical Design and suggest that while it conceptually, ethically, socially and aesthetically fits with the current trends in design, it has been poorly adopted. Like many of the other areas in this field of design, they found Critical Design lacks clear definition and articulation of its central methods and concepts, which may explain why the adoption is so low. There is a risk that Critical Design will commit the same errors of omission via a lack of detailed articulation of methods and theories as we see in many areas of Professional Design and Design Thinking. Rather than apply Critical Design as a just method of inquiry, Dunne and Raby have called for adoption of Critical Design as a stance that designers can take when approaching their work.

This opens the possibility that a design initiative could exist within Professional Design, utilize Design Thinking and take a Critical Design stance.

Figure 12: *Forever Bicycles* at Nathan Phillips Square, Toronto, ON



9: Convergences & Tensions

John Maeda (2013), writing as part of the LinkedIn blog network, commented on Apple's change towards more fanciful colouring and accoutrements beyond its initial product offerings says "Design has always been about the substantive and the superficial at the same time." Maeda was referring to the product design, however the term fits the field as a whole.

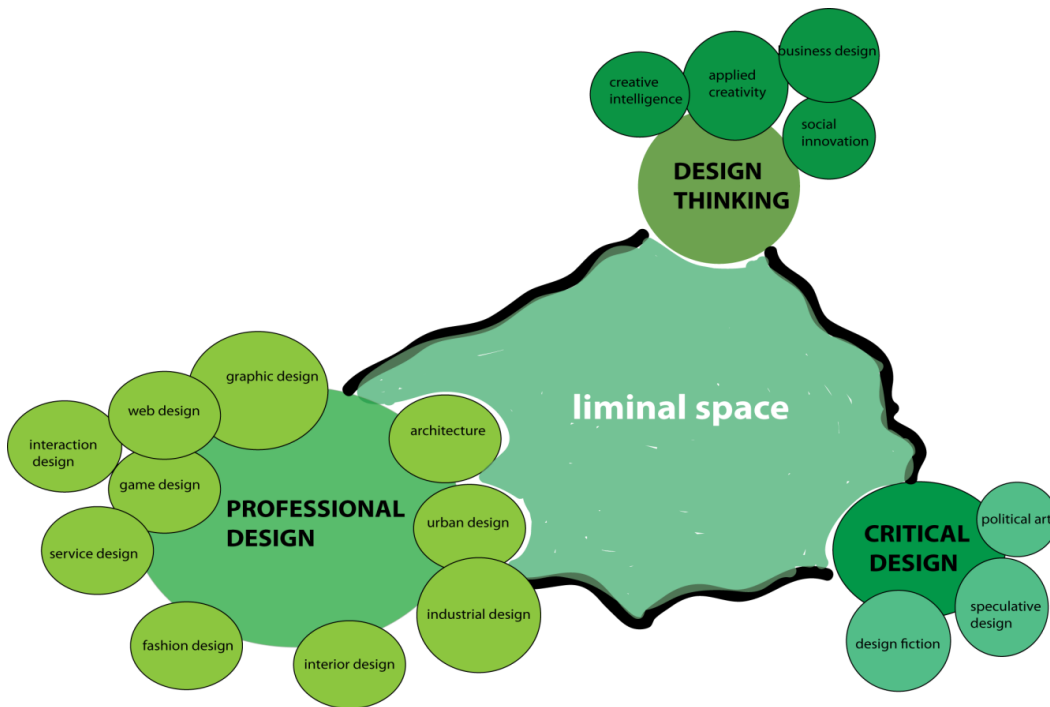
When fields, disciplines or professions are disrupted there are behaviours that are manifest: openness and retrenchment (Christensen, 1997; 2000). The latter position is one that is demonstrated by credentialism and protectionism. The field of graphic design might be said to represent both examples with AIGA choosing to become open and embracing the entire field of design while RGD seeks to be closed and restricted, emphasizing its value through exclusivity rather than inclusion. It is worth noting that RGD makes far more bold claims about what design can do than AIGA, although both bodies have been known to trumpet the idea that "design can change the world".

If design is to hope to have a significant impact on the world as it aspires, it is important to understand the field's composition and structure. Returning to Lewin's Field Theory as a model, it is important to establish "the order of coexisting facts" (Burnes and Cooke, 2013) in understanding what is taking place between the three domains that make up this field of design.

9.1 Mapping the field

The field of design as described earlier in Figure 1 was set as three domains of a liminal triadic space. The linearity of a triangle is useful as a basic structure for illustration, however in practice the connection between the three domains in the field is fluid and non-linear in its behaviour. Further, the three domains are organizing units in themselves (micro fields) comprised of smaller organized units of discipline or practice; Figure 13 illustrates this relationship with some greater nuance and detail. The unevenness of the positioning of the various elements within each domain, the non-geometric shape of the connecting lines and the somewhat roughened surface of the liminal space is meant to reflect the fluid, dynamic and unsettled nature of the field. The representation of disciplines and elements within each domain are meant to serve as examples and not be exhaustive. For example, the choice of disciplines to highlight in the Professional Design domain were sampled from the UK Design Council's list of design categories.

Figure 13: A design field



Reviewing the artifacts and literature across the contexts finds many more similarities than distinctions. The similarities across the three conditions include the concepts listed in Table 3 extracted from a thorough review of the literature across the three domains. These are features that are common across the field and could be used to describe its qualities. While each of the three domains engages these qualities differently, they all are present in the perspective, actions, and activities associated with Professional Design, Design Thinking and Critical Design to some extent. These themes are presented in the literature using a general sense of phrasing, thus inviting some questions about the exact use of each term, its definition and its relative comparability across contexts, domains and within the liminal space of design that is discussed here.

Table 3: Creation-specific qualities across all domains

Empathy	Strategy	Emotion
Craft	Materials	Insight
Systems thinking	Holism	Expression
Inquiry / Curiosity	Production	Aesthetics
Creativity	Desiderata	Interpretation
Imagination	Communication	Connection
Composition	Measurement of Impact	Utility

The qualities presented in Table 3 show various within and between-domain characteristics that are shared. A comparative analysis based on these qualities would be problematic, partly because the differences within each domain appear to be as great as between each domain. Table 4 lists those qualities (items) that represent those qualities that are similar, yet measurably distinctive between domains and the operational definition used to define each quality. These qualities were treated as conceptually similar within each domain, but were expressed differently across domains within the liminal space zone of the field.

These distinctions were developed through extraction and thematic coding of the literature and the definitions proposed are presented below. Thus, that is the area where we will focus our energy.

Table 4: Distinctions between the three domains (definitions)

No.	Activity	Definition
1	Creative flexibility and license	The degree of freedom the designer has to shape the product and process.
2	Licensure or regulation	The presence and relative influence of regulations or licensure of product, process and the designer's qualifications on the design.
3	Risk	The level of risk (e.g., health, wellbeing) associated with the product and process on the public.
4	Barriers to Participation	The limitations that prevent engagement in the design process by the client, public or other professionals.
5	Immediate Utility of Products	The time between the conception of the design or idea and its ability to be used and implemented.
6	Collaboration in development	The amount of collaboration opportunities for others in the design process.
7	Transparency in process	The level of visibility and accessibility to the methods, tools, process, decisions and product-related development activities by those affected by or invested in the design.
8	Designer's Expression	How much of the designer's own vision, personality, desires or style are expressed or encouraged in the design.
9	Constraints Specification	The level of constraints typically placed on the product or process of creation. These can be due to the design specification, resources, or regulation.
10	Call to action	How much the designed product encourages and facilitates activity by those who use the product.
11	Explicitness of Perspective in the Product	The level of clear perspective-taking by the designer as evident in the design and process of the product.
12	Product Transferability (ability to generalize to	The potential for a product, process or service to be transposed from one setting or context into

	other settings)	another that may be beyond the original design or designer's intention.
13	Abstraction	Tolerance and use of abstract concepts and thinking in the development of the product and its final expression.
14	Client Centredness	The degree that the product is designed around the needs, demands and context of the client / user.
15	Product Dynamism	The degree that the design is intentionally created to be adaptive to change to meet different conditions and contexts a priori even if the specific adaptations are not known in advance.
16	Evaluability / Established Criteria	Established means of assessment of quality and appeal are in place and can be used consistently to judge a product, process or service.
17	Clarity of Designer's intention	The explicitness of the intention of the designer on the design, the use, and impact of the product.
18	Temporal Flexibility	The degree to which the design is affected by time, timing of production, and setting.
19	Use of theory	The explicit reliance on a theory of design, change or social theory to guide the product and its development.
20	Use of evidence	The reliance on and use of evidence in making design-related decisions.

Table 5 outlines the rating given to each of the items in reviewing them against their representation in practice and the literature. Ratings were assigned using a non-quantified scale by the author, thus they are themselves interpretive. The relative difference between scaling categories (low-medium, medium-high, high-low) is non-standardized and the best effort was made to ensure that there was some equality in differences between each rating. However, in keeping with the aim of using this investigation as a provocation, the differences might be worth revisiting by others.

Table 5: Comparative distinctions between the three domains

No.	Activity	Professional Design	Design Thinking	Critical Design
1	Creative flexibility and license	Medium	High	High
2	Licensure or regulation	Medium	Low	Low
3	Risk	High	Low	Medium
4	Barriers to Participation	High	Medium	Low
5	Immediate Utility of Products	High	Medium	Low
6	Collaboration in development	Medium	High	Low
7	Transparency in process	Medium	High	Low
8	Designer's Expression	Medium	Low	High
9	Constraints Specification	High	Medium	Low
10	Demand for action	Low	Medium	High
11	Explicitness of Perspective in the Product	Medium	Low	High
12	Product transferability (ability to generalize to other settings)	High	Low	Medium
13	Abstraction	Low	Medium	High
14	Client Centredness	High	Medium	Low
15	Product Dynamism	Low	High	High
16	Evaluability / Established Criteria	High	Medium	Low
17	Clarity of Designer's intention	High	Low	Medium
18	Temporal Flexibility	Low	Medium	High
19	Use of theory	Medium	Medium	Low
20	Use of evidence	Medium	Medium	Low

Within the three domains of a field of design, Professional Design and Design Thinking are the most prominent and have the greatest source of tension between them, largely because of the direct references practitioners in each circles make to each other. Critical Design is somewhat left out of the debate and provides more of an opportunity for designers to work in areas that have a different set of boundary conditions and freedoms, and also to be more expressive politically.

9.2 Comparative analysis

The characteristics of each of the three domains were mapped according to the relative level of expression of 20 different characteristics that were extracted from the review of the literature. These ratings are not quantified and the explanation for the ratings is provided below with discussion on how they fit relative to the literature. The levels are not meant to be evaluative assessments, there is no 'good' or 'bad' levels of any single rating as each constraint provides creative fuel for innovation (Sawyer, 2013).

These qualities were mapped on to the liminal space model that was illustrated in Figure 12. These are not meant to be absolute and like the space they are mapped into, these have some fluidity. They are built on generalizations and will not fit all cases, yet still provide a useful starting place for examining structures and assumptions inherent in each domains' characteristics. One of the assumptions is that Professional Design is drawn into projects that have a design brief focused on a *product* to guide their actions, no matter how vague. It is assumed that Design Thinking is starting as focused more commonly on a *problem* and that it is used as part of a collaborative means of addressing that problem with multiple

stakeholders. Critical Design is assumed to focus on an *issue* and uses creative means to develop ways to explore this issue through design.

