Drawing on the Write Things: Finding the Hidden Needs in Design

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Abstract

This research will demonstrate how insights are generated in anthropology and design through the process of data gathering and data analysis towards making meaning. By making the tacit knowledge embedded in practice more explicit and comparing that to observations made by researchers I will explain why certain practices work better for insight generation from qualitative data. This research will also show that the current design pedagogy approach of separating data analysis from data gathering may be premature, and that, in fact, the analysis of data should intertwine with the gathering. What will be shown is that the process of asking questions and rigorous meaning making is what helps designers and anthropologists to frame research problems and make sense of the large amounts of data that go into any project, and that many of the methods used in both disciplines are of use to designers learning research methods.

Keywords: Qualitative research methods; Design research methods; Iterative design; Participant observation

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Ch. 1 – Introduction

1.1 Background to Research Plan

Over the past few decades there has been a steady interest in the process how to better recognize meaningful insights about users that designers can use to create better products and/or services for those users. Product offerings have become more varied and complex so that the need for more accurate information about end users has pushed the discipline of design to use a greater variety of interdisciplinary approaches and be part of a wider variety of disciplines (Bremner and Rodgers, 2013). Appropriate research methods in design vary in their articulation (for example Crouch and Pearce, 2012; Kumar, 2013; Laurel, 2003) but the process can be visualized as moving from the "fuzzy front end" of data gathering through to the realization of a final design (as illustrated by Figure 1).

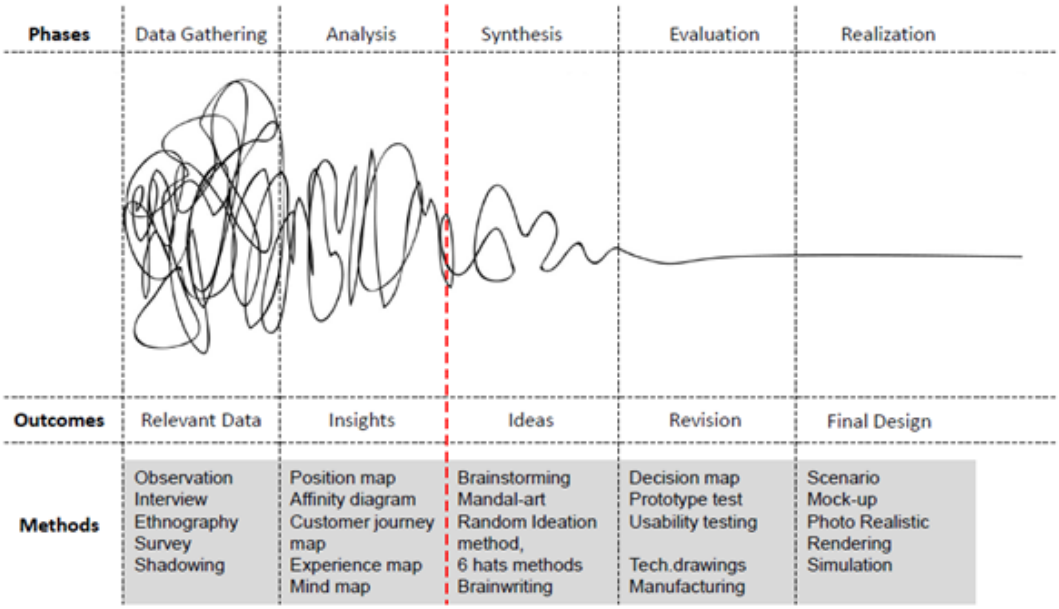


Figure 1 – Visual Conception of Design Process (amalgamated by WonJoon Chung for Studio Class)

Following this conception of the design process, then, we can see that the first two phases of research (data gathering and analysis) provide the relevant data and then insights that serve as the raw material for the designer to develop ideas, prototypes and a final design. The dotted red line in the figure serves to show the demarcation point between the research that designers and non-designers can do as part of the process, while the synthesis, evaluation and realization phases fall firmly into the realm of the designer. The separation of the thinking into phases, much like de Bono's (1985) Thinking Hats, serves as a way to create milestones for students to learn to internalize the problem solving methods that are relevant to the process. While this dividing up the phases of research in the design process is fairly straight-forward, the process of gathering insights from the data in the second phase is not, and there is a tendency by students of industrial design to take gathered observations, survey answers and have difficulty analyzing the data to derive insights (Chung, Personal Communication).

As an MDes student who is also an anthropologist by training, I was drawn to this study of qualitative research in design research by two inter-related, but separate experiences during my time in the MDes program. The first experience was learning about design research methods in my seminar course in my first term; in that course I was struck by this process of separating insight generation from the process of gathering data. For one assignment, we had to bring together suggestions on a particular topic of research. The reliance on visualization of the data, using such methods as affinity diagrams or mind-mapping, did make some connections more obvious than before, but I also found myself using some of the note-taking and field note interpretation techniques I had learned years before as an ethnographer. In addition to this separation of the process,

there was also the frequent use of the term "insight" as a desired goal when observing users or analyzing data – and this term, as near as I could discern, meant anything that was novel or unexpected in your findings.

The second experience occurred when I was having a discussion with my soon to be advisor, WonJoon Chung, about how anthropologists make sense of the qualitative data that they gather and how they recognize "insights" from the data. I replied that anthropologists create those insights when they code their field notes, write their monographs and engage in the ethnographic enterprise. This statement, "we just create them", came as a shock and prompted an excellent discussion about how undergraduate design students tended to use ethnographic techniques to get "answers" from users and taking their statements as "the insight", according to Dr. Chung (Chung, Personal Communication)

This experience, coupled with numerous conversations with my design professors and fellow design students, convinced me that something is missing from the data gathering and analysis phases that might make the process of generating insights from data more effective and relevant to the design process. I knew that I had learned much about qualitative research methods in my years as an anthropology graduate student and as an applied anthropologist, but I needed to be sure that my impressions of both the anthropology and the design fields was based on experts and the literature and not just my personal observations. My review of the literature suggests that there are four major themes surrounding the process of gaining "insights" in anthropology and design:

1. the use of participant observation/interviewing/surveying to gain information from users,

2. the process of making the intangible more tangible,
3. the iterative process of meaning making
4. the impact of goals and outcomes on the process of research

This research reveals that the process of insights may be something that one generates through the process of researching, designing and testing one's ideas. To this end I to seek to better understand the use of the term "insight", as it is sometimes used in design research, and "meaning making" as it is sometimes used in anthropology.

1.2 Hypothesis and Research Methods

My working hypothesis, based on the literature, is: "insights" are not something one finds 'out there' but rather are part of the active rational process of making sense of one's data to make it meaningful. Furthermore, this process of active meaning making can work with writing as well as with objects (following the process outlined by Biggs and Buchler, 2012). Anthropology also uses processes of active meaning making, but they appear to articulate that process of "insights" around "meaning".

There are three questions that I will answer with this research study:

- How do anthropologists and designers develop insights from their research data?
    - Do they have methods for verifying those insights, particularly with qualitative data?
- How do anthropologists and designers frame their observations?
    - Is it strictly through qualitative or quantitative approaches?
- How do students of design understand the process of insight recognition, fieldwork and data analysis
    - How could design pedagogy be improved for them?

Semi-structured interview questions (Appendix 1) were asked of a mix of subject matter experts in anthropology and design as well as design students (Le Compte and

Schensul, 1999; Spradley, 1980). The everyday practice realities of the subject matter experts were then compared both to the literature and the realities of the Third Year design students who are learning research methods for the first time in a series of matrices summarizing their results (Appendices 5, 6, 7).

1.3 Outcomes

This research will demonstrate how "insights" are generated in anthropology and design through the process of data gathering and data analysis towards making meaning. By making the tacit knowledge embedded in practice more explicit and comparing that to observations made by researchers I will explain why certain practices work better for insight generation from qualitative data. This research will also show that the current design pedagogy approach of separating data analysis from data gathering may be premature, and that, in fact, the analysis of data should intertwine with the gathering. What will be shown is that the process of asking questions and rigorous meaning making is what helps designers and anthropologists to frame research problems and make sense of the large amounts of data that go into any project, and that many of the methods used in both disciplines are of use to designers learning research methods.

Chapter 2 – Literature Review

Design researchers have worked to develop more effective practices and methods for uncovering meaningful insights about people and how those insights could be used to inform better products or processes. Design research has already borrowed from other disciplines like cognitive science, psychology and, more recently, anthropology to help provide additional tools to understand people and gain valuable insights. While both anthropologists and design researchers have much to offer each other, they do have somewhat different objectives and ways of using techniques of understanding others; this literature review serves as an overview of the similarities and differences between anthropology and design with regards to developing those insights, including the methods of participant observation, recording information, creating prototypes and iterative models of their findings to create physical and/or written products. Throughout the process, the modes of reasoning that both design researchers and anthropologists share help with the realization and articulation of meaningful insights – and this process is one that is essential to inter-linking all of the other parts of the research cycle.