9.2.1. Creative flexibility and license

The professional designer, design thinker and critical designers all work within a creative space, however each has different parameters that scope the amount of creativity that the solutions development can appropriately absorb. A professional designer is granted a set of parameters through the design brief, which typically presents a statement about the desired product the client seeks, a project timeline and a budget. Professional designers might also be constrained by regulatory issues related to the product being explored. Design thinkers experience some of these constraints, but generally find them more relaxed. The illustration of Design Thinking in the IDEO Shopping Cart project illustrates how these constraints are manifest with a clear one-week timeframe, a purposed project, and the need to demonstrate creativity in the process of creating the product ('for the cameras'). The project team was given five days to cycle through an entire development process. While that was constrained, there were no explicit budgetary constraints, nor was the product subject to standards for manufacturing and distribution. Critical Design has an open creative palette, largely because Critical Design's decisions, from subject matter to materials rest largely with the designer.

9.2.2. Licensure or regulation

The role of practitioner accreditation or product regulation is most prominent in some Professional Design disciplines. Industrial design, architecture, landscape architecture and urban design, and fashion design all have some level of product or practitioner-level regulatory codes affiliated with them. Other fields like graphic

design, interior design, web design, and service design have some recognized standards for parts of their work or they work in close proximity to disciplines that do (e.g., interior designers close work with architects, interaction designers with industrial designers). Design Thinking is one step removed from this and thus, has some of the limitations based on this, yet these are more limited. Critical Design is limited only inasmuch as its visions intersect with other areas of design that have regulatory restrictions.

9.2.3. Risk

Regulation and licensure is commonly associated with the level of risk to human wellbeing associated with the products of design. For this reason, Professional Design faces the highest risk levels as there are genuine health risks associated with faulty products produced by architects, product designers, industrial designers, and other disciplines. Design Thinking is often a precursor and facilitator of products, but does not require that they be realized, thus reducing exposure to risk. Critical Design's use of fiction, political statement, and other provocations means that it is not 'real' in the sense that the objects produced are not intended to be used in an explicit manner and thus, the risk is also lower. Nonetheless, there is the potential risk that a thorough design thinking process will not eliminate errors in its quest for the optimal design. However, as these provocations can elicit real feelings and surface tensions or reveal relations otherwise unseen, Critical Design is not a risk-free endeavor either. The ZEDTO *ByoLogyc* experience for example made no clear obvious mention of itself as an experimental design fiction while it was happening and thus some participants could have left that experience with the design changing their beliefs based on a falsehood.

9.2.4. Barriers to entry

Professional Designers may have a designation and in the cases of fields like architecture a professional designation. These are based on approved methods of training (e.g., degrees from recognized institutions, approved practica/internships, practice hours), adherence to identified standards of practice (e.g., codes of ethics), and sometimes membership in professional associations. Some disciplines like graphic design have a tension around this. As cited earlier, graphic designers in Ontario and other jurisdictions are represented by bodies like RGD, which introduces barriers to entry through its membership with an aim to raise the level of professionalism of the discipline. However, there remain fully competent graphic designers who are practicing and teaching that may be self-taught or trained through methods not approved by bodies like RGD or unwilling to join the association. Design Thinking has some loose agreement on methods and tools and thus one could argue that a lack of familiarity with these methods and the approach could create barriers to its utilization. Critical Design has few barriers to entry with no agreed standards for practice or quality.

9.2.5. Immediate utility of product

Designer's products are ready to go once they are 'signed off' by the client. Design Thinking processes may produce prototypes or ready-to-go products, but may not always be fully-formed products. The earlier example of the IDEO Shopping Cart example produced a fully functional prototype, yet one that hasn't been adopted. 'Skunkworks' projects in corporations like SAP, Lockheed Martin and others routinely produce new innovations that may not be adopted into a product right away. The value of design thinking is in the future potential of the product. Critical

Design operates in a similar manner, but with a more ambiguous goal and even less connection to the immediacy of action. Critical designers The Yes Men use a mix of product design, theatre, and design fiction to create scenarios in the present that illustrate present and past injustices and point to possible futures. One initiative was the publication of a good news version of the New York Times, which was distributed freely to commuters in New York City in 2009. The design work created a real artifact that was designed to show how the media feeds negative news by offering a stark contrast in a paper that had nothing but positive stories in it. The utility is non-specific, but it could start shifting how individuals consume news.

9.2.6. Collaboration in development

No mention is made in the literature of solitary Design Thinking practice with the exception of the loose association between Bruce Mau and his lifestyle changes in Warren Berger's (2009) *Glimmer* (and even that was done in partnership with Mau's associates). Design Thinking is conceived of as a collaborative, participatory process for finding and framing problems and generating possible solution options. Although design is noted for its celebration of individual designers, particularly in fashion and architecture and certain product designs, the creative process is one that rests on a high amount of collaboration at different stages with the client, stakeholders or other designers. Critical Design is open as a design approach. Ai Weiwei worked with hundreds of others to produce the Citizens' Investigation Project that produced a list of names of children killed that was a prominent piece of the *According to What?* exhibition.

9.2.7. Transparency in process

Jon Kolko used the term 'magic of design' in a tongue-in-cheek way in his book on design research methods to play with the idea that design isn't magic at all, but methodical (even if it is creative) (Kolko, 2011). Professional Design's longer history, its diversity of disciplines, and explicit focus on a product makes it possible to deconstruct method and process even if that is not made explicit. What is often missing is the record of how decisions were made in the design process. Design Thinking, which has fewer pressures to generate a definitive final product is also clear in the means in which it is to achieve creative insights. Indeed, the entire Design Thinking approach rests on making the process as transparent as possible. Its ability to make itself visible is what gives design thinking its greatest source of value. It is the most transparent of the three domains. Critical Design is transparent in its intent, but its lack of uniformity, designer-driven process, and use of conventional design and art-based methods makes it difficult to extrapolate what methods, tools, processes and materials were used and how (Bardzell and Bardzell, 2013).

9.2.8. Individual expression

The freedom of the designer or design leader to shape a product and impose a vision is highest among Critical Design products, which are generally vehicles for expression in the same way that many art projects are. They may be commissioned works, but the Critical Designer is drawing on personal vision to accomplish their project and curating the material. Ai Weiwei's *According to What?* is an example of this. Professional designers also have an ability to shape personal vision. The 'personality' behind the vision that Apple has imbued in its designs still resonate

with the style that was shaped by Steve Jobs, Hartmut Eslinger and Jonathan Ives. The highly collaborative process of Design Thinking makes it far more complicated to shape a vision set by a small group or an individual. The expression is one that is shared more widely by those engaged in the process of Design Thinking.

9.2.9. Explicitness of perspective / stance

Design is not a neutral activity, although the level of articulation and acknowledgement of the stance and perspective of the designer is not available or evident. The degree to which the client, audience or user is unclear about the stance of the designer or their perspective also differs widely across the three domains of design. Critical Design makes the most explicit use of stance where the work is very much a reflection of the designer's perspective. Martin argues that Design Thinking is about taking a stance and documenting it (Martin, 2007). However, as Design Thinking is an exploratory approach and is often documented as something akin to (and described as) a toolkit, the perspective of the designer seems secondary and is not mentioned in detail and the literature. Professional Design does emphasize perspective, however the role of perspective is different from discipline to discipline and thus it is less than the role of the Critical Designer, but more than with Design Thinking.

9.2.10. Call to action

A call to action emerged as perhaps the most central component of the liminal space of design. If we consider the definition of design -- creation for reproduction -- as central to this field, it should not be surprising to find that this facet of the literature is placed nearest to the centre of the model. Works like Ai Weiwei's *According to What?* and ZEDTO's *ByoLogyc* design fiction experience command attention to issues

and engage those viewing or participating in these works to think about the subject matter critically, even if the specificity of the message is unclear. Design Thinking inspires action through the co-creation of its products by its participants. There is an unstated assumption that the ideas produced through a Design Thinking process will be acted upon in some form or at least considered. Professional Design products' focus on a workable product is in itself a call for functionality in the design. All three domains call for some action, which separates design from art, planning, and other creative workshops.

9.2.11. Explicit perspective

Perspective is the stance that the designer has chosen to take. It is the point-of-view or philosophy as manifest in the creation of the object and may reflect a style, evidence, or theory. Of the three domains, Critical Design makes this perspective the most obvious, often because of its connection to the intention of the designer for the product. The paraSITE project provides a point of view from the perspective of a designer, a parasitic creature and a homeless person simultaneously by seeing opportunities to literally connect a solution to the very homes that people on the street lack. Professional Designed products vary widely in the perspective that is manifest in their development, however many design scholars argue that this is something necessary if designers are to produce meaningful objects that positively influence the world (Chimero, 2012; Papanek, 1984/1985; Potter, 2002).

9.2.12. Product transferability (ability to generalize to other settings)

Relative differences between each design domain exist on the transferability of the product of design into other contexts and settings. Design Thinking exercises are strictly focused on the problem at hand, and while facile in its approach to

envisioning new possibilities, the approach itself is intended to generate workable solutions for a specific product. Critical Design is focused on an issue, however the manner in which the issue is explored and its contexts allow for some transferability and replication beyond the original intention and project. Thus, we see the way in which the *ByoLogyc* narrative continues in new forms after the original ZEDTO 8-month project was completed in 2012. Perhaps surprisingly, Professional Design products are designed explicitly for a particular context, yet are frequently adapted for new ones post-production. Fashions are altered, architecture plans are re-used, and interior design motifs are copied into other forms. The reproduction is rarely exact, but many designed products are used and designed for reproduction in ways that extend long-beyond the original design. Kerr & Co's original design for healthcare-focused furniture moving into bus stations, offices and other settings is an example of the transferability of products beyond their original focus or intent.

9.2.13. Abstraction

The design brief used to guide Professional Design provides a clear sense of what the outcome should be, even if the exactness of the design isn't known in advance. Thus, the level of abstraction is generally low with much of the creative energy shifting within a narrow set of constraints to guide the product. Thus, a fashion designer does not seek to design a jacket for a teenage, North American teen girl in a manner that will be confused with work pants for an African day-labourer. With Design Thinking, the artifacts generated through that approach are designed with possibility in mind, thus prototyped products often have different avenues to pursue in the development. Critical Design is about shifting consciousness and abstraction

is at the core of that strategy by allowing multiple interpretations, encouraged through the design experience, to emerge through the work.

9.2.14. Client-centredness

The degree to which the client (or user or audience) is involved in the creation of the designed object varies intensely. Critical Design projects like the ZEDTO initiative involve intensive user participation, however the messages that are delivered are not coming from the user, rather the Critical Designer and his collaborators. The meaning of the interaction is co-created around a set that is designed by and for the audience with a specific set of intentions. Ai Weiwei paid homage to more than 5000 children who died in the Sichuan earthquake, but did not seek the input of families or the government on how to do it. Design Thinking encourages the use of empathy (Brown, 2009; Lockwood, 2010; Lim, 2013) as a primary focus of its work, however it also creates new possibilities for providing solutions that are unanticipated and may challenge the original intention of the project. Professional Design has the highest explicit client-centredness because of the brief and the expectations that they will deliver a functioning product that fits the specifications - however broad or narrow - and thus, the need to respond to client demands is highest in this category.

9.2.15. Product dynamism

The ability for a product to become multiple things reflects a dynamism that is a key strength of Design Thinking's distance from a solid product. It is an approach that is designed around rapid iteration and adjustment, largely because the initial products are ideas, which have no physical or temporal limits. Critical Design is the same way, with many different interpretations and uses of designed products to suit context and need. With Professional Design the dynamism is often related to specific

adaptations, lead-user innovations, developed and eventually adopted as part of the product's evolution (Franke & Shah, 2003; von Hippel, 1996).

9.2.16. Evaluation criteria

Standards for product or process performance are elusive in many areas across the field. The argument over what is “good design” has been waged throughout the literature, but on that issue there is at least some (contested) criteria. Good design has been described in many ways and applied indiscriminately across the different disciplines (Hertenstein, Platt, Veryzer, 2013). Architecture and much of industrial design have explicit, international standards that they must meet in their products. Leitka (2013) sought to explore and validate processes in Design Thinking to modest success in theory, yet it remains to be seen if there will be some convergent validity in the future with additional criteria and evaluations. Critical Design lacks any notable evaluation criteria and resists the norms and constructions of established orders, yet hasn't developed alternatives as of yet for what makes good critical design, although some have argued that a solid grounding in social theory would be a start (Bardzell & Bardzell, 2013).