2.1 – Participant Observation

Observations from the literature show that the process of data gathering for both anthropologists and designers involves similar techniques of observation, interviewing and surveying of people to understand what they are doing and why they do it. The practice of participant observation is a critical part of the process of determining what people actually do, both by sharing in activities and by knowing what questions to ask – getting at 'why' people do what they do, and this is of interest to both anthropologists and

designers. The main difference in approach to participant observation lies with the amount of time spent and the intent of the observation.

Anthropologists use participant observation to engage with people and cultures to understand how they order things in different ways (for example, ritual objects compared to everyday objects) but also how people are ordered by things (such as reciprocity systems and gift giving) and how they use things to invest the world with meaning (Miller, 2002, p. 400-417). Ethnographic fieldwork for anthropologists, however, has a central role in the discipline, and relies heavily on three broad methods – interview, participant observation and direct systematic observation to capture activities in a given scene or community accurately (Johnson, 1998, p. 301-305; Spradley, 1980). This process of 'being in the field', whether in a distant country or with a local community group, necessitates that the anthropologist be constantly "on", or what Breglia (2009) calls the working but not seeming to be working game – constantly observing what people are doing while making notes and jottings at 'break' moments (p. 129-131). The goal of this fieldwork is to understand what people do, what they make and use, and what they think about those things and then to extrapolate what that means about the culture as a whole (Schensul, 1999). As Clifford Geertz (1973) notes, as anthropologists "we begin with our own interpretations of what our informants are up to, or think they are up to, and then systematize those" (p. 15). To be sure that they are, in fact, capturing the "native's point of view", anthropologists take great pains to carry out detailed descriptions but also to learn how to operate in the society, there they will play the role of the "ignorant child" to be open to learning how to become a semi-functional adult in that society, thereby internalizing the norms and values of that society (Schweizer, 1998). This process is

slow and involved, because much of learning of people's lives is tacit and at the level of the body – you must do to understand (DeWalt et al., 1998, p. 264).

Typically, anthropologists will spend much more time with those that they are working with – partly because the process of field work requires the revising of partial formulations and negotiating your way from "unobtrusive observer" to "full participant" requires weeks or even months to develop the necessary rapport (Blomberg et al., 1993, p. 130-131). Even when anthropologists carry out fieldwork in their own communities, so that they can leave the field each day and then return (such as in office studies or local cultural studies) they still spend hundreds of hours engaging with people (Spradley, 1980, p. 56-58; Wolcott, 1999, p. 38-39; 51). Design researchers, by contrast, typically do not have as long a time window to carry out their fieldwork and analysis – design anthropologists and design researchers both have shorter fieldwork cycles (Otto and Smith, 2013). In many ways the time challenges of design research mirror those of applied anthropologists, who typically have to compress research into tight deadlines to conform with project reports and deadlines for government organizations and/or the needs of industry (Brutti, 2005). These short-term assignments inhibit the close relationship that is typical for anthropology and force a type of 'hybrid-fieldwork' that revolves around rapid assessment techniques and more frequently choreographed interviewing (Robins, 1986).

It is clear that both anthropologists and design researchers use ethnographic field techniques to engage with people and things to better understand the context of that use. Designers' intent for participant observations tends towards the product focus in their research interest, while anthropologists tend to focus more heavily on the social roles and

relationships between people; yet both disciplines show the importance of understanding material culture as a central facet in people's lives. Anthropologists have made fieldwork within other cultures a central facet of their discipline, where they play the role of ignorant child seeking to learn how to be human. Designers, by contrast, often carry out fieldwork in their own cultures with objects and social situations that they might already have strong knowledge about, and they must work through an active process of "defamilarization" to clear out these preconceptions and see products, and those who use them, in a new light (Bell, 2005).

2.2 - Modes of Recording Information

Both anthropologists and design researchers take their data gathered through their observations and seek to make the intangible things they've observed and thought more tangible to both themselves and others. Both designers and anthropologists use a combination of visual and written means to represent their views of other; designers tend towards more visual approaches and anthropologists more writing, but both fields have strong uses of visual and written materials in their practice. What is interesting about this process is that the work of making the observed reality clear requires the active engagement of the researcher, though the ability to switch between mediums is what shapes how that reality is represented and, as we will see in the next section, shapes what it means.

Design research methods typically emphasize visual methods for analyzing the data gathered from ethnographic field techniques; these visual methods of analysis include position mapping, affinity diagramming, and mapping the customer journey and experience (Kumar, 2013; Laurel, 2003). Thinking visually is important for design

research, as the process of drawing and sketching is also one of criticism and discovery of possibilities (Cross, 2011, p. 13). Sketching and communicating ideas with images, intertwined with written accounts of observations from users are also commonly used (Kelley, 2001; Ho Lee, 2012). Designers frequently use writing in their daily work to structure project reports and maintain control of day to day aspects of a product's design, from client expectations to team design organization (Boradkar, 2010). Visualization is also important for anthropologists, as they diagram and model cultural domains or share and communicate concepts and ideas.[1] Design anthropologist Mark Dawson notes, "The more you write, the less they read", necessitating the use of ethnographic image boards where still shots from ethnography work are fit with excerpts of field notes to show the data (2002, p. 168-171). Some anthropologists, like Michael Taussig (2011), have called for greater use of drawing in the ethnographic enterprises for making meaning and to serve as "laborious seeing" to break open insights into the cultural world.

Sketching and recording visual information is often used by anthropologists in the field to accurately portray material culture and cultural practices in action – a noted example would be Arthur Bernard Deacon's use of rubbings and sketches during his fieldwork in the Torres Straits Expeditions in the early 20th century (Geismar, 2014), or, more recently, the use of naturalist-realist painting as a means to engage with informants and gain perceptions of everyday life in communities (Bray, 2015). The use of film and photography within the sub-field of visual anthropology has a long tradition of conveying and recording the traditions and details of cultures and practices, from the photography of American Indians by ethnologist Edward S. Curtis around the turn of the 20th century to

[1] One example of participatory mapping in anthropology is its use to study community organization and help in developing appropriate interventions in HIV testing and counseling services in developing countries (Maman et al., 2009).

the ethnographic film making Robert Gardner in Papua New Guinea each has served as another form of field note for discussion (Pink, 2006). Finally, anthropologists have also turned to expressive forms of poetry and art as part of their understanding of how they engage with "the other". John Cove (1985) uses a "native art-style" to convey how he struggled with truly engaging with the Gitksan's culture, where the anthropologist serves as the 'child' being fed by the informant (Figure 2) (p. 8-9), while Dell Hymes (1985) uses of poetry to interpret art and culture (Figure 3) (p. 13).

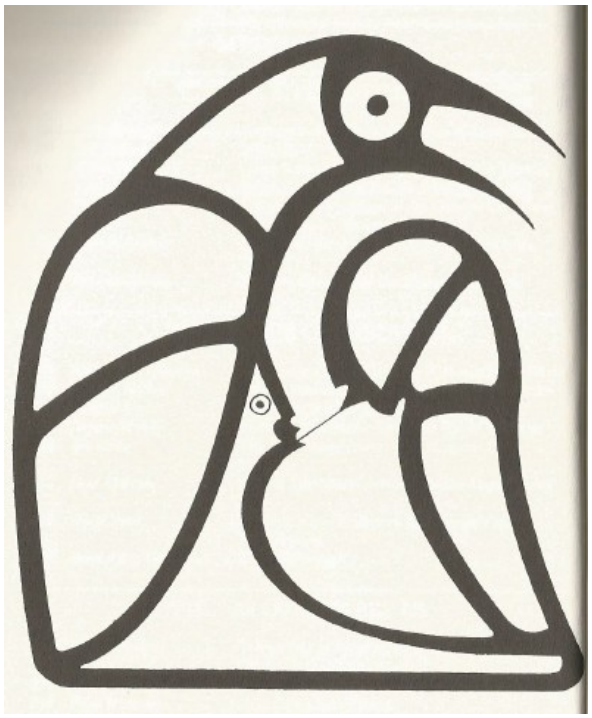
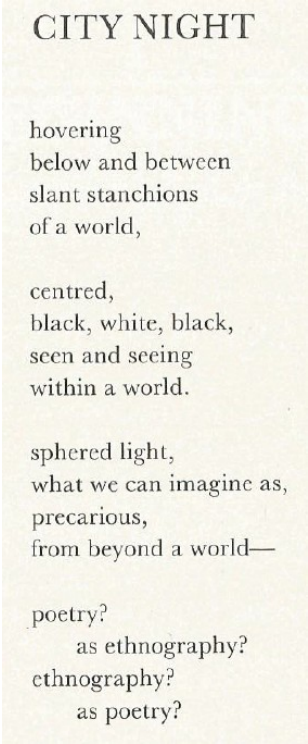


Figure 2 – "Fieldwork" (Cove, 1985, p.8)



CITY NIGHT

hovering
below and between
slant stanchions
of a world,

centred,
black, white, black,
seen and seeing
within a world.

sphered light,
what we can imagine as,
precarious,
from beyond a world—

poetry?
as ethnography?
ethnography?
as poetry?

Figure 3 – "City Night" (Hymes, 1985, p.13)

Anthropologists, however, also rely heavily on writing to record and convey information about the social and material world and, as a result, tend to generate more written information and overall detail as part of their participant observation. Field notes are extremely important, for they serve to record observations and experiences in the

field: from the events observed to the information given, records of prolonged activities and ceremonies, details of people and relationships to each other as well as the anthropologist (DeWalt et al., 1998, p. 270). Typically anthropologists will make very brief 'head notes' or jottings while engaging in activities, so as not to disrupt the flow of events; even when interviewing most accounts are written in quick shorthand to avoid distracting respondents and allow for relatively normal pace of conversation (Emerson et al., 1995, p. 17-31). These "jottings" typically comprise impressions of scenes and other concrete details to serve as a memory trigger; at night the ethnographer will expand upon these notes to capture the immediacy of lived experience and provide the nuances that will be needed when writing the ethnography – so there is a need to keep up with this recording and expanding on a daily basis (Emerson et al., 1995, p. 45-62). The amount of detail thus gathered by an anthropologist can easily amount to thousands of pages of field notes over the course of a few months of research in the field (DeWalt et al., 1995; Emerson et al., 1995; Schensul, 1999).

Both designers and anthropologists work to show what they figure out from their fieldwork and research with people; design researchers use more visual methods to carry out their analysis and capturing of user data, while anthropologists rely more heavily on the written word to capture what they perceive as reality. Each of these disciplines is able to represent a vast amount of information from the social world using these different approaches that demand different ways of thinking. One of the challenges is translating between these different ways of thinking, whether translating the actions and events of people into words or sketches, or translating objects into words – both involve a re-contextualizing of the data gathered, which necessarily involves the creation of meaning.

2.3 – Iteration as Paths to Meaning

The third observation is that both designers and anthropologists continually create meaning through their work, for crafting a product or ethnography is an iterative process of creation towards a meaningful end (Boradkar, 2010b; Wolcott, 1999). Designers use iteration and divergent thinking to create what does not yet exist – which is why design is a fiction (Simon, 1996). This meaning making process is how the researcher frames the situation being studied, based on the data gathered and the problem or project being reviewed. Ethnographies, as Geertz (1973) has also pointed out, are also fictions, as anthropologists guess at the meanings that informants share with them and try to write them down to make sense of them. Throughout a designer or anthropologist's struggle to understand and pull together diverse threads of research, observation and discussion they use words and things to help them along – and this process is how the actively create the insights from the data at hand.

Design problems are typically created with both internal and external constraints, and stem both from client expectations, user research and the designer's perceptions of solutions and issues (Lawson, 1990, p. 67-71). The process of framing the design problem is a conversation carried out between the designer and the client to help ensure that everyone is on the same shared horizon of understanding the issue, and to help with working towards solutions together (Paton and Dorst, 2011, p. 582-583)[2]. This conversation can also be thought of as collaboration between designer and client in a 'shared space" to play with ideas and possibilities and articulate issues more succinctly (Schrage, 2000, p. xiii-xvii). This reflective practice is an on-going iterative process of

[2] Paton and Dorst's (2011) study, for example, show how graphic designers use language and metaphor with story boards to help clients articulate their needs and work towards appropriate solutions; for the designers interviewed, the vast majority preferred this approach to merely being told 'what to do'.

working through the problem and encouraging collaborative approaches which can lead to a better realization of what the client's needs are (Schön, 1983, p. 299-302).

One of the ways that designers will help frame and work through problems is through the use of rough prototypes, or physical models to articulate issues or possibilities; in this capacity low fidelity prototypes can serve as a way to explore concepts or ideas even as users and/or clients are talking about their needs (Cross 1995, p. 106-107; Kelley, 2011, p. 37-40).[3] Much like visual sketching or visual representations of data, prototypes can serve to convey information to others in an effective and convincing manner that allow for new discussions and enhance the process of collaboration about an issue; in effect, the prototype serves as a hypothesis, marketplace and playground (Schrage, 2013, p. 21-26). Prototypes have long been used to help gain feedback from users about a potential product. For example, in the UTOPIA project, Susanne Bødker had users work with paper-based mock-ups to figure out their needs and then used that feedback to construct more realistic prototypes (1991). Prototypes also assist in research into a problem by serving as a way to connect abstract theories to experience, to operationalize hypotheses to evoke discussion and reflection on those theories (Stappers, 2013, p. 86-91).[4] One example of this process was a test by Sanders and Stappers (2008, p. 10-14) where they used a generative prototyping toolkit for figuring out the ideal locations for furniture and equipment in a patient care room with nurses, who were able to envision possibilities more effectively with physical models of

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[3] As Ashley Hall (2011, p. 20) has observed "If design can be summarized as 'thinking to make' then craft may be summarized as 'making to think'".

[4] In one examination of how graphic designers use prototypes to guide their work, for example, the presence of physical prototypes within the range of the designer served to inspire work at the big picture or "large range" and then compare ideas in the smaller picture or "medium range" and focus their ideas at the sketch or model at hand (from Keller 2005, p. 44 – cited in Stappers, 2013).

the room than simply with abstract questioning. These probes and toolkits serve as measures to help participants to discuss and develop ideas that can then be evaluated through prototyping (Sanders and Stappers 2014, p. 10-11) (Figure 4).

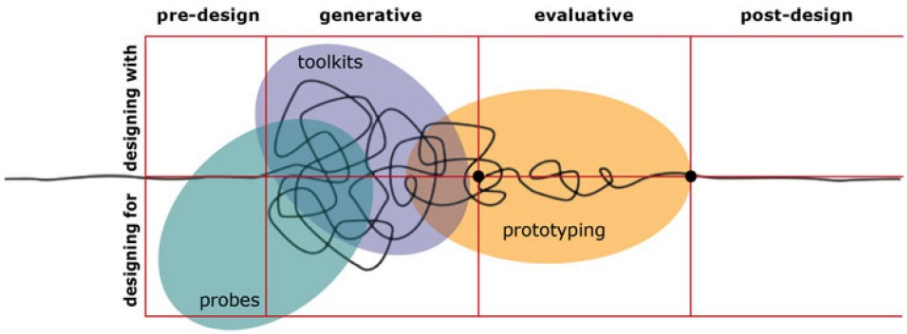

Figure 4 – Use of probes and toolkits to help with generating and refining ideas (Fig 5 in Sanders and Stappers 2014, p. 11)

For design researchers, prototyping is used in two separate phases of the design process, otherwise known as the "double diamond" (Figure 5). The first diamond starts with the insight that is used to ask why and what possibilities exists, expanding the range of possibilities that will then be defined and clarified by creating ideas (ideation) that can be made into exploratory prototypes that can be used to think through those possibilities.

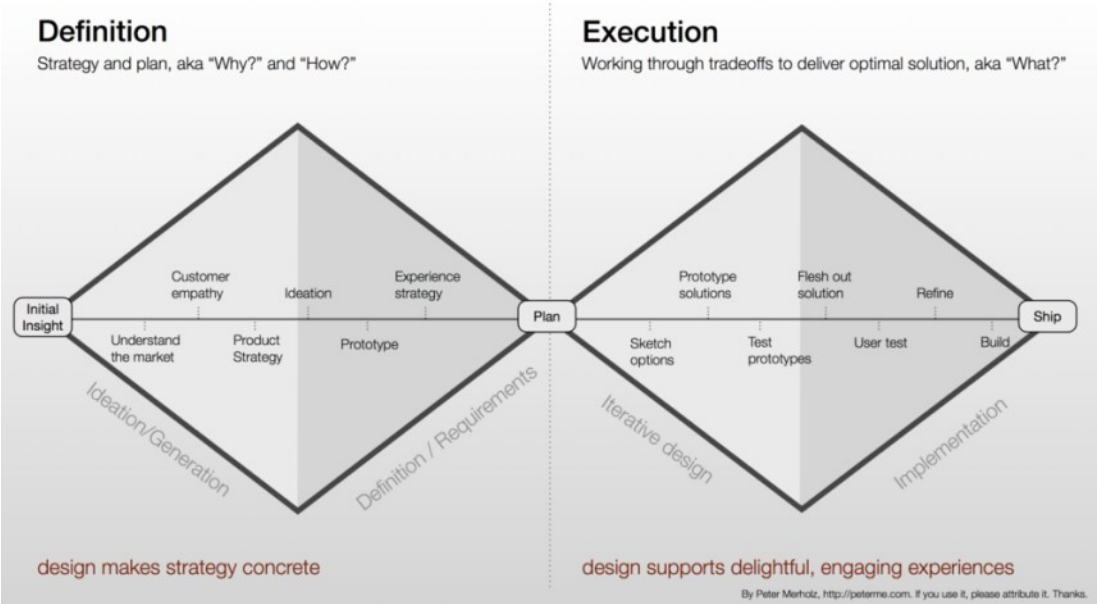

Figure 5 – Double Design Process – Peter Merholz as discussed by Rachel Reynard (2016)

These early prototypes are usually rough forms or mock ups – this process of using low-fidelity prototypes to help users articulate their needs is well served by the example of IDEO who developed a sinus surgery tool and made a quick prototype out of a marker pen, clothespin and film container (Figure 6). As Chung (2009, p. 110-111) notes, this cross-functional prototype served to make tangible a concept that was harder to envision in paper format (left picture in Figure 4 below) as opposed to the physical form that permitted the surgeons to show the design team how they would use the device to carry out their surgery.