9.2.17. Clarity of intention

Similar to the role of perspective, the intended outcome of the designed product is not always evident. With Critical Design the intention of the designer to provoke is usually made clear in a general way. With paraSITE the most obvious intention was to provoke discussion of the issue of homelessness while providing a workable solution to sheltering people in the winter. Professional Design is somewhere in the middle, where the designer's intentions for the product might be made explicit or hidden. Many consumer products are designed with little sense of who the designer

is, what their goal was beyond simple utility, and what meaning the user was to generate from it (c.f., Diller, Shedroff & Rhea, 2006). Design Thinking's highly collaborative nature means that the intention(s) of the designer(s) are almost always obscured or multi-fold in nature. The saying that "there is no 'i' in team" also means that there is no single 'i' for intention visible in team-based work.

9.2.18. Temporal flexibility

Critical Design represents a small part of the overall landscape in the literature -- grey or published. Yet, the potential influence of Critical Design cannot be underestimated, particularly in its ability to manage and deal with time in design. Large-scale exhibits such as the Bruce Mau/Institute Without Boundaries' *Massive Change*, Ai Weiwei's *According to What?* and MOMA's *Talk to Me* were able to draw thousands of spectator/participants and spawn enormous dialogue in professional circles about their contents. Multi-year narratives like the ZEDTO / ByoLogyc design fiction on the role of biotechnology and society engaged thousands of people across physical and virtual platforms in ways that static 'texts' could. These Critical Design endeavors allow designers to transcend many of the temporal boundaries that constrain design and Design Thinking by creating futures *in the present* while simultaneously reimagining and revisiting the past in the present. Ai Weiwei's present sculptures represent a work of now, literally constructed out of culturally significant materials made so by the past. The material nature of many Professional Design products and the requirements in their briefs limits the flexibility in the way things are produced and reproduced. In many cases, professional design products must follow some structure in the scheduling of various tasks due to the nature of the products themselves.

9.2.19. Use of theory

The extensive work of Roger Martin on articulating the thought processes used in Design Thinking has contributed greatly to the theory base in Design Thinking (2007, 2009). Design Thinking also borrows tangentially from systems thinking and complexity science (c.f. Jones, 2013; Kolko, 2012; Norman and Yip, 2013) partly because of its perception as a vehicle to address problem wickedness. Nonetheless, Design Thinking's use of theory is often coupled with technique and, like this field of design, used interchangeably. The use of theory in Professional Design is inconsistently emphasized across the spectrum of disciplines, with description of technique often standing in for theory. Yet, there is design theory and a sufficient body of knowledge to demonstrate the presence of a theory even if the common practice is to describe designed products made by Professional Designers in terms of their outcome or process, not theory. Critical Design's use of many different forms of expression, media and political perspective draws on many non-design theories such as critical social science, social theory, political theory, and design, yet these are not made clear or explicit in most of the examples explored in this study.

9.2.20. Use of evidence

Design research involves looking at the way design is studied and how knowledge is generated from it (Laurel, 2003). The design charrette is predicated on the notion of grounding itself in the known facts of the day to inform the design of the plans and products, but this explicit use of evidence is not always as clearly laid out as with this method (Lennertz, 2003). Professional Design is grounded in research, but varies in how much acknowledgement past evidence plays in the process of creation. Regulated professions or products require some use of evidence to support

the project constructions and thus evidence plays a large part. Design Thinking uses evidence less explicitly, but also grounds itself in doing some research at different stages of the process. The IDEO Shopping Cart example, field and desk research plays prominently in the case study, yet most major texts have little mention of evidence beyond doing ethnographic observations. Even detailed texts like Liedtka & Ogilve (2011) have little mention of using evidence to inform decisions. In Critical Design there is no mention of evidence at all, although like with Design Thinking, primary research is often used to inform the process, not just past practice.

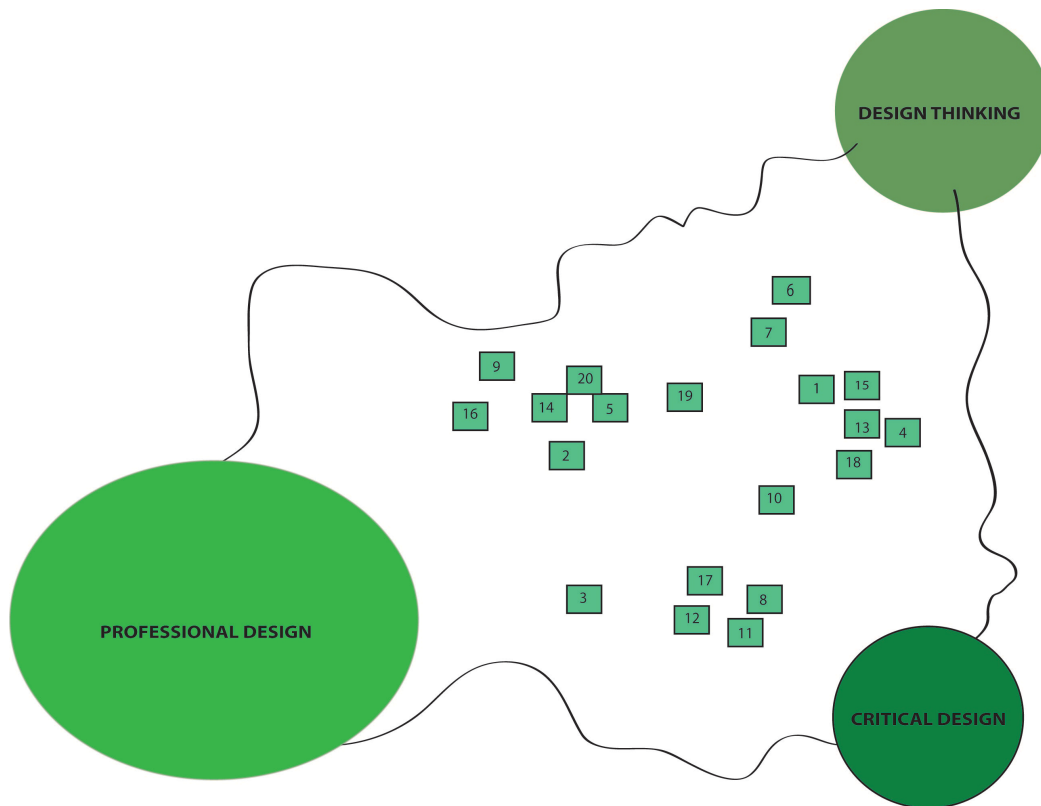
9.3 Concept mapping

Concept mapping is a social science method of sorting data using proximal measures of distributing content (Kane & Trochim, 2007). It is most often done as part of a data collection technique that employs many of the exploratory processes found in Design Thinking such as brainstorming/ideation, related synthesis and prototyping. As such, this method is suited to this project where the data is not benchmarked to a standard. It begins with initial research, brainstorming ideas and then the development of structured statements that participants rank and sort. The approach used here draws on the approach to plotting and clustering data inspired by concept mapping with all data selected, sorted and defined by the investigator. Nonetheless, the use of a graph to plot data provides a visual representation of the concepts and serves as a qualitative and quantitative means of organizing the data gleaned from reviewing the literature.

Figure 14 shows the concept map of the 20 different features (items) related to each domain. Items are denoted by a numbered box with the number

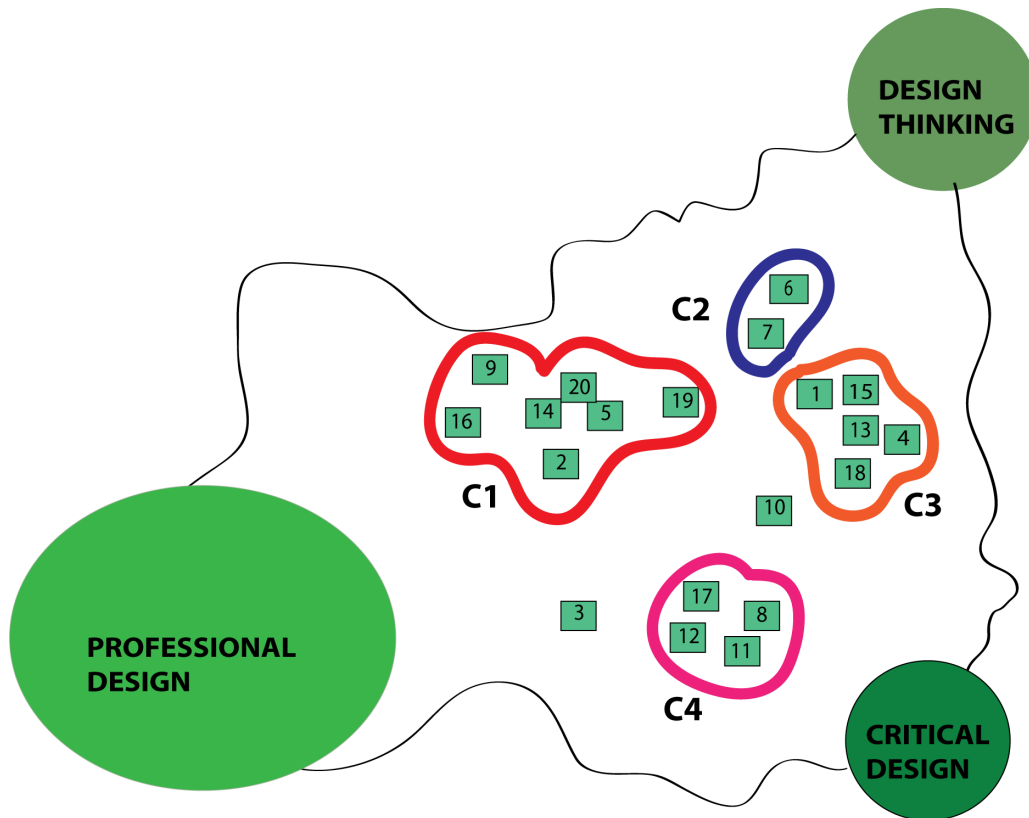
corresponding to the list presented above. The 20 items were plotted according to their fit with the ratings of each feature presented in Table 4. Items were not numbered according to any specific system or taxonomy. Although each item was rated on a three-point scale -- Low to High -- the relative differences between scores was different between features, thus the variation in the location of the points on the plot.

Figure 14: Concept map of design field



Emerging from the concept map were four clusters and two single items (#3 & #10) that did not cluster with other items. These clusters are visually presented in Figure 15.

Figure 15: Cluster map of design field

Legend:

- C1: Touchstones of Creation
- C2: Open door, Open window
- C3: Fluidity & Flux
- C4: I, Designer

Clusters were formed by spatial proximity to each other and conceptual fit.

The four clusters vary in size from seven items to two, with two single items that did not cluster. One item (#10: Call to Action) was positioned near the centre nexus of the three domains. Another single item (#3 Risk Level) did not adequately cluster with other items. Table 6 presents the clusters.

Table 6: Thematic clusters

Cluster Number and Name	Item #	Item Name
C1. Touchstones of Creation	16	Evaluability / Established Criteria
	9	Constraints Specification
	14	Client Centredness
	2	Licensure or regulation
	5	Immediate Utility of Products*
	20	Use of evidence
	19	Use of theory
C2. Open Door, Open Window	6	Collaboration in product development
	7	Transparency in design process
C3. Fluidity & Flux	1	Creative flexibility and license
	15	Product Dynamism
	13	Abstraction
	18	Temporal Flexibility
	4	Barriers to Participation
C4. I, Designer	17	Clarity of Designer's intention
	12	Product transferability (ability to generalize to other settings)*
	11	Explicitness of Perspective in the Product
	8	Designer's Expression
Unclustered Items	3	Risk & Liability
	10	Call to action

* Items that do not conceptually map on to the thematic cluster

9.3.1 Clusters

The concept mapping produced four distinct clusters with two items that remained unclustered. Clusters were organized based initially on spatial proximity within the design field and then on the basis of conceptual affinity. With the exception of two items denoted above, all items within each cluster fit a theme. Names reflective of each theme were given to each cluster as illustrated in Table 6 and in the text below.