Figure 6 – Early prototype for surgery tool (Figure from Chung 2009, p.111 fig 5.1)

Prototypes are then used again in the second stage of the design process, the second diamond where possible forms for the prototype are created and then tested to see which serves the functions required the best (Meynard, 2016). This process of expanding possibilities and synthesizing options is part of the iteration of solutions and testing of ideas; prototyping serves as a means to better understand the problem as well as the solution.

For anthropologists, field notes serve as the raw material for their re-interpretation of their data as they work to write an ethnography that reflects what they have seen and experienced as represents, as nearly as possible, the voices of their informants and those they have observed in the field. Anthropologists observe but also interpret, so that "what we call our data are really our own constructions of other people's constructions of what they and their compatriots are up to" (Geertz, 1973, p. 9). Geertz (1973) borrows Ryle's notion of "thick description" to convey the depth of information that can come from observing social interactions in the broader context of the society and the anthropologist's perceptions of self and others. We can sum up ethnographic description as: "it is interpretive; what it is interpretive of is the flow of social discourse; and the interpreting involved consists in trying to rescue the "said" of such discourse from its perishing occasions and fix it in perusable terms." (Geertz, 1973, p. 20). So field notes are

nonfiction but not fully - "It is creating something, not creating it in the imagination sense, but creating it in terms of bringing it out as a fact." (Jackson, 1990, p. 35)

The process of translating reality to the page is one of mirroring as reality is observed by the anthropologist and then recounted and re-contextualized. Participant observation is an iterative process and field notes are continually read and re-read to catch errors or incomplete information. Field notes have a temporary and conditional cohesion, as they can change as the anthropologist's view of things changes through further fieldwork and further writing (Emerson et al., 1995, p. 98). The whole process of re-writing is the process of putting in order, creating the meaning while pruning out the irrelevant and tightening narratives to explain the overall theme, so "field notes are simultaneously data and analysis" - a dialectic that you create with the informant and by yourself (DeWalt et al., 1998, p. 271). Because the anthropologist serves as the recording instrument for observations, it is common practice to write a separate set of notes (sometimes called a "field diary" or "personal journal") to record one's emotions and personal events during the fieldwork. This field diary serves as a counterpoint to one's ethnographic observations so that interpretations made in the field can be evaluated against how one was feeling (Jackson, 1990).

The process of pulling out the thematic narrative that weaves together the observed incidences and themes that the anthropologist has identified through coding and re-coding their data takes time, but it serves to pull together ideas and to give the ethnographer time to reflect on the broader meaning of the work (Emerson et al., 1995, p. 170-200). This cultural knowledge, both as journal entries, codes and ethnographies is a form of prototype that the anthropologist can use to externalize their thoughts and make

concrete the culture they have studied in (Drazin, 2013, p. 44). Anthropologists will code their data in the field when they rewrite their journal notes at night – often making some small theoretical notes or excerpts about thematic connections in the margins; this process of constituting "ethnographic subjects" serves to steer the anthropologist in their fieldwork, bouncing back and forth between the general and the specific (Fortun, 2009, p. 182-183). The process of writing up field notes and expanding on meanings observed in the field gives "...fieldnote entries...an open-endedness which allows for new information and insights and an unfinished in-progress quality which calls for editing later on" (Emerson, Fretz and Shaw 1995, p. 45).

This coding process will often begin while the anthropologist is still in the field, as a way to sort through events and figure out patterns and areas of interest, and compare that to theoretical perspectives and what one expected to find (LeCompte, 1999, p. 178-181). The creation of codes and sorting of details into perceived cultural domains often results in new questions and ways of looking at the scene – frequently the anthropologist will follow up interviews with other interviews to clarify missing details or look at issues only now seem important to observe (Emerson et al., 1995). This process of re-entry and re-evaluation is part of the iterative process of understanding a culture and also serves to enhance the validity of those observations – one can test one's ideas through asking questions that follow your hypotheses – one example of Koestler (1996) (as cited in Johnson, 1998, p.162-163) shows his direct observations of actual HIV drug users contrasted with interview data on their practices – he would repeat his studies and change his perspectives on needle sharing behavior, as a result.

2.4 – Product or Paper

Anthropology and design both have measures for finding meaningful patterns and insights about people, but they do so from different disciplinary structures and for different reasons. Anthropologists engage in their work to understand the subtle nuances of cultures to both create an ethnographic account that often relates their work to the broader theories of the discipline. Designers, by contrast, have emphasized the methodology of their discipline as both craft and product focus – their work typically begins with the project and ends with the realization of a product solution. These different disciplinary structures and reasons for carrying out the research have an impact on what insights are generated and how they are used, yet both have impacts on the users and informants that are involved.

Anthropologists, over the past few decades, have had to grapple with the epistemological challenges of being in the field and trying to accurately reflect the cultures of others from their perspective. The fact that the research flows through the observations and interpretations of the anthropologist means that the ethnography itself largely "…consists in incorrigible assertion" (Geertz, 1988, p. 5). Trying to represent the lives of others in a compelling fashion means the ethnographer is in the difficult position of having to be a dispassionate scientist and yet literary biographer at the same time. The anthropologist, in writing about the other, writes about themselves and must acknowledge that self-reflexivity while maintaining an objective viewpoint, or risk seeming like they are merely concocting stories (Geertz, 1988, p. 133-140). But ethnography must transport the imagination in order to be effective, because "...the method of ethnography is inseparable from the genre of ethnography. You have to learn to write about what

you're experiencing, what you're witnessing, and that will help us be more innovative in our approach to method (Behar, 2007, p.154).

Writing up the ethnography itself is also a rhetorical activity, for the anthropologist is writing more than a travel book or literary description of a people but is also setting up an approach to improve scientific analysis and insight generation (Atkinson, 1990, p. 25-27). At the same time, the anthropologist must consider how aesthetics shape how thought is structured, and remember the literary adages of show, don't tell, and provide the overview and building up of characters as part of the process of engaging the reader in the process of discovery of the culture (Atkinson, 1990, p. 20-22). Sometimes the styles of writing will be used to illustrate important issues – such as Jock Young (1971) who shows the paradox of deviance to demonstrate how the 'reality' and 'fantasy' of drug taking that is espoused by politicians is ironically a reversal of what actually occurs (as illustrated in Figure 7 below, cited in Atkinson, 1990, p. 171).

	'Reality'	*'Fantasy'*
1	Highly organized bohemian community.	Isolated drug-users in socially disorganized groups.
2	Clear-cut values: hedonism, spontaneity, expressivity, disdain for work, etc.	Asocial, lacking in values; *or* ideologically motivated group of corrupters of the young.
3	Drug-taking irregular: not essential prerequisite to group membership; instrumental and symbolic use of drug. Drugs important, but not central.	Backbone of the culture; all other activities subordinate to it.
4	User and seller not fixed roles, at street level.	Sharp contrast between the 'pusher' and the buyer – between the corrupter and the corrupted.
5	Psychologically stable individuals.	Immature, unstable young people, led astray by pushers.
6	Marijuana users disdain heroin addicts.	Heroin addicts and marijuana users often indistinguishable.
7	Large numbers of marijuana users in Notting Hill.	Small numbers (though perceived as too large and increasingly rapidly).
8	Effects of marijuana, when taken in a supportive culture, mildly euphoric; psychotic effects rare and temporary.	Exaggerated ambivalence: drugs plunge the user into misery, and hold promise of unlimited pleasure: from extreme sexuality, though aggressive criminality, to wildly psychotic episodes.

Figure 7 - Reality and Fantasy of Drug Use (adaptation of Young 1971 by Atkinson, 1990, p. 171)

The use of metaphor is also a common strategy employed by anthropologists and sociologists to encapsulate meaning and reflect on the realities they observe, both in the accounts given by informants as well as their own observations (Lakoff and Johnson, 1980). Our minds work well as associative engines that create mental models, often using emotions as inference, to serve as "...a simple proposition in the premises when the proposition is true in the possibility" (Johnson-Laird, 2006, p. 112). The advantage of mental models are their ability to save working memory; the disadvantage is that we can get the dangerous idea that we grasp possibilities that are actually beyond us, so we must use relationships to judge our models and modify them in the presence of real world constraints (Johnson-Laird, 2006, p. 117-138). In this way we create analogies of problems to make them easier to comprehend, which is why we use metaphors in language to transfer the understanding of one domain of experience in terms of another (Lakoff and Johnson, 1980, p. 117). The use of metaphor allows us to communicate experiences and events in terms that others can grasp both intellectually and emotionally, and it serves to highlight certain features while suppressing others; for example, Amory Lovins has spoken of energy development as being either a "hard path" (uses energy supplies that are inflexible, non-renewable and need military/geopolitical control) versus a "soft path" (use flexible, renewable energy - solar wind, reducing needs) (Lakoff and Johnson, 1980, p. 141-142 and 157). Analogy is the core of cognition, and metaphors serve to help us probe the similarities between disparate objects, which can help us get at the deeper meanings of a product or process (Cummins, 2012; Felton, 2015).

But anthropology is not solely ethnography where the craft of writing or the outcomes of that writing are separate from the purposes of the discipline; anthropology is

also about working with communities to effect change (Ingold, 2008, p. 85-88). Increasingly, collaborative approaches to address issues in developing communities and provide more applied anthropological solutions to relevant problems is serving to help integrate theory and practice, research and training (Lassiter, 2005, p. 83-84). Collaboration in ethnographic fieldwork helps the anthropologist overcome the isolation of working with a host community, and helps those that he/she works with engage in issues that matter to them (Gottlieb, 1995, p. 21-23). Anthropologists have always, to a degree, engaged in collaborative approaches in their work, often showing drafts of ethnographies to informants for commentary, and to increase this participation with focus groups, community feedback and co-written texts is just strengthening that process; collaboration, as Lassiter (2005) notes, provides the anthropologist with the potential to challenge the discipline and provide new ideas for research (p. 94-101). Collaborative and applied approaches to ethnographic fieldwork work in tandem to provide the case study research that allows for broader generalization to larger social processes, which can help to inform policy decisions as well as academic theoretical discussions (Flyvberg, 2006, p. 240). Having good ethnographic fieldwork providing solid case-study evidence and writing the narrative in a compelling manner can clearly demonstrate key issues, and this can do much to advance both our understanding of people as well as influence those who may have an effect on their society.

Design researchers have, more typically, tended to focus on dealing with problem-solving as part of a project-based outcome (Boradkar, 2010a, p. 273-275); the fact that much of design revolves around physical objects, whether for commercial development or for thinking about problems (as discussed in the previous section).

Design, like anthropology, seeks to understand the human condition, but the goal is to produce the products that reflect human wants, desires and aesthetic sensibilities (Boradkar, 2010b). Like anthropology, design has also had to deal with a crisis of defining its role in studying users to create goods that may, or may not, benefit those users; the concern that design must be more scientific has been echoed numerous times over the past several decades and has only intensified as design methods and approaches have been brought into inter-disciplinary projects (Bremner and Rodgers, 2013, p. 4-10). Also, like anthropology, designers have made extensive use of a variety of methods to understand users and the things that they use and activities they undertake: from ethnographic research to narrative stories to case studies and mixed methods, the process of design research works to understand and break down pre-conceived notions about people (Crouch and Pearce, 2012).

As designers have moved into the sphere of dealing with complex sociotechnical systems they have had to increase their coping with the complexity and ambiguity of the design process, or what Norman and Stappers (2015) have termed "Design X Problems" (p. 84). They call on designers to use their skills to deal with the complexities of implementation by divide and conquer, using design methods of framing to break complex problems down into manageable small steps to allow for on-going evaluation and refinement, or what Lindblom has termed "muddling through" (Norman and Stappers, 2015, p. 92). The grand theory of planning may make sense on paper, but the administrator working in the immediate problem must use a system of successive approximation, learning and fixing, so that "policy is not made once and for all; it is made and re-made endlessly" (Lindblom, 1959, p. 86-87).

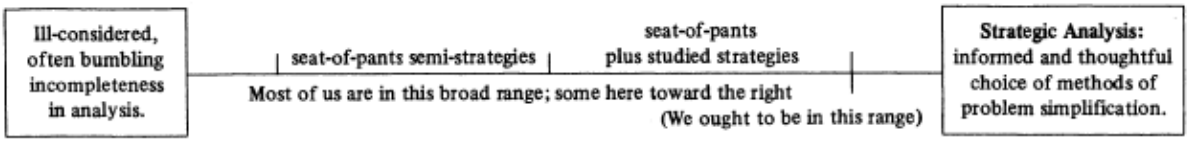

Figure 8 – Disjointed Incrementalism (Lindblom, 1979, p. 519)

At the same time, much like design, there is an over-arching strategy to improve how one approaches future iterations of that policy, or a process of disjointed incrementalism, where you come up with local solutions from "seat-of-pants" experiences but then you learn more about the larger process by observing (Figure 8) (Lindblom, 1979, p. 519).

Throughout the process is an emphasis on working with incomplete information and only an approximation of a good end or simply a "good enough" that will satisfice (after Simon, 1996). Once you break things down, you will get gaps and other issues, but making them manageable will then mean taking the time to pay a lot of attention to social, cultural and political issues of implementation (Norman and Stappers, 2015, p.94). If design research is to be used increasingly to work in the strategic design sphere, as well as in product design, then the emphasis on communication, both visual and written, becomes ever more important (Kolko, 2005, p. 2-4).

2.5 – Theory and Abduction in Design and Anthropology

Human reasoning has developed in light of an imperfect access to information about the world, and the ability to make connections by interacting with that world necessitates the ability to tolerate ambiguity and uncertainty. There are three modes of reasoning that humans use to make sense of the world and anticipate actions: abduction,

induction and deduction[5]. In order to better understand how these modes of reasoning are actually used by designers and anthropologists to develop insights, we shall look more closely at each of these elements to see what role they play in shaping our thinking.

Deduction follows the formal rules of logic, first developed by Aristotle, who stated that "A deduction is speech (logos) in which, certain things having been supposed, something different from those supposed results of necessity because of their being so." (Smith, 2015, p. 3). For example, the statement "All men have minds" is followed by "Bob is a man" therefore "Bob has a mind" is an example of deduction. We use deduction when we know what something is and how it will operate to allow us to predict what will happen, and this is a core skill within science to inform justification for a particular hypothesis (Dorst, 2011, p. 523)[6]. The fact that we can predict that a ball will fall down when we release it from our hands, even if we've never dropped that particular ball before, is an example of deductive logic – we apply the Law of Gravity to explain why something will fall. A deductive argument, then, is one that logically guarantees the truth of conclusion and can't offer new findings on these conclusions.

Generalization and abstraction are key elements of the mind's operation, for it allows us to reason from samples, and all of our knowledge is based on observed facts. Induction can lead to assumptions, such as "induction by enumeration" where we assume that if we see more instances of the same sort of entity we can infer that all of those entities act the same way – or what Auden has called "An abstract model of events derived from past experiments" (Johnson-Laird, 2006, p. 178). Induction allows us to

[5] As Cross (2011) succinctly puts it, "Deduction proves something *must* be; induction shows that something *actually* is operative; abduction suggest that something *may* be" (p.27).
[6] An example of pure logical reasoning is a Sudoku puzzle (Johnson-Laird, 2006, p. 272)

block out some models with real-life experience, so that you can stick your finger in hot water and know it's hot – no need to stick in your foot or hand afterwards. We can stick with an assumption based on induction until the evidence over-rules it - we know the "what" and we can observe the results but must figure out the how through induction. This is the way hypotheses are formed and thus, in science, inductive reasoning informs discovery, while deductive reasoning informs justification (Dorst, 2011, p. 523). Bacon would assert that repeatedly testing a hypothesis would make it "proven" but, as David Hume noted, one can't prove all cases so one can only state that a hypothesis is not yet disproven[7], but repeated confirmation and testing by other scientists replicating experiments would lend weight to the hypothesis as being more likely (Cummins, 2012, p. 123). In most cases we seek out positives to confirm what we suspect, which is also known as confirmation bias, because it tends to be much easier to do, since thinking of all possible non-successful methods would take too many mental and time resources (Cummins, 2012, p. 124-130).

The paradox of causality is that we can't always see the direct causes and so we must infer it, and that process of figuring out a verifiable question takes some guesswork or what Pierce (1957) had first termed "an abductory induction" (p. 247). Abductive inferences are when you don't have all of the examples possible but you conclude that x is the result of y – it is an exploratory effort to uncover connections – using the idea that the closest explanation is likely the most true (Douven, 2011, p. 3-4 and 14). We will use abduction to "reason backwards from an inconsistency to a cause that explains it", retracting it if it does not fit the facts (Johnson-Laird, 2006, p. 346). The use of

[7] Hume's argument revolved around the idea of black swans, or the assertion that just because no one had ever seen a black swan did not mean one did not exist as yet unseen (Cummins, 2012, p. 122)

deduction, induction and abduction all serve to help researchers to conceive of possible connections, articulate what those connections are and how to test those connections to ensure that they are reliable explanations of phenomena.

Anthropology aims for generalizable theories about human processes, while design is future oriented towards creating products and solutions, more likely to effect change and carry out more collaboration (Otto, 2013, p. 4). Part of the reason for this difference is that design is frequently a service relationship between the client, the consumer and the designer, and designers often spend much of their research not just understanding the user, but also the needs of the client (Nelson and Stolterman, 2012, p. 42-46). Every design project begins with "the brief" or mental constraints that the designer works within; unlike most academic anthropology, most designers work in an interdisciplinary environment to deal with the growing complexity of design projects (Brown, 2009, p. 21-32). Design researchers, like Donald Schön (1983), point out that designers deal with this complexity by having a "reflective conversation with the situation" by probing for possibilities and then articulating solutions (p. 77). These possible solutions are both heuristic devices, meaning that they are good to think with, and also "virtual worlds" that help constrain possibilities so that the designer does not become overwhelmed by details (Schön, 1983). The experienced designer will often use formerly solved problems as a precedent or metaphor to make the new problem seem less unique and to engage "reflecting-in-action" to play a game with the situation and use experimentation to figure out strategies and more quickly discard less useful approaches (Schön, 1987, p. 66-74).