9.3.1.1 Touchstones of creation

This cluster focused on design specifications; the kind of issues that designers use to scope their projects. Located between Professional Design and Design Thinking, these are the activities that provide boundaries for projects such as regulations, client needs, and past practice. They are those limitations that can determine the level of creativity allowed in a project. Constraints, whether regulatory or due to evidence or tradition all shape how Design Thinking and Professional Design are developed. It is these limitations or constraints which also partly define the relationship between these two domains and cause the most tension for Professional Designers, who express these constraints as assurances of quality (e.g., qualifications, training, certifications), while Design Thinking seeks to push these limits, creating tension between the two domains. Critical Design operates with far fewer limitations, which is less threatening and perhaps even attractive to Professional Designers, while being cumbersome to design thinkers.

9.3.1.2 Open Door, Open Window

The visibility of design activities is the unifying feature of this cluster by focusing on the openness to having ideas shared, people engaged, and a process that is

accessible. This cluster is located closest to the Design Thinking domain, reflecting the collaborative and co-creative qualities that are emphasized in the literature for framing Design Thinking as a means of group problem solving. While there is some shared elements with Professional Design, the lack of requirement for either collaboration or transparency in that domain or Critical Design is what positions this cluster where it is.

9.3.1.3 Fluidity and Flux

The ability to bend and shape the conditions for creation including the materials and scope is what defines this cluster. The space between Design Thinking and Critical Design is one where there are great possibilities, largely because of the lack of restrictions imposed by tradition, licensure and regulation, and the virtually unlimited range of tools and methods that these two domains present. For this reason, there are few barriers to participation like credentials, advanced skillsets, or social positions unlike Professional Design, which is partly defined by its barriers (or protections).

9.3.1.4 I, Designer

Situated between Professional Designer and Critical Design, this space is where designers are most able to assert their own personal brand or identity on to a project. The designer's motivations, style, ideas and perspective is brought up to the forefront in this cluster, which sits opposite to Design Thinking where many of the ideas and impulses to create are shared or negotiated with others and thinking beyond the self is encouraged. With this cluster, designer's egos and personal tastes are encouraged and expressed, which allows for a space for professional designers

to relax a little and play. It also serves as that place where critical designers can demonstrate their credibility and skill in the way they affiliate themselves with the legitimating structures of Professional Design.

9.3.1.5 Unclustered Items

The role of risk and liability is mostly associated with Professional Design and its standards and expectations, however the freedom to explore controversial and provocative concepts and methodologies inherent in Critical Design does not make it risk free. Performance-type designs like the fictional ByoLogyc Corporation by ZEDTO and the Yes Men's frequent impersonations of real life officials can lead participants to believe fictions and act on them. The believability is what makes these provocations powerful, yet also present the greatest social risk. Nonetheless, the risks are most commonly those associated with a change of perspective in Critical Design, whereas Professional Design has considerable risks to the person and physical health if creations do not take into account their impact fully before deployment.

The last item represents the most significant point of unity among all three domains and is what defines the field as a whole: a call to action. All three domains encourage users, products and services to facilitate change, realizing much of what Herbert Simon proclaimed as designer's activity: changing something into another, more preferred, thing. The location relatively equidistant from each other is what makes this stand out as a point of convergence for the design field. Change is the central concept in this model.

10. Autoethnographic report

To create is, by definition, active. It follows from this assertion that understanding the creative act requires methods that are adaptive and can account for change. At the same time, without a firm foundation to view the activity of design as defined by a sample of actors operating with clear definitions, boundaries and activities such as discussed in this paper, there is little theoretical base to frame observations and make meaning of the findings in a manner that can be easily interpreted by those involved in the research (Schensul, Schensul, & LeCompte, 1999). This absence of a base is one of the problems affecting research into the work involving multiple disciplines as discussed earlier (e.g., Bammer, 2013).

To address these boundaries and explore a field of design in practice the researcher engaged in an autoethnographic study to provide data that could help tie the research findings from the literature together. The autoethnography allows for a common point of comparison (the researcher) while ideas are being explored.

10.1. Introduction: The role of the designer

If design is about creation for reproduction, the role of the designer is not inconsequential given that the intentions, motivations, skills, perspective, and resources will play a considerable role in shaping what is created and how or whether something has the chance to reproduce. Nigel Cross' work on designerly ways of knowing (2001, 2007, 2011) profiles the ways in which the designer acts as the instrument of creation and channels ideas, knowledge and talent into developing useful products. Marketing and product designers like Austin Howe (2011), George

Lois (2012) and Debbie Millman (2011) have all written extensively on the ways designers come to think and know about their work. Millman, who regularly interviews designers on her monthly podcast *Design Matters* for Design Observer, may be as knowledgeable as any when it comes to how designers think, having interviewed hundreds of designers from different disciplines over the years. Her assessment is that design is something that is shared, but personal at the same time and connecting to that personal motivation allows for greater shared understanding (Millman, 2011). With that in mind, the investigator sought to explore the thinking, behaviour, and overall process involved in designing this exploration into the liminal space of design. Thus, this project and the resulting paper is the designed product that is being reflected upon.

10.2 Documenting design: major themes

A journal was kept throughout the project to aid in documenting reflections, activities and engagements with the material to provide a perspective grounded in practice to help frame and contextualize the findings. Process notes that began in April 2013 were merged with more systematically collected journalling data that was collected from August 15, 2013 to December 4, 2013. Notes were reviewed and summarized thematically. The title of each of the themes borrows from the approach in foresight to create evocative, interesting titles that capture the spirit as well as the content of the theme. Each major theme in the research has two-three sub-themes within it. These will all be discussed with reference to specific artifacts where appropriate. Due to the personal nature of the method, the text switches to

use of first person language for the presentation of these findings located in Appendix 3.

Only the summary of the themes will be covered in the body of the paper with a more detailed exploration presented in the appendix.

10.2.1 Boundaries

The general theme of boundaries emerged as one of the dominant and most persistent themes in the data. From the beginning of this project, boundaries set the stage. There were recommended guides from OCADU in terms of style, format and sometimes implicit and explicit expectations from the university, the program and the faculty about what this project ought to look like. Parameters help focus creators, however for the investigator it also meant examining the conditions in which he was most accustomed to working and wanted to explore. As this was about looking at a liminal space that existed between domains the boundaries were not inconsequential. Indeed, the boundaries themselves were the conditions of interest. In looking at that, the manner by which boundaries were treated in the process of developing the project became a critical point of focus.

The setting of design (e.g. workspace) and the availability of tools to create were important. Even though much of the project was developed using document-based research, the space in which these documents were read, sorted, and ideas extracted mattered a great deal. Tools like Whiteboards, sketchpads, notebooks and computer equipment (e.g., second monitors) made a significant contribution to the project.

The time that was spent and when and where that time was spent mattered. Some of the ideas took considerable time (months) to emerge and could not have been generated quickly. Only through a slower pace could some of the ideas come together. At the same time, rapid prototyping was also useful for certain aspects of the project.

10.2.2 The role of the designer

The designer himself was an instrument in the production in curious ways. Permission-giving was found to be a barrier and facilitator of the project as much or more than knowledge and skill. Granting oneself permission to explore ideas visually or using media that are not familiar, yet may prove insightful for that very reason, was a major sub-theme that emerged throughout the project.

The work-style and preference of the investigator was also something that was found to be of importance. Reflecting on the literature and the data itself, it was evident that the field of design as discussed here and the corpus of information provided by design scholars rarely speaks to this point. What kind of preferences, aptitudes and the degree of affinity for details, project management, or 'big picture' thinking that the designer brought seems to matter a great deal in what is produced and how projects are conceived of and executed.

Training in techniques and skills is another key. The investigator found himself drawing on new techniques and skills acquired through the SFI program at OCADU, but also by scaffolding that new knowledge on to his existing skillset as a researcher.

10.2.3 User engagement

The engagement with the intended user of a product or service was another theme that emerged from the autoethnographic study. The depth of engagement that things like exhibits such as *Massive Change* (Toronto and Vancouver), *Hyperlinks* (Chicago), *the Heidelberg Project* (Detroit), *Talk to Me* (New York City), and *According to What?* (Toronto) all provided an engaging, immersive experience that lasted for years in the memory of the investigator and others who were exposed to the exhibit.

What also stood out was the temporal limits these exhibits worked with. All of the exhibits have been dismantled after their completion and the products dispersed, yet all were also immortalized in book form. The tension between these two temporal conditions of permanency and impermanency was evident in the reflections about the lasting role of design in shaping behaviour and thinking and what artifacts remain from design interventions.

10.2.4 Defining quality

Exploring design brings questions about what *good* design is and what standards ought to be applied in making such an assessment. It was unclear what the threshold was and how to apply that to the work being done. Without clear guidelines from the literature, it became an exploration of what intrinsic value was brought out from the design and, at the same time, a comparative study of existing designed artifacts to assess what quality meant. It became evident that the field of design being looked at offered little in the way of objective ways to compare products.

10.3 Summary

Autoethnography forces consideration of one's values, practices and theories, making them visible through the systematic collection of data drawn from experience. The experience of creating a project that was on design using design methods and tools and positioned to reflect it all was a powerful form of reflective practice while serving as a valuable data source. By turning the lens on my own practice the investigator was able to reveal certain patterns that were not covered in the literature or other sources. One of the missing components was motivational: there is little discussion about how and why people are motivated to work through problems in the way they do and how fears and talents play into the selection of tools and techniques. Indeed, many of the personal qualities and attributes of design in practice are poorly discussed or acknowledged in the literature. For example, work style preferences like those in the Basadur Profile (Basadur, Graen & Wakabayashi, 1990), an instrument used to orient learners and support healthy, creative collaboration in the OCADU SFI program.

Another insight was the role of context in shaping many of the factors that present in Professional Design, Design Thinking and Critical Design. This meant paying attention to things like time and timing, the setting of practice like the studio (which is not often discussed at length), and the general conditions associated with the boundaries that creative acts negotiate. Noting that many of the factors that influence design practice are fluid, even when such activity is conducted within stable, controlled conditions, the mood and pace of design (and resulting insights or products) can vary significantly.

The negotiation of boundaries was also important to experience and capture because such boundaries kept much of the focus of the project on actions related to Professional Design activities or Design Thinking. The format of the paper and the insistence on using conventional academic styles to convey ideas significantly limited the kind of boundary-spanning creativity that extends from Critical Design. There was relatively no opportunity to deeply challenge the structures that frame knowledge, the medium and only some of the message. In preparing for this project and throughout it, video and photographs were taken with the hope to use it as a complement to the text version of the paper, however that work was largely shelved because of the complications that such media present when formatting the paper to meet university guidelines. That content could be re-worked for future post-defence iterations of the document set for wider release.

11. Discussion

Bryan Boyer, former lead designer at the Helsinki Design Lab (HDL), speaking to design lab practitioners in Toronto in 2012 argued that “(designers for social innovation) need to be better at explaining what we do” (Boyer, November 13 2012). Boyer argues that the social value of design is not well known to the public and policy makers and that there is a need for educating potential users and making the value transparent. The Helsinki Design Lab, which closed in June 2013, was a leader in this respect by documenting their projects, making their methods and theories transparent, and widely disseminating their learning to the world through open-access means. What HDL did was aim to demystify design and bring it closer to those that could use it and clearly linked the process of creation with the tools, models, evidence and actions that followed in a way that was transparent, but not rigid. The HDL combined elements of Professional Design, Design Thinking and Critical Design all at once, living in that liminal space of design.