Designers, through data manipulation and organization produce information through “abductive sensemaking” or the action oriented process of integrating experience to make connections between seemingly unconnected things and then working out the explicit and implicit relationships between them (Kolko, 2010, p. 17-19). Both design and science use “strategic cognitive processes” to lay out potentials and options and choose a research plan to select options and choose which facts to use or to observe (Farrell and Hooker, 2014, p. 33-34). Expert designers will approach a project with a combination of expertise and experience that allows them to create models of a particular design problem that they orient into a “design schemata” of common problem/solution patterns (Lawson and Dorst, 2009, p. 170-171). They draw upon the analogy of the chess masters who see a board of chess but do not analyze it so much as recognize it, where seminal moves are a gambit, and responses are calculated based on that – an expert designer will recognize a problem and using “guiding principles” to help them shape possibilities and reframe the problem into something knowable and understandable. Novice designers implement ideas immediately and then evaluate while expert designers evaluate before they implement - because design has many more possible solutions in play, one must use 'gambits' more like "guiding principles" to shape possibilities. In this way, master designers quickly see and set the agenda, and using divergent thinking to apply solutions from one area to another (Lawson and Dorst, 2009, p. 178-190). The process of design is not about having 'eureka!" moments so much as continually reframing and re-understanding the problems and solutions and how they relate to each other while juggling the expectations of different stakeholders and working to keep the possibilities to a reasonable number (Lawson and Dorst, 2009, p.31-45).

The key to thinking well, of course, is to break down and separate out the processes involved in thinking to slow down the steps and avoid confusion and arguments – the impetus behind de Bono's concept of the Six Thinking Hats (1985). His ritual system for forcing thinkers to do one type of thinking at a time (white hat for facts, red hat for emotions, black hat for criticism, yellow hat for speculation, green hat for creativity and blue hat to control the process) serves as one system for encouraging artificial rules and control to enable thinkers to become more conscious of their thought and focus on map-making and connections. Convergent thinking (as shown in Figure 9 below) is used most heavily in deductive and inductive thinking, while abductive thinking is where connections are made.

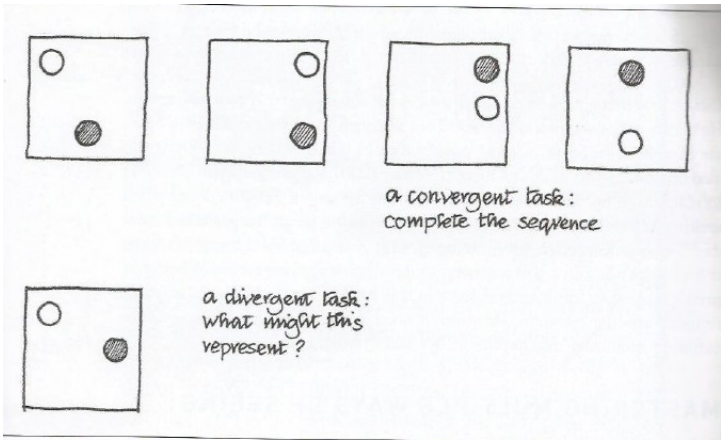

Figure 9 – Convergent and Divergent Tasks (fig 5.4 Lawson and Dorst, 2009, p. 197)

Another way to foster abductive and divergent thinking is to break down assumptions and fostering communication with others to challenge our ideas and provide new possibilities for collaboration. One of the ways to help concretize and encourage that process is to use prototypes as part of the thinking process, either to provoke criticism of issues (c.f. Boer et al., 2013 "provotypes") or challenge conceptions (c.f.

Niedderer, 2007 “mindful prototypes”) or foster collaboration (c.f. Sanders and Stappers, 2014 “probes, toolkits and prototypes”). With provotypes, Boer et al. (2015) suggest designing provocative prototypes embed a critique of a situation (such as how to design indoor climate) and push people to question and re-sense the issue (p.83-86). In a similar vein, Niedderer (2007) designs “performative objects” to influence interaction by making the user become mindful of them, such as a cup with extra holes that force you to cover them, or a game that forces you to relax to win. Sanders and Stappers (2014) call for the use of prototypes to foster team conversation and testing of hypotheses, with the goal of enhancing collaboration among different people by encouraging sharing and engagement with an issue in a more physical manner than simply talking (p.7-11).

For anthropologists, the issue of divergent thinking and generating insights begins with deeply engaging with the people that they are studying and trying to understand what they are experiencing, as opposed to trying to experience it directly. As Clifford Geertz (1983) noted, "The trick is not to get yourself into some inner correspondence of spirit with your informants. Preferring, like the rest of us, to call their souls their own, they are not going to be altogether keen about such an effort anyhow. The trick is to figure out what the devil they think they are up to. "(p.56-57). Ethnography revolves around the use of field notes, participant observation and collaboration to provide one understanding (but not the only one) of what is happening in a particular culture, and is an interpretive process where “data, observations, stories are important only as means to working through and working out the analytic possibilities currently in view” (Anderson, 1992, p. 7). This means that the anthropologist is sorting out the deeper patterns being

played out in the culture that come to the surface in little (and sometimes large) details[8], but it is a pattern whose meaning is, in part, shaped by the perception of the anthropologist. Anthropologists work heavily with meaning systems, indeed the pursuit of meaning is central to the ethnographic enterprise, as an active practice of inquiry that guides their discipline (Rabinow, 2008). The work of social science is one that "neither 'builds up' from microscopic study nor 'deduces down' from conceptual elaboration...to build and to deduce at the same time, in the same process of study...by means of adequate formulation and re-formulation of problems and their adequate solutions" (Mills, 1959, p.128). Thus anthropology and sociology both seek to contextualize the actions of individuals in the larger whole of a culture or a society and to work iteratively towards that deeper understanding. Because the anthropologist is the recording instrument, and field notes are the record of that relationship with others, the taking of field notes is of particular importance to helping trigger memories for some, or to avoid over-simplification in recall (Jackson, 1990, p. 19-20). Field notes can also serve as a device to trigger new analyses, for many anthropologists will write commentaries in margins and use their field notes as the raw material for coding and re-interpreting their data both in the field and out of it (Jackson, 1990, p. 25-28). Ethnographers can gain insights about a culture through the re-interpretation of field notes and research data through mechanical means, such as the re-arranging of files, re-classifying information according to different theories or even inverting information to give a different perspective (Mills, 1959, p. 211-216). Writing and classifying information is not the only means of gaining insights about

[8] Or as Geertz (2010) characterized the eye of the anthropologist: “That eye looks less for iron law and repetitive cause than for significant form and relevatory detail, less for the conclusions toward which everything trends or the ideal which everything imitates than for the specificities that everything takes" (p. 215).

ethnographic research, of course, as many ethnographers will use visual techniques to better understand people and things. Zoe Bray (2015), for example, has used her naturalist-realist painting skills to paint objective descriptions of the world but also of informants to help them speak about their life experiences (p. 121-125). Other anthropologists have used sketching to record events, show art pieces or articulate sketch maps of communities; sketching serves as a representational form of engagement with a scene that, like writing, serve as a type of thinking of what is happening (Geismar, 2014, p.99-108).

The challenge for design, as Friedman (2003) notes, is that design research has failed to develop grounded theory out of practice through articulation and inductive inquiry, preferring to equate practice as theory (p. 419). While tacit knowledge is embodied and experiential knowledge can yield useful information, you need to test it and make explicit the statements you are using, since "All knowledge, all science, all practice relies on a rich cycle of knowledge management that moves from tacit knowledge to explicit and back again." (Friedman, 2003, p. 520). Part of the reason for this difficulty in codifying design practice into theory has much to do with the nature of the discipline itself. While designers often refer to the process of design as a way to organize complexity, the process of synthesis appears as something magical that occurs after some use of design research methods, but there is a real process of codification and discovery at work (Kolko, 2010).

Even though the outcomes of anthropology and design research differ, they both share approaches that weave qualitative and quantitative approaches to understand reality. Theory construction serves to model reality, to show how things work (Friedman,

2002a, p. 20); but that process of bringing theory into practice is not always clear-cut, particularly in design practice that works in a complex environment where projects cross boundaries of several organizations and must meet many conflicting stakeholder expectations and the physical and economic realities of mass production (Friedman, 2002b, p. 213). Similarly, as anthropological practice has had to face greater stakeholder involvement in applied projects as well (such as in development or project evaluation) the capacity to develop abstract theory has also met with greater challenge to use anthropological models to build up the understanding of complex systems (Butler, 2005, p. 24-26).

In conclusion, we see that there are some key themes emerging from this review regarding the approach of design researchers and anthropologists for generating insights. First, observations from the literature shows that the process of data gathering for both anthropologists and designers involves similar techniques of observation, interviewing and surveying of people to understand what they are doing and why they do it. The practice of participant observation is a critical part of the process of determining what people actually do, both by sharing in activities and by knowing what questions to ask – getting at 'why' people do what they do, and this is of interest to both anthropologists and designers for gaining insights. Designers use participant observation and engaging with users to understand how people use products (Bell et al., 2005), how they understand and organize products (Csikszentmihalyi and Rochberg-Halton, 1981; Miller, 2002) and even how they feel products (Jordan, 2000). Similarly, anthropologists use participant observation to engage with users to understand how they sort out products and actions into meaningful categories or "domains" (Breglia, 2009; Johnson, 1998; Spradley, 1980).