Linking what design claims or aspires towards to its actual activities is one of the first places to start developing if a field is to have coherence in the terms and thinking that frames its foundations. Don Norman, interviewed in the DMI Review (Norman, 2013), points to one of the many issues surrounding the concept of Design Thinking and whether it is a thing in itself:

“Design Thinking is actually a misnomer. First of all, only a small percentage of designers do it. Second, there may be no agreement about what it might be. And third, whatever it is, it has been practiced for millennia by great thinkers in every discipline from literature to engineering, art to physics.”
(p.6)

Norman has written about Design Thinking being a 'useful myth' and has been forthcoming and public his internal struggles with the concept. Indeed, in a series of interviews by the investigator (Cameron Norman) with professionals identified as having been associated with or using Design Thinking, many expressed reluctance in using the term either due to perceived hype that fails to match reality or the awkwardness that comes with using a term 'thinking' to describe thinking and doing. There is a mis-match between the name, the activity and the outcome.

With Professional Design, there are similar problems. Claims by groups such as RGD to be changemakers that extend their influence well beyond what a professional graphic designer typically does add to the confusion about what Professional Design and Design Thinking is and isn't. This issue isn't limited to graphic design, architects similarly use the terms design and architecture interchangeably. This is made more complicated by training differences in countries like Italy where the tradition is to train architects as all-around designers and programs such as the Institute Without Boundaries (IWB) at George Brown College in Toronto, which presents as a similar styled program to Italy in a country (Canada) where architecture training is focused on the planning and building of physical structures. Is IWB challenging the established disciplinary order, confused, adopting a design tradition from places like Italy, all three or something else? There are many opinions, but few objective standards to determine what answer fits best.

While the field of practice of design is vibrant, the conceptual ground that supports it is shaky. Lack of a sound or consistent theoretical base matched with evidence -- practice-based or through research -- has hampered efforts to find common elements to tie the field together. As Richardson (1993) pointed out 20

years ago, there is a gap between what designers say they do and what they actually do. This gap appears everywhere. For example, Eve Blossom's recent book *Material Change: Design Thinking and the social entrepreneurship movement* (2011) has little to do with Design Thinking and much to do with product design. Nigel Cross' (2011) recent book, *Design Thinking*, further underscores the author's desire to write about designing, not Design Thinking as he states in the opening: "In writing this book, my goal has been to help anyone interested in design to develop their understanding of how designers think and work" (p.1). Cross' contribution joins Bryan Lawson's (2006) *How Designers Think* (now in its 4th edition), Michael Beirut's (2007) *Seventy-nine Short Essays on Design*, Austin Howe's (2011) *Designers Don't Have Influences*, and Debbie Millman's (2007) *How to think like a Graphic Designer* and (2011) *Brand Thinking* among others as detailed explanation of designer's thinking process, not Design Thinking. Yet the terms design and Design Thinking get used interchangeably with one claiming provenance over the other depending on the context (as Norman illustrated above).

Contrast this to the work of writers like Roger Martin who lay no claim whatsoever to speaking for Professional Designers, but still hold many of them as exemplars of design thinking. Indeed, Martin's Rotman School of Business and its research unit DesignWorks (Fraser, 2012) has sought to advance design thinking scholarship without any formal connection to a design program, perhaps explaining its collaboration with the RGD and sponsorship of the Design Thinker of the Year award. In this example, an organization devoted to training design thinkers is supporting the work of professional designers who are claiming to be the real

design thinkers. If this is confusing to those inside this field of design, imagine the confusion for those at its periphery or beyond.

Ongoing confusion and conflation of terms is a significant issue. Consider a recent example with Paul Rodgers (2013) unintentionally ironic introduction to a special issue of the journal *Design Studies* on design thinking entitled *Articulating Design Thinking*. In the article, Rodgers venerates business leaders like Roger Martin and Roberto Verganti as leading design thinkers, while highlighting the special issue contents that largely focus on the thinking in designers practice in the traditional professional domains. Is this confusion and conflation intentional? Are scholars like Rodgers aware of the conflations they make when they do it or is this meant as means to challenge the status quo?

Critical Design is left out, likely because it is new and the least articulated of the three domains. While there is also an emergent field of speculative design that is becoming more well known and used (e.g., Turney, 2013), it's similarities suggest it best falls within the Critical Design domain for the purposes of this review. Critical Designers like Ai Weiwei at one time co-design buildings like Beijing's 'Birdsnest' stadium and others develop pieces that are so abstract that use of the term design is inappropriate. What is he? Artist? Designer? The Critical Designer is often both at the same time.

11.1 Changing the state of design

The current state of design appears to be one that is fragmented, inconsistent, poorly defined and framed, contested, and unstructured. Questions persist about the legitimacy of design as a discipline and the crisis of perspective that is evident in the

literature (Bremner & Rodgers, 2013; Richardson, 2013). While efforts by leading design scholars to clarify concepts like Design Thinking for those within and beyond the field continue (Dorst, 2011; Liedtka, 2013) some argue that current research is just further diluting an already weakly-articulated concept toward meaninglessness (Badke-schaub, Roozenburg, & Cardoso, 2010).

Drawing on Simon's (1995) perspective of design as a problem forming, finding and solving exercise, this paper sought to highlight work on the first two steps and provide suggestions for the third as part of a provocation. Through analysis of the literature and other artifacts, synthesis of the findings, interpretation and model development, and a structured reflective practice study the problems facing design have been articulated and specific points within the field as mapped. It is now time to shift our gaze to action and consideration of what that action could look like if one is to accept the proposition that design is in need of change if it is to influence our collective wellbeing and future beyond its current messy borders.

Skinner (2002) synthesized the literature on behaviour change in health found that the likelihood of change is indexed higher the more the following items are present and endorsed by the person or organization:

1. Sees threats to comfort and situational wellbeing as serious and is concerned about it
2. Feels personally susceptible to the threat
3. Believes recommended change strategies to be effective in reducing risk
4. Assesses the expected benefits (pros) are greater than the drawbacks (cons) of change

5. Believes that significant others -- industry, peers, clients, public -- think the behaviour should be changed
6. Is motivated to comply with the desires of others for change
7. Is in a context (environment) that is supportive of action
8. Has the knowledge, skills and emotional coping responses to change successfully
9. Feels capable of carrying out the action successfully
10. Wants to engage in action because of value alignment

The analogy with health is appropriate given that the wellbeing of the ideas of design is at stake inasmuch as they can survive outside its narrow confines. Looking through the list above, it is hard to identify widespread acceptance in design's various domains of many of these points despite calls from critics (e.g., Badkeschaub, Roozenburg, & Cardoso, 2010; Bardzell & Bardzell, 2013; Bremner & Rodgers, 2013; Nussbaum, 2013; Richardson, 2013).

One of the issues is that with health there is usually clarity around the problem itself. For example, there are clear metrics and thresholds to determine whether someone has diabetes, hypertension, depression or arthritis even if the interpretations of the cause and consequence is debated. Part of this is due to a consistency of language, standards of measurement, and a body of scientific literature to base claims upon⁷. This standardization allows for more fulsome debate

⁷ There is enormous debate over the significance and methods used to describe and assess health conditions, but these are done most often within a set of parameters around the articulation of a term that is clear and replicable consistently. It is why medical school has

because participants in the discussion have a common frame to start from. Some of this is due to the complexity of the environment in which design operates. As Archer (2007) articulates, “design was once easy to define, but as a result of the major changes in society, that concrete definition is now obsolete. We continue to teach design as a combination of art, technology, and science, when in fact it is now a discrete discipline and a way of thinking” (p.116).

As Bremner & Rodgers (2013) argue, much of design is not amenable to disciplinary structuring in a traditional way, while articulations of multi-, inter-, and trans-disciplinarity used in fields like health and social science (c.f. Rosenfield, 2001) may be problematic as well. What is common among these perspectives is the development of a shared means of communication even if the organization of the practice varies. That quest for a shared language is where we begin as we look to provoke thinking about how to design a field of design for change.

11.2 Toward a design literacy

Language emerges when previous forms of communication break down due to their complexity and new tools arise to support learning and expression (Logan, 2004, 2007). As language becomes more sophisticated, so too does the need for the mindsets, skillsets and toolsets for sensemaking and communicating using this language: literacy. Literacy represents a critical intersection between thought and action related to a complex set of skills that are deemed essential for optimal functioning in a particular domain. Perhaps not surprisingly, what was once a basic concept related to reading and writing has now been applied to multiple domains

standardized components to a curriculum that are consistent across institutions and hospitals have diagnostic tools and procedures that are similar from place to place.

such as health, media, science and information as the complexities arise within each domain (Norman & Skinner, 2006).

Design may be in the same place. If we return to Van Alstyne and Logan's (2007) definition of design -- "creation for reproduction" -- as a start point and consider the reproductive environment for which that takes place, the case for complexity is clear. The original work on design focused on: 1) materials, 2) craftspersons⁸, 3) tools, 4) facilities and 5) markets. These factors are still present today, but the manner in which they are combined is vastly more complicated into a state of hybridity that is represented by new combinations of these factors in time, place, and order that is entirely new and yet, familiar (c.f., Kraidy, 2005). Mass production began with a creation involving materials were relatively few in number and known to the workers (e.g., wood, steel, cotton fabric), workers hired for specific roles and discrete duties using a small number of tools, operating factories and workshops located in specific communities and focused on providing a market with a specific, defined good that was created according a specification made by a designer. Now, design is collaborative, markets are emergent and the makers of things are many, decentralized using shared digital files, component parts manufactured in different locations across the globe. Manufacturers may be at once specialized on products or generalized to a variety of products or services. The introduction of open-source tools and technologies from programming code to 3-D

⁸ With mass manufacturing, 'craft' may have been reduced to simple repetitive labour, however the principle of having a human being as manufacturer still existed.

printers to scientific information only furthers the complexity of the modern product cycle.⁹

John Thackara (2005) sees a need for systems and process literacies that can draw attention to things unseen and reveal new processes of collaborative inquiry to shape and design the future. Design brings the possibility of moving us from visual to sensual representations of knowledge that enable greater appreciation of the complexities of a world where human activity is “situated, social, and in direct response to the physical and social environment” (p.171). Thackara sees a design literacy as the means of creating the conversations across contexts that allow for humans to understand the systems they are in and shape them in sustainable ways by creating trust through co-creation and collaboration.

“When someone we trust tells us to our face that a thing is important, we pay attention. Conversation is a more powerful medium of understanding than messages projected at us by media. But tomorrow’s literacies need not exclude artifice and creativity. Someone has to orchestrate the dinners and cook the food. The context where we eat and talk can be enhanced by artful means....When added to the designer’s powerful representations, the artist’s critical intuition -- especially when used to trigger our own insight -- can shift our focus away from the material world and its visual artifacts toward a deeper understanding of natural processes and social relationships.” (p.181)

It is in these natural processes and social relationships that design’s potential is being viewed against. It is for these reasons that organizations like the Gates Foundation, SAP, P&G, and the Rockefeller Foundation are enlisting ‘Design Thinking’ as a possible solution to the complex, messy problems faced globally and why Critical Designers like Ai Weiwei draw tens of thousands of visitors their

⁹ A product cycle as defined here includes the design, planning, manufacturing, marketing, distributing, selling and disposing.

exhibitions and why Massive Change remains (anecdotally) a continued source of inspiration for many innovators nearly a decade after it was first staged . If design is about creation for reproduction, it is important that what is reproduced is going to have much benefit and limited, conceivable risks whenever possible.

Language reproduces faster than almost anything humans create. Language is learned through teaching, observing, and practicing. It may be among the reproducible of human creations...or designs. How we foster this literacy, support the central aim of change through design, or recognize the role of the designer and prepare her or him for living that role is what we'll consider next.

11.3 Recommendations

It is beyond the scope of this paper to suggest the definitive features of a design literacy, however there are some salient points generated through this investigation that provide a starting point towards such literacy development. The choice to use design as a literacy and language may not be moot. Logan's work in language development (2004 / 2007) point to the ways in which societies evolve their communications over time to adapt to increasing complexity. The same complexity is evident in design (Archer, 2007) and thus viewing it as a language and drawing metaphorical connections between language and design are appropriate.

Language is transparent and flexible, yet accountable and evolving. We can interrogate the use of words and phrases to explore their meaning individually *and* collectively. Design requires both greater accessibility and articulation supported by means to interrogate by those outside of the immediate context. If it is about creation for reproduction, design itself requires a re-design to allow itself to be

reproduced or at least develop the 'blueprints' required for such consideration (Van Alstyne & Logan, 2007).

The following recommendations aim to provoke discussion and action on the purpose and prospects for a field of design and aid in the development of methods, tools, curricula and research to support this development over time.

11.3.1 Focus on Change

Whether one agrees or disagrees with Simon's assertion that designers are those who seek to change things, the theme of change itself is evident throughout the findings of this project. However, the nature of this change, its purpose, and the intent of the designer is typically (at least partially) obscured. In the concept mapping activity, change was the only variable that mapped close to the centre of the three domains in the design field. It is a common concept across all dimensions of design, thus it is a lever for cross-domain work and may serve as a focal point for the field itself. Whether it is an interior designer transforming a living space, a design thinker aiming to enlarge a team's perspective, or a Critical Designer seeking social change, the movement from one state to another is a constant, shared narrative to build on rather than on products or procedures. Developing new theories and incorporating those from the social and material sciences as well as social theory is a place to start. Fields like psychology have deep knowledge in change work and can contribute much to design, just as it can contribute to psychology. A further contribution is in the area of evaluation. With a focus on change will come the need to assess whether it happens or not, which will serve to validate design's value more than anything else it does.

11.3.2 Terminology

Domain-specific technical terminology aside, there is enormous room for consistent terminology across the field. Whether the specificity of the terms used are agreed upon, greater breadth in the use of design-specific concepts would enhance greater engagement between domains and provide a lexicon that could identify the field of practice, making it accessible to those outside it. Terms like prototyping and ideation are examples that have some wide purchase across the field; design needs more of these, with greater specificity. A review of the definitions of design (Appendix 1) illustrates the veritable Tower of Babel that exists in describing what it is and does. Ralph and Wand (2009) and Van Alstyne and Logan (2007) are among the few examples that explain their definition and make the reasoning for it open to discussion and debate.

11.3.3 Documentation

Design is largely a product-driven field in its cognitive style. Even Design Thinking, which is described as an approach, still places great emphasis on the ideas and prototypes created from it. While there are an abundance of toolkits and designed products and exhibitions, there are very limited number of case studies that document the design process linking specific activities to outcomes. Notable exceptions include: Nigel Cross' look at designerly thinking (2011), Bone and Johnson's (2009) exploration of their work at IDEO, Buxton's (2007) *Sketching User Experiences*, and some of the cases in Moggridge's (2007) collection looking at interaction design and the *Open Design* cases by Van Abel et al (2011). These are exceptions in a field that features 'war stories' about design activity that lack the

detail needed to repeat the action, contravening the idea of production for replication.

11.3.4 Theory

The field of design as considered here is littered with “because I said so” kind of statements that are poorly supported by a visible logic or explicit framework for action. Whether or not the products of this kind of opaque approach to design are useful, the means of understanding that production for replication are not. Without an explicit, accessible theoretical foundation there is no means of explaining success or failure in design. Nor does it allow others from different areas within design or outside it to contribute. For example, brainstorming is a method that has been tested as useful for some contexts and discredited based on theory and evidence in others. The choice to engage diverse perspectives in Design Thinking can easily be upended if the process is not rooted in theory, which is linked to *cognitive diversity*, not just diversity in all things (c.f., Mohammed & Ringseis, 2001). This issue is perhaps more salient to the non-tangible process of creation rather than the technical ones, but as the thought process is part of what makes design what it is, the importance can’t be easily dismissed.

11.3.5 Evaluative criteria

Following the need for some theoretical articulation for how design produces and transforms, connecting that theory to some expected output that can be evaluated is also important. The concept of ‘good design’ requires attention and articulation, although some have made progress on such a goal (Hertenstein, Platt, & Veryzer, 2013). Evaluation need not impair or limit designers’ creative flexibility. Approaches

like Developmental Evaluation, which emphasizes ongoing changes and improvements using iterative feedback, is ideally suited as a method of evaluating design and working with complexity (Patton, 2010). By creating flexible, negotiable standards to which activities and products can be critiqued for all aspects of field, design is better positioned to engage others outside its boundaries.

11.3.6 Evidence

If design is really to change the world as some enthuse (Simmons, 2010), then evidence is required to show that change has taken place. This requires theory and evaluation criteria as stated previously along with the research needed to illustrate connections between design activities and outcomes. Such evidence need not be confined to scientific studies or rigid research designs, it can come from properly documented practice (see above), something used in public health (Green, 2006). Complexity-oriented research approaches can be useful in organizing data from design practice and outcomes that are consistent with many of the non-linear methods that designers use (Norman & Yip, 2013). Nonetheless, without some form of evidence for effect, it will be difficult to convince others like educators, health professionals and policy makers to adopt design into their practice.

By bringing these activities to bear on a field of design discussed here the opportunity for fertilization and transplantation of ideas and methods is likely to be enhanced and the foundation for a design literacy that has internal and external reliability and validity can be developed. Just as psychology branched out from its limited roots in clinical and scientific settings to the classroom, boardroom, and

council chamber, so can design. Psychology could do this because it had all of the above features even though it emerged from a different history.

However, like psychology there is the risk that the term will become watered down as a catch-all phrase. Farson (2008) argues that the term has already “escaped” into the world. He makes the argument that *metadesign* might be a useful term to distinguish the more specific design-related activities encompassed within the field described in this work.

“Design is that kind of word. It has power. It is like psychology or leadership or communication, each of which has come to be regarded as relevant to almost any human situation. So it will be with design. The term is no longer the property of the traditional disciplines.” (p.4)

He later argues, when speaking of the expansion and transformation in a field of design that “the metadesigner is not tied to one discipline, he or she is able to embrace these developments, very often gaining sufficient understanding of these new fields to be able to organize working ensembles of designers from several disciplines.” (p.5). Farson, a psychologist by training, draws parallels with that discipline showing how it, too, is a meta form of itself having adopted perspectives from information sciences, systems theory, and neuroscience just as it has influenced other fields itself.

This metadesign language is what Van Patter, Pastor and colleagues at Humantific use in describing the perspective needed to take design to the level of changing systems, not just producing better products and services. They along with Jones (2013) refer to the concept of design in versions much like software, with one building, but not supplanting, the other.

The concept of metadesign could be a way to expand the thinking within the field and increase the possibilities for adoption and further innovation. It could also add further confusion to the term design.

11.3.7 Modeling Practice(s)

This study developed a model for understanding design through the use of Field Theory and multiple means of inquiry. The use of a three-pronged model allowed exploration of the similar and dissimilar elements within the field in a manner that presented the constant, dynamic tension that exists between domains. For example, Professional Design conflicts with Design Thinking largely due to perceptions of one overstepping the bounds and potentially usurping influence from the other. Yet, Critical Design is not in such a space as it is less threatening to Professional Design. Many fields of practice -- medicine, education, and psychology -- have similar relations where there exists a dominant professionalized realm, an emergent realm that seeks to build on the tradition, yet alter the practice for a different context (creating tensions and eliciting the perceived need for protections like licensure and registration), and a realm that is so different as to not threaten the profession. This is the case with Professional Design, Design Thinking and Critical Design. The model presented in Figure 2 illustrates the potential ways these relations might unfold within and beyond domains and fields.

There is potential to use this method of graphing practice, understanding tensions, and exploring the liminal spaces within and between fields is considerable in aiding our understanding of how diverse groups work to address complex problems. This model differs from other taxonomies or conceptualizations of

professional practice and discipline in that it focuses on clustering activity around attractors and recognizing that such attractors have differential pulls on each other. Thus, we see the tensions between some pairs of domains (e.g., Professional Design and Design Thinking), affinity in difference between others (e.g., Professional Design and Critical Design), and indifference (Critical Design and Design Thinking). This model appears to fit other fields on the surface and the next step would be to apply it fully.

11.4 Limitations

This study is intended to be a provocation through systematic investigative means and not an intervention aimed at resolving the conflicts within the field. Although the inquiry faithfully and rigorously adhered to the chosen methods, there are notable limitations to the findings and conclusions. Most of the findings are limited by the absence of clear, defined, concepts for the various design fields and practices that have wide agreement or sufficient specificity. This absence of clear definitions means that some useful sources may have been missed in the review.

The concept mapping approach relied on opinion-driven data estimates, which are limited by the experience and perception of each of the three domains, which were also derived from opinion as well as the literature. For example, it could be argued that domains like Professional Design are too diverse to cluster. However, the review of the literature in all forms finds a lack of documentation on definitions of design professions, Design Thinking, and other design concepts enough that aspiring to something highly precise to form decision rules that are not arbitrary is

impossible. Given the role of this paper as a provocation, such effort was deemed non-productive.

A further limitation is that the rankings were subjective and that it is possible that others with different perspectives might rank and thus plot the data in a different manner.

It may also be argued that the choice to use Professional Design, Design Thinking and Critical Design as the domains is too restrictive. Returning to the previous point, the noted absence of widely agreed, operational definitions made it difficult to envision other domains that had more congruence than the ones presented here. There are numerous other ways of conceiving design. Yee, Jeffries and Tan (2013) sought to map a field of design using case studies and organized them using the following categories: 1) Design research, 2) Design art, 3) Products / Design Futures, 4) Social Design, 5) Design of Services, 6) Strategy / Design / Innovation. The inclusion of Design art makes this taxonomy more attractive, however the insufficient detail on the definition of each of these makes this a recommendation for future work rather than a practical current solution.

11.5 Next Steps

The use Lewin's Field Theory to describe the space in which the creative act we call design exists allows for connections between practices that are disparate at one level to be positioned collectively and interpreted as a whole using theory and data to serve as the organizing principle. While there are exceptions to the way practices are realized in the way they are presented as theories or approaches, what makes design a field is the common elements shared and clustered within that liminal

space. This paper argues that understanding that space is a key to finding unity and allowing for greater participation in design in order for more people to realize its benefits.

As an inquiry, this project provides further questions of method. The clustering of the items were done qualitatively, it would be worth considering a formal psychometrically driven study employing confirmatory factor analysis to see how the clusters match up. The internal consistency of the clusters was generally good with individual variables sorting according to conceptual fit (e.g., designer-centred variables formed a cluster rather than were dispersed), however two of the clusters features items that didn't fully fit with the resulting model. In a psychometric study it would be more easily possible to confirm the relationship and accuracy of the clustering. Another option would be to do the same type of ranking with others who see themselves as familiar with the three domains of design and aggregate the rankings to provide a more robust dataset comparative across people. Taking this model and applying it to other fields is a reasonable next step.

This project has aimed to describe the field from someone who has found themselves inhabiting the liminal space in the field, at times identifying with practices and ideas in each of the three domains, yet at home in none. The liminal space between these domains is where much of the innovation potential of the field lays and where designers often find themselves. It is in 'the spaces between' that emergent forms of knowledge are generated and where established practices, titles and power hold less sway opening up possibility for new participants and new thinking. As we consider design the space of *creation for reproduction* it is worth returning to Van Alstyne and Logan's description of the designer's 'bottom line':

“Purpose must be the starting point, the motivating factor. Next the materials must be in place, the elements that go into the design. Then the designer must catalyze the process so that the elements of the design self-organize into a pattern that can achieve the purpose or *telos* of the design.