One key difference with anthropology, however, is in their approach to participant observation, because anthropologists play the role of ignorant child, and seek to be taught how to become a 'functional adult' within a culture; this is somewhat different approach to observation from that of design, where the goal is to understand the product/user connection more directly (Geertz, 1973; Schweizer, 1998).

Secondly, both anthropologists and designers take their data gathered through their observations and seek to make the intangible things they've observed and thought more tangible to both themselves and others. Design researchers pulling together observation data would use analysis methods that center on visualization, creating maps to show affinities for preferences, experiences and positioning wants and desires of users (Cross, 2011; Kumar, 2013). Sketching and communicating ideas with images, intertwined with written accounts of observations from users are also commonly used (Kelley, 2001; Ho Lee, 2012). Visualization is also important for anthropologists, as they diagram and model cultural domains or share and communicate concepts and ideas as well as art, poetry and visual media (Bray, 2015; Dawson, 2002; Pink, 2006; Prattis, 1985; Schensul, 1999); some anthropologists, like Michael Taussig (2011), have called for greater use of drawing in the ethnographic enterprises for making meaning and to serve as "laborious seeing" to break open insights into the cultural world. Yet, anthropologists overwhelmingly use writing to record and convey information about the social and material world and, as a result, tend to generate much more written information and overall detail as part of their participant observation (Atkinson, 1990; Behar, 2007; Geertz, 1973; Wolcott, 1999). The writing of field notes for anthropologists serves to record observations and experiences in the field, but these notes

are only the beginning of the process, as one must read and re-read them and rewrite them from different perspectives as one works through possibilities (DeWalt et al., 1998; Emerson, Fretz and Shaw, 1995; Geertz, 1988).

The third observation is that both design researchers and anthropologists continually create meaning through their work, for crafting a product or ethnography is an iterative process of creation towards a meaningful end (Boradkar, 2010b; Wolcott, 1999). Designers will look at a problem and create models to envision possibilities and shape how they approach their work (Schön, 1983; Schrage, 2000). Because the research designers carry out is used to inform the creation of some new product, their first analyses of their data emphasize divergent thinking and creating possibilities (Kumar, 2013). Fundamentally, design is a fiction, as designers create what does not yet exist (Simon 1996). Ethnographies, as Geertz (1973) has pointed out, are also fictions, as anthropologists guess at the meanings that informants share with them and then try to create a piece of writing that captures this meaning. The process of writing up field notes and expanding on meanings observed in the field gives "...fieldnote entries...an open-endedness which allows for new information and insights and an unfinished in-progress quality which calls for editing later on" (Emerson, Fretz and Shaw, 1995, p. 45). Both design and ethnography are iterative processes, where the back and forth struggle to capture meaning and conceptualize thought serves to crystallize possibilities and choose paths to insight (Drazin, 2013; Fortun, 2009; Friedman, 2002b).

The fourth observation is that both anthropology and design research have measures for recognizing meaningful insights about people, but they do so from different disciplinary structures and for different reasons. Anthropologists engage in their work to

understand the subtle nuances of cultures in order to write about those cultures – the ethnography is the outcome of that research. Furthermore, the goal of anthropological research is to use these case studies to inform broader understandings of human society and inform the generation and/or maintenance of theoretical models of human behaviour and change (Geertz, 1973; Schweizer, 1998; Spradley, 1980). Designers (and design researchers), by contrast, have emphasized the methodology of their discipline as both craft and product focus; design as constructing a language without words (Oropallo, 2012). This emphasis has led some designers, like Ken Friedman (2003), to assert that design relies on the project or design problem to be the focus of inquiry and the creation of the product or process as the sole aim of the work, with little overt theory to guide the choices made. The field of architecture also makes heavy use of methods and design thinking in the creation of buildings and spaces as well (Lawson 1990) and also draws on inter-disciplinary approaches to understand how people interact with those spaces (e.g. Brown, 1980; Gieryn, 2002). Unlike product design, architecture academic practice has tended to emphasize theoretical approaches to underpin choices and explanations for changes in practices (e.g Antoniades, 1990; Tawa, 2011).

Both design and anthropology use related and different methods to understand people and things leading to a blending of perspectives. The process of data gathering for both disciplines involves observation and recording of people's actions, and both write about and communicate about their findings to make sense of what they have experienced. Through an iterative process of reflecting on practice, events and ideas, designers and anthropologists make sense of the problems and issues that they face and then use that information to create testable prototypes and coded field notes that serve as testaments to

their 'muddling through'. The fact that most anthropology fieldwork ends up as an ethnography or a field report for an NGO while most design fieldwork results in a new product or process is part of the difference between them, but I would argue that the methods of getting to the insights both rely on the heavy use of meaning generation. Where anthropology differs most heavily from design is in its use of theory to both generate questions for inquiry as well as the emphasis on generalization to serve other needs beyond the immediate project. Anthropology has a large body of self-generated theory to draw upon that can serve to situate a case study into a wider explanation of human behavior, and this focus on articulation of 'why' actions work is less examined in design, but this is changing.

Ultimately, the process of generating "insights" about human behaviour and needs relies on the human ability to conceptualize complex processes as models and using language and visual skills to articulate those models. As the designer or the anthropologist works to make sense of a problem they move through abductive to inductive processes of thinking, facilitated by writing, sketching and/or making of prototypes to better understand connections between disparate elements. In addition, the communication of these elements to others, through the use of metaphor and analogies to demonstrate connections and show oppositions is particularly helpful – the active process of meaning making (both to the researcher and to those with whom they communicate) serves to stimulate connections, and a deeper understanding. There is also the iterative process of reinterpreting data in light of new conceptions that is also important so that as new ideas come to light they are used to generate new questions that stimulate further interpretations. It is with these observations in mind that we now turn our attention to the

processes that experienced anthropologists and designers use in their daily practice, in order to see how well these suppositions explain the process of insight generation.

Chapter 3. Methodology

The review of the literature has demonstrated that gaining meaningful insights about people is a process of trying to make sense of data and problems, rather that something that is simply discovered passively. What we need to understand now is how design researchers and anthropologists recognize and develop insights during their research as part of their practice. To this end, I carried out semi-structured interviews with expert designers, anthropologists and design students to understand how they used various research methods to gain useful information about people, as well as how they conceived of "insights" and the process of uncovering meaning in data.

3.1 Interview and Recording Methodology for Semi-Structured Interviews of Subject Matter Experts

My working hypothesis is that insights are not something one finds "out there" but rather part of the active rational process of making sense of one's data to make it meaningful.

The three questions I sought to answer were as follows:

1. How do anthropologists, designers and architects develop insights from their research data?
2. How do anthropologists, designers and architects frame their observations?
3. To what degree does theory inform practice in anthropology, design and architecture?

Before I spoke with design students, I wanted to understand how the use of design research and ethnographic research was being carried out by experienced designers and

anthropologists, both in the applied and academic streams. The three broad questions I wanted to answer informed the semi-structured interview questions that I developed for these subject matter experts that I broke into (see Appendix 1) three key groups: Group 1 comprised of anthropologists, Group 2 comprised of industrial design professors and business practitioners and Group 3 architecture professors and professional architects. I drew on professors of anthropology from both Carleton University and the University of Ottawa; for design and architecture I could only draw on Carleton University since there is no program of Architecture or Industrial Design at the University of Ottawa.

My first step was to apply for ethics clearance through the Carleton University Research Ethics Board (CUREB), which I did through December of 2015 to January of 2016. I provided the sample email cover letter to reach out to potential subject matter experts (SMEs) to interview (Appendix 2) and, if they would agree to participate in the study, I would then send them the Subject Matter Expert Consent Letter (Appendix 3). For each interview I brought two blank printed copies of the consent letter and we signed both copies – one of which I've retained in a secure location and the other left with the interviewed SME.

My second step was to develop a contact list of potential SMEs to interview, which I did through reviewing websites of faculties and professional firms. I developed a short-list of 29 participants and I sent them the emails through my Carleton email account, as per ethics protocol. Of the 29 participants contacted, 14 agreed to be part of the study, and they were interviewed during February and March of 2016; 12 of the participants were interviewed in person at their places of work, while 2 were interviewed over Skype video because of their great distance from Ottawa. The interviews took

approximately one hour to complete – I asked each question in turn and wrote down notes in my field record book of what the participants were saying. Each participant was assigned a unique code (from A1 to A14) and neither their gender nor position of work was identified in any of the notes, to make it less likely that they would be recognizable to an individual reading this thesis. In all, 79 pages of fieldnotes were taken for all of the respondents.