These four elements represent the four causes of Aristotle: material, formal (the pattern), efficient (the designer), and final or *telos* cause (the purpose). The designer is the efficient cause trying to make the final cause -- the purpose. Designing is causing.” (p. 92, italics in original).

How this field organizes itself and expresses its *telos* will determine its emergent properties. Change sits at the centre of this field and the designer is the *telos* behind it. By understanding the fundamental patterns that shape both the field and the actors operating within it, we may better channel the causes and consequences of design to shape the world in harmony with natural systems and human desires. Doing so may offer our world means of addressing the increasingly complex problems we face and allow humans -- designers -- to flourish in our states of systems change rather than be subsumed by it.

There is much at stake if we do not clarify what design offers to the world. It risks marginalizing a field that has great potential to address problems in a human-centred manner that meets both needs and desires and also recognizes and works with complexity. Few other fields offer this. As an increasing level of complexity finds its way into more areas of our society and environment tools, approaches and strategies will be needed to guide the change we aspire towards, rather than leave us to passively accept those changes complexity thrusts upon us. Design is a field that offers us that hope if we are willing to critically reflect on what it is, what it does, and what is needed to do it well. By contemplating and revealing such things

we invite the world into design rather than just ask it to passively accept and consume its products. In doing so, we offer hope of fostering the change we seek in the world and make designers of us all.

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Appendix 1: Definitions of Design & Design Thinking

Selected definitions of design and Design Thinking:

A1.1 Design:

- “A designer is an emerging synthesis of artist, inventor, mechanic, objective economist and evolutionary strategist” - Buckminster Fuller
- Design is the conscious effort to impose a meaningful order - Victor Papanek (1985)
- Utility enhanced by significance - Nigel Cross (2011)
- Design in its simplest form is the activity of creating solutions. - Frank Nuovo (n.d.)
- The application of forethought to action - Race & Torma (1998 -- this is more around urban planning)
- Design is what links creativity and innovation. It shapes ideas to become practical and attractive propositions for users or customers. Design may be described as creativity deployed to a specific end - Sir George Cox
- Design is a plan for arranging elements in such a way as best to accomplish a particular purpose. - Charles Eames
- "Design is to design a design to produce a design" - John Heskett John Heskett (2005), in *Design: a very short introduction*, Oxford University Press: New York, NY
- “Good design is a Renaissance attitude that combines technology, cognitive science, human need and beauty to produce something.” - Paola Antonelli (2001), curator of architecture and design, Museum of Modern Art, New York, in *A Conversation About The Good, The Bad And The Ugly*
- Design is an expression of the purpose, and it may (if it is good enough) later be judged as art; design depends largely on constraints and it is a method of action (there are always constraints and these usually include ethic). - Charles Eames
- To design is to communicate clearly by whatever means you can control or master. - Milton Glaser

- Creativity is allowing yourself to make mistakes. Design is knowing which ones to keep. - Scott Adams
- Design is in everything we make, but it's also between those things. It's a mix of craft, science, storytelling, propaganda, and philosophy. - Erik Adegard
- Design is not just what it looks like and feels like. Design is how it works. - Steve Jobs (2003), as quoted in Rob Walker, "The Guts of a New Machine", *The New York Times Magazine*, 30 November 2003
- Good design is also an act of communication between the designer and the user, except that all the communication has to come about by the appearance of the device itself. The device must explain itself. - Donald Norman (2002), *The Design of Everyday Things*, Introduction to the 2002 Edition

A1.2 Design Thinking:

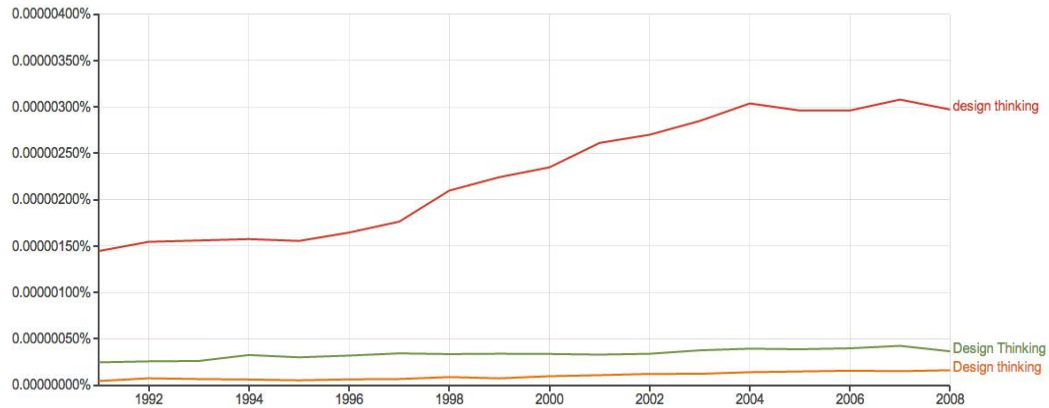
- Design Thinking is something inherent within human cognition: it is a key part of what makes us human - Nigel Cross (2011)
- Design Thinking is what people do when they pursue their goals...Design Thinking is a more powerful, comprehensive and creative form of purposeful thinking that can be applied to interpret or resolve complex, confusing, or unanticipated situations whenever and however they occur. - Charles Burnett, idesignthinking.com
- Design Thinking is an essential mental process in accelerating and promoting innovation. Design Thinking essentially brings together observation and imagination. - Mayo Clinic Center for Innovation
- Design Thinking can be described as a discipline that uses the designer's sensibility 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 - Tim Brown, IDEO
- Design Thinking is a human-centered innovation process that emphasizes observation, collaboration, fast learning, visualization of ideas, rapid concept prototyping, and concurrent business analysis - Thomas Lockwood (2009).

A1.3 Critical Design

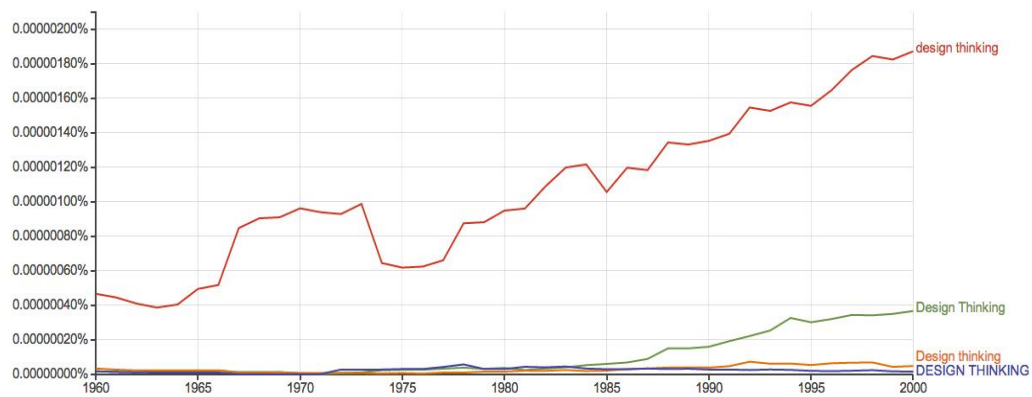
- Critical Design uses designed artifacts as an embodied critique or commentary on consumer culture. Both the designed artifact (and subsequent use) and the process of designing such an artifact causes reflection on existing values, mores, and practices in a culture. A Critical Design will often challenge its audience's preconceptions and expectations thereby provoking new ways of thinking about the object, its use, and the surrounding environment. Critical Designers generally believe design that provokes, inspires, makes us think, and questions fundamental assumptions can make a valuable contribution to debates about the role technology plays in everyday life. - Wikipedia, December 1, 2013
- Critical Design uses speculative design proposals to challenge narrow assumptions, preconceptions and givens about the role products play in everyday life. It is more of an attitude than anything else, a position rather than a method. There are many people doing this who have never heard of the term Critical Design and who have their own way of describing what they do. Naming it Critical Design is simply a useful way of making this activity more visible and subject to discussion and debate. Its opposite is affirmative design: design that reinforces the status quo - Anthony Dunne & Fiona Raby
- Critical Design is a form of research aimed at leveraging designs to make consumers more critical about their everyday lives, and in particular how their lives are mediated by assumptions, values, ideologies, and behavioral norms inscribed in designs - Bardzell & Bardzell (2013)

Appendix 2: Design Thinking Search Results

Google N-Gram Search: “Design Thinking” (case insensitive) 1990 - 2008



Google N-Gram Search: “Design Thinking” (case insensitive) 1960 - 2000



Appendix 3: Autoethnographic Detailed Report

A3-1: Boundary conditions

A3-1.1. Boundary conditions

Throughout the project I found myself struggling with what *could be* and what *ought to be* and negotiating those boundaries. Further complicating matters was that there was no clear sense of either at the same time.

After my first full meeting with the committee, there was agreement among all of us that this project was ‘half finished’ in that the document only illustrated a partial view of the final product. At that stage, most of the synthesis was missing. We all agreed that this was the case, yet the document was already over 25 pages of text, which expanded the perception of how long this final document would or could become. I knew that I could easily write much more and that the findings, which I was putting together, had the potential to be far more expansive in the text.

I struggled with how to address this from a design standpoint. Design offers many seductive options for expressing ideas, however depending on whether one operates within the domain of Professional Design, Design Thinking, or Critical Design shapes what kind of boundaries constrain and facilitate this creativity. What I learned was that the lack of definition as to what kind of project this was, often hindered the creative process. Unclear boundaries are not desirable.

One of the issues I was challenged with was presentation of findings. I know that graphical information has great potential to convey more in a smaller space than text. However, the data has to fit the medium. Further, I need the skills to

present the data in a particular was. I was constantly finding myself wrestling with the tools, the demands, the ideas and the time available. I was surprised that this tension hasn't been more explored in the literature. It is almost always mentioned, but rarely is it explored.

A3-1.2 Setting and tools

My relationship with the tools and the setting mattered a great deal. I work from home or at a shared space at the Centre for Social Innovation and definitely experienced a difference in what was created and where. My home was my studio and had computers, tablets, second screens, a mobile whiteboard, books, and notebooks. I work at my desk and my kitchen table simultaneously. The ability to leave ideas up on a board, notebooks open to a page, or books propped up nearby was key. Ideas came and went, but having the artifacts nearby at a moment's notice was enormously important. It suggested to me that the role of the studio is a crucial element to design. My shared desk space was less useful for the kind of expansive work that design demanded of me.

"I am listening to Yves Behar being interviewed on Monocle 24 talking to Andrew Tuck speak about growing up in Switzerland and moving to San Francisco...Behar spoke about San Francisco's strong desire for change -- not doing what has been done before". (13/10/03). For Behar, the spirit of San Francisco was what shaped his designs somewhat by creating the creative culture that spurs new kinds of thinking. I was constantly reflecting on the role of the setting – Centre for Social Innovation, OCADU, downtown Toronto, Canada – in shaping not just what I thought about, but how.

Yet, in that same entry I noted how the week before I had the opportunity to interact with Tyree Guyton of the Heidelberg Project in Detroit, who made a point of emphasizing the role of place in design and (perhaps ironically) spoke of a love of Switzerland, partly for the reasons that it is a space that has some consistency. Both designers point to different creation-scapes as their preference.

A3-1.3 Time and chance

Time is the perpetual limit facing nearly any human creation, save for Catalan architect Antoni Gaudí's *Sagrada Família* in Barcelona, which remains perpetually under construction. Much has been written about how deadlines can focus the mind.

As I closed in on the final date for my MRP I found myself contemplating the role that time plays in shaping the design process. I began the formal work on the MRP looking at how Design Thinking was manifest in different conditions and the tension between Design Thinking and Professional Design. Compared with my peers, my thinking and preparation was quite advanced in that I had been mulling over this subject area since beginning the SFI program, even if the specifics of the topic were unclear. The addition or revelation of the third domain in the design field of Critical Design was something that I believed only could have come to fruition because I spent the time contemplating the topic for the time I did.

Professional Design is largely driven by the brief, although this might be said for Design Thinking, too. However, what I found myself meditating on was the term 'rapid prototyping' which is so common in the Design Thinking literature along with phrases like IDEO's 'fail faster to succeed sooner'.

“There is an almost fetishistic entrancement with rapid prototyping”

(13/08/15)

I have struggled to understand how a domain that stressed the need for good problem framing and finding could be so distracted by *rapid* prototyping.

I also reflected on how the emphasis on rapid prototyping is a very North American concept. Having spent two weeks touring Finland and Italy in June 2013 with a view to learning more about their approach to design it was hard not to think how those places were shaped using different time scales. Returning from that trip I wrote:

Speaking with architects and designers in Italy it was clear that the thinking — the Design Thinking — that goes into developing, restoring or transforming things today builds time into the plans differently than is visible in much of the popular discourse (in North America). That translates in Italian design to taking the time to know history, know places, and understand the context in which a design is implemented.

Yet Finland, a far younger society, has also managed to do this in a different way by anchoring its design and architecture to its natural environment. The Finns take great pride in building structures and environments that fit with the land they call home and the lifestyle they wish to lead. (13/07/11)

A3-2 The role of the designer

The product and my role to it was another key emergent condition in my self-reflective process.

A3-2.1 Personal permission

“I have a fear of putting things out into the world that have a sense of me into it. When Steve Jobs suggested that the typeface mattered in the early

days of the Mac he had a sense of power and a personality for how to force things on to people; that power got things done.” (13/09/22)

I continued that line of thinking the next day when I wrote:

“Creating is a hard thing. In reading through books and journals it is remarkable how much has been put down that looks at design and making...yet having that knowledge doesn’t make doing it any easier”
(13/09/23)

At the time I was making a concerted effort to spend time visualizing the thesis of my paper not only to expand my thinking, but to live out the very design principles that I was reading about and sought to learn more about. Around that same time I saw a talk by Bill Buxton who spoke on the necessity of sketching for good interaction design. His point was well made, but it seems that there is an assumption that people feel it is OK to do this and have it encouraged. It is what Sunni Brown talks about in encouraging people to doodle in her TED talk on the subject.

It is also what David and Tom Kelley (2013) caught on to as they wrote their book *Creative Confidence*, which was released during the writing of this paper. I don’t fully submit to their thesis that it is mostly confidence, rather I see the role of permission-giving as a better example -- for me anyway. I know I can sketch and do visualization and do it with my clients and students at any time. What I don’t do is give myself permission to do it for fun or in place of other ways of expressing myself.

In sharing this observation with colleagues I’ve noted that it is far from unique and that many other designerly professionals struggle with creation.

Whether or not it is a matter of confidence, permission or some other contributing factor, the sheer power of this force in preventing creative expression suggests to me that it is something that design educators and facilitators need to take seriously.

A3-2.2 Level of work detail / work styles

In playing with ideas and using different strategies to explore them aimed at emulating the practices of Professional Designers, design thinkers and Critical Design practitioners I came to realize that the choice to align oneself with each of these areas is as much about the work style preference as it is the problems that one uses design to solve.

“I simply don’t have the patience to embrace the minutiae of programming no matter how many resources I have at my disposal” (13/11/02) was what I wrote when I began visioning my ideas out in sketched form and contemplated ways to make the data I had and my ideas look good digitally.

I had been exploring the use of Processing, a programming tool, something I had been introduced in my course on Data Visualization at OCADU. In contemplating what many design professionals are required to do, I began to notice how each domain in design requires a slightly different aptitude for treatment of detail in the way they systematically think of their material. Professional Designers often have to spend much energy focused on technical skills and finer-grained details.

When I was producing sketches or rendering graphical models I was required to spend much of my cognitive and creative energies on using tools and techniques like Adobe Illustrator or focusing on things like my use of shadow and

colour in my sketches. This mode of work is less appealing to me largely because I am less comfortable focusing my attention at the micro level.

Design Thinking required more attention at the meso level. When using ideation and visualization methods through a Design Thinking approach there was less need for specificity in technique and more in paying attention to the spaces where each artifact could connect an idea to an action, even if it was partly abstract. This was the area that was most familiar to my experiences in the SFI program.

I found the most challenge to execute, yet the most comfortable space to think was in the Critical Design space. It suggests that we ought to train people to learn more about their thinking preferences and explore what they mean for various tasks, much like the SFI program assesses learners' work preferences and uses that information to partially shape the learning experience.

A3-2.3 Training

My experience as a teacher and learner of design as written here placed a large amount of attention on training.

I found myself drawing on three distinct experiences in the SFI program that aided my design exploration with the MRP: 1) Giga-mapping in the systems course, 2) Foresight methods, and 3) an artful (almost critical) design experience in our Leadership experience. Giga-mapping was useful in that it gave permission and encouragement for pulling together disparate media forms in a systems-oriented manner that I found helpful in breaking my thinking away from more siloed system mapping approaches. Foresight as a series of methods encourages fantastical thinking about imaginations rooted in data, which was liberating given that most of

my previous work had focused on data alone. And the critical art project that was part of the leadership course gave me a chance to work collaboratively on a piece that was purposeful, open to method and interpretation and functional as well.

I brought some of these together in developing visual idea prototypes early in the MRP-development process.

A3-3 User engagement

The engagement with the intended user of a product or service also stood out throughout my notes and observations.

A3-3.1 Depth of engagement

In reflecting on my major motivations, the Critical Design experiences were the ones that stood out. I have powerful memories of seeing in Toronto *According to What?* and *Massive Change* (as well as Vancouver), *Talk to Me* at MOMA in New York City, *Hyperlinks* in Chicago, *The Heidelberg Project* in Detroit, and participating in ZEDTO's *Byologyc* experience as part of Nuit Blanche 2012. These had a profound effect on the way I saw my world, which is exactly the impact that Critical Design seeks. Indeed, these exhibits did a better job of illustrating complexity than anything other designed object or experience I know of.

I experienced *According to What?* and visited the Heidelberg Project during the course of this project. Some of this engagement is through raising consciousness and seeing possibility in objects, relationships, situations and the design process itself. Tyree Guyton uses reclaimed and found objects as material for his work. He takes objects that were designed for one purpose that is no longer useful and

transforms that into something that is new and adds value in a way that was beyond the original product designer's intent.

A3-3.2 Building to last

In speaking with Greg Van Alstyne about his experience with Massive Change it occurred to me that there is nothing left of that remarkable project in a tangible form that resembles the original exhibition. Unlike an art exhibit that often features pieces that can be re-shown or appreciated as independent works on their own, Critical Design has a vanishing quality to it. In reflecting back about that conversation I went home and opened up the books that I had in my library from nearly all of the aforementioned major Critical Design events I had participated in. There was something about going through these books and seeing the works again that brought insight into the way I saw (critical) design and its role in profoundly shaping social attitudes in an engaging way.

A3-4 Defining quality

Exploring design brings questions about what good design is. In contemplating that question I found myself returning to an explanation of "sense of community" that psychologist Seymour Sarason made: "You know it when you have it and when you don't". In addition to his widely debated definition of a designer, Herb Simon was known for the concept of satisficing; doing good enough work to meet a sufficient threshold. Another quote that I recalled in doing my design work was from filmmaker George Lucas who said films aren't finished, they are abandoned. With rare exception, design is about satisficing and abandonment and I spent

considerable time exploring this. The biggest question was: what was the threshold that was good enough?

A3-4.1 Wild West or Bust

Coming from an applied science background I am used to drawing on evidence at the beginning of an inquiry and throughout the lifespan of a project. Yet, in innovative contexts innovation might be lacking. One of my attractions to design is that it doesn't let lack of evidence limit its sense of possibility. At the same time, I bristle at some of the claims made by designers and their grasping attempts to legitimize things. One term that I find is most ripe with insecurity is design research, which might fall anywhere within the design field across all of the three domains. One particular day had me noticing this more than usual:

“Reading Nelson and Stolterman reveals a powerful insecurity among the design fields. There is this almost desperate need to be perceived as a science or the solution generator. There is this sense of finding the ultimate truth through design.” (13/10/02). At the time I was reading this book I had just gone through a series of documents looking at the relationship between design and science and finding the arguments horribly lacking in credibility from a scientific standpoint. The above note is important because it came from a trigger to some of the language they were using and was written after a day of frustration. I have had much respect for Nelson's work and the systems approach that they take to design, yet on this day was finding the early part of their arguments problematic enough to write down that frustration.

Later, I would write: “Further reading of Nelson and Stolterman has me more convinced that they captured a broad sense of what design is all about” (13/10/02).

In an earlier moment I’d lost patience with a field that appeared to be using terms that I was familiar with in ways that were incorrect, incomplete or incomprehensible.

The absence of justification for positions in design is something I repeatedly encountered during my investigation. The hubris of many designers or design thinkers is unnerving given that there is relatively little hard, empirical evidence to support the claims that design is changing the world. Yet, I believe in its power. I believe design is capable of changing the world, hence my reason for getting involved in it. Yet, there is a frustration seeing texts that have little in the way of references and anecdotes listed as fact. Most case studies discuss little of the theory, method or past work that informed them and insights are treated as self-evident to the expert designer.

What made this frustrating was a lack of example for how to cite material or reference works when most of the practice literature is devoid of good examples. It is as Austin Howe (2011) cheekily refers in his book: designers don’t have influences. I wrote extensively in my notes and asked questions about how I could expect to be taken seriously in the health sector if there was no way to cite where my influences came from.

A3-4.2 Best vs rest

A related observation was one that pertained to the assessment of quality in design and whether it was better to focus on exemplars or common practice. If the former, then how would I know what exemplary is? Would I rely on the perspective of experts, which means accepting such vague proclamations such as Dieter Rams' "design is as little design as possible" as truths? One of the most challenging aspects of this project was determining what to focus on in terms of 'best' vs 'common' practice. Not surprisingly, there is an emphasis in the literature on ideal practice. Jeanne Liedtka, speaking at the Rotman School of Business and author of one of the only published models of Design Thinking notes the irony that her models for the non-linear practice of iterative development in Design Thinking are all presented as linear (November 5, 2013). However, speaking to a business audience she noted that a linear method of presentation is what is most understood and accepted in business. This perspective speaks to the tension between what is expected, what is published, and what is practiced and how they differ greatly. Does design thinking live up to its own values by using linear models to represent non-linear processes or shortcuts to represent deeper concepts?

In my personal work I aimed to conduct exemplary practice in developing this project even if the outcome would inevitably reflect some form of satisficing. What was challenging was going into some depth about defining what was exemplary practice. Disciplines like graphic design have an enormous corpus of literature on what makes for effective products and messages, yet this appears rooted in conjecture as much as any empirical evidence. In producing my own sketches and models I found that there is an aesthetic quality that has a feel that can't be easily quantified, if at all. This might be that elusive quality of 'good design'.

It left me wondering what methods or approaches we could use to assess and evaluate design to answer some of these questions.

A3-4.3 Challenges with the abstract

The initial work on this project looked at the tension between Professional Design and Design Thinking. However, the complexity of the space between them and in which design takes place demanded that a more sophisticated perspective be adopted. Complexity abhors dichotomies and my analysis was proving this: something was missing. It was on a visit to Detroit and a tour of the Heidelberg Project that the missing link became evident:

“I have so far been considering a space between Design Thinking and (professional) design, but there may be a third space for creative thinking. Tyree Guyton and The Heidelberg Project are designing consciousness through art. Where does this fit? In many ways it is about discovery and purpose. It has the elements of design -- a structured method for producing a product, but the product is ambiguous.” (13/10/01)

The ambiguity in Critical Design and much of Design Thinking is a challenge for expressing its approach and outcomes. It is quite likely why Design Thinking has struggled to find a definition to describe itself.