Although the questions were asked in order, the process of questioning followed the passion of the respondent – frequently the conversation would merge two questions together, or bounce ahead to issues that related to a later question, but, overall, the conversation moved through the topics in a coherent form, and I was careful to ask for clarification and to repeat back what I had heard to make sure I understood the examples given by the SMEs (Schensul, 1999, p.125-130). I made careful notes of examples given by the respondents to illustrate their perceptions of insights, and would reiterate those examples with ones of my own to see if I had the concepts clearly laid out. I used a field notebook to write down responses and did not record the interviews – this was done both to reduce inhibition from the respondents and also to focus my attention on the discussion. Once the interview was completed, I would type up my field notes into a document in bullet format to ensure that I expanded upon the notes I had taken down.

The third step involved retyping and organizing the field notes into a matrix (Appendices 5 and 6) for the designers/architects and the anthropologists. This matrix listed each question and the responses by all of the respondents in that category to make it easier to compare responses and recognize patterns. These matrices then serve as the

basis for the creation of two break-down tables (Tables 1 and 2) that are discussed in the results section (Chapter 4).

3.2 Interview and Recording Methodology for Semi-Structured Interviews of Design Students

Once I had compiled and contrasted the results of the Subject Matter Interviews and the literature reviews to determine connections, I noted that there were five common themes being that every project is unique and requires one's experience and literature to ask questions and frame the parameters of the work; that design work is very client-centred and out of the box thinking requires in-the-box restraints to facilitate creativity; that iteration and testing through sketching, prototyping and questioning of users is critical; that being able to tell a story and understand how to pull the pieces together is essential so that, finally, the researcher can use a back and forth process of questioning and answering to break out of preconceptions and achieve a measure of insight.

When discussing these themes with those subject matter experts who were also professor or instructors, I found they often lamented that third and fourth year students did not seem to take enough time to do research or were unable to recognize truly insightful design projects from their interactions with users. I then prepared my semi-structured interview questions for the students with similar questions but with the following key foci for my probing:

1. Understanding how a research project is given to the students and what tools they use to approach the project
2. Trying to see how they are taught research methods in their third year classes

3. Finding out what changes they would make to the program if they had the option

It was with this in mind that I set about interviewing design students to better understand how they approached design projects and what difficulties they were experiencing.

My first step was to apply for ethics clearance through the Carleton University Research Ethics Board (CUREB), which I did from September to October 2016. Once I received ethics clearance I used a standard email letter to contact the professors of the design studios in the School of Industrial Design to gain permission to come to their studio classes and provide a speech to the students about my research and ask them to participate (Appendix 2). After each recruitment speech in a studio or class, I left behind the questions that I would be asking the students (Appendix 1) as well as copies of the consent letter that we would sign (Appendix 3). For each interview I brought two blank printed copies of the consent letter and we signed both copies – one of which I've retained in a secure location and the other left with the interviewed student.

My second step was recruitment; because most of my recruitment had to be carried out late in the Fall term, most of the students were very busy with studio assignments, making it very difficult to recruit interview subjects. Despite my best efforts, I could not interest a single fourth year student to participate, but I did manage to speak with 5 third year design students as well as one Masters of Design student between November 10 – 16, 2016. The interviews took approximately thirty minutes to complete – I asked each question in turn and wrote down notes in my field record book of what the participants were saying. Each participant was assigned a unique code (from B1 to B6) and neither their gender nor position of work was identified in any of the notes, to make it

less likely that they would be recognizable to an individual reading this thesis. In all, 18 pages of field notes were taken for all of the student respondents.

Although the questions were asked in order, the process of questioning followed the passion of the respondent, but, overall, the conversation moved through the topics in a coherent form, and I was careful to ask for clarification and to repeat back what I had heard to make sure I understood the examples given by the SMEs (Schensul, 1999:125-130). I made careful notes of examples given by the respondents to illustrate their perceptions of insights, and would reiterate those examples with ones of my own to see if I had the concepts clearly laid out. I used a field notebook to write down responses and did not record the interviews – this was done both to reduce inhibition from the respondents and also to focus my attention on the discussion. Once the interview was completed, I would type up my field notes into a document in bullet format to ensure that I expanded upon the notes I had taken down. My third step involved retyping and organizing the field notes into a matrix (Appendix 7). This matrix listed each question and the responses by all of the respondents in that category to make it easier to compare responses and recognize patterns (shown in Table 3 in Ch. 4 Results).

Chapter 4. Results & Discussion

The interviews with expert designers, anthropologists and design students revealed some important themes in the process of qualitative analysis and understanding how they perceive their work and best practices in the field. As will be shown in this chapter, the key related themes for design and anthropology show the importance of communication and framing problems, actively working with prototypes, sketches and restraints to stimulate and refine ideas and issues.

4.1 Designer Responses to Interviews

Out of the 18 designers that were contacted by email, a total of 9 agreed to be interviewed – 8 were industrial designers and one was a professor of architecture. All of the designers had worked both professionally in their field and had some experience teaching students either as contract faculty or full-time faculty. Most had a minimum of 10 years of professional experience working in Ottawa but also internationally, and, combined, had worked on hundreds of different design projects over the years, which formed the basis of their responses that were further categorized in Table 1, below:

Table 1 – Synopsis of Designer Responses to Interviews

Question	Most Common Answer	Unique Answers
1 – Can you describe a typical research process for a project?	-start with literature/patents/subject matter review to see possibilities – very much project specific (4x) -need to have a one-page proposal/research report/critical project drivers and/or stakeholder orientation measure to keep expectations in line (4x)	-private practice doesn't call it research – no money for that (1x) -urbanism is about possibilities and people ("living approach") (1x)
2-How do you gather data?	-literature review/patent and product review/review client needs/stakeholder ideas ("There's not much new in the world") (6x)	-designers are bridge-builders who navigate conflicts (1x)

	-make and test prototypes with users, do empathy and journey mapping - use to break down assumptions with users/ourselves (3x)	
3-How do you analyze that data?	-qualitative data is feedback from users, mockups and prototypes – takes time to analyze and is not absolute (5x) -quantitative data is more believable, hard facts like building codes or regulatory guides, surveys "we need more quantitative data in design, NVivo to enhance qualitative analysis" (4x)	-use storyboards and prototypes to think and to convince/convey (2x) -mockup and test "I play, I apply" (2x)
4-How do you define a user insight?	-trial and error learning by the user (3x) -gain insights by doing and participant observation (4x) -is not a big AHA but a process of sense making – figuring out the connections/relationships – very incremental understanding process (5x)	-"I never heard that word once in industry" – it's more "let's try this" (1x) -Insight is something I didn't know before and can use (2x)
5-How do you recognize insights from your data/work?	-writing reports/making Power point presentations and/or sketching to explore and explain possibilities with team discussion and debate (6x) -doing and making – playing with old products and mockups to see possibilities (3x)	-noting odd statements that trigger further questioning/explanation (1x)
6-How does your daily practice differ from school teaching?	-more writing, reporting and keeping projects organized (4x) -manufacturing is the larger focus now – constrains what can be done (2x) -much less time for creativity – more tight deadlines for creation (3x) -must be better at sharing information/translating ideas – sketching, prototyping and delegation (4x) -"Sketch models and mockups are relationship builders"	-design is more about people than things (1x) -little connection between design research and daily design practice (1x)
7-What would help you in your work with regards to improving the process of gathering and analyzing data about the user?	-students must learn to make decisions and rely on SMEs and data to push their ideas (3x) – show client how you got there -research must be seen as useful – not just a stage to 'get through" (2x) -important to emphasize team work and working with real people on projects (3x)	- must formalize research and report writing for student process (1x) -must develop pragmatic creativity (1x) -problem of ego – students never want to finish someone else's project but want to be the star (1x)

The majority of the designers interviewed found that research projects were set up on a project by project basis, but a common refrain was the need to set up a tracking report or have some measure to ensure consistency in the delivery of the product compared to client needs and expectation. This was called different names (one-page proposal, critical project drivers, stake holder expectations) but they served as an orientation document to keep the details of the project relevant to the design group. This was also a part of the next part of the project process for gathering data, by reviewing technical literature, previous patents and market offerings for similar products and comparing those to the demands of the client. More than a few designers noted that this review of materials was never called "research" expressly because "there's no money for that in private practice".

Data was viewed by the majority of designers as being either qualitative (feedback from users with mock ups or prototypes, opinion discussions and ideas from empathy and journey mapping) or quantitative (building/regulatory codes, surveys and 'hard data') – the latter type of data was seen by some designers as more "trustworthy" while qualitative data had many uses it was viewed as taking much time to analyze and being more variable in quality. A couple of designers also noted that they used prototypes and mock ups to help them think about possible solutions or issues to address, or as one designer noted "I play, I apply".

When the questions about insights were asked there were a variety of definitions and uses for the term – some saw insights as the trial and error learning of the user, others as one's own insights gained through making and doing participant observation, yet most agreed that it was not a sudden "Aha!" moment but rather a process of making sense of

the issues and often just a "let's try this" approach to solving problems as they arose. A couple of designers went so far as to define an insight as something specifically that they did not know before and could use – if they could not use it, it was not an insight at all. Even the term "insight" was not necessarily seen as helpful – one designer noted that in all the years they worked in private industry "I never heard that word once". There was a lot more agreement about how to recognize insights in their work – the vast majority used writing, sketching or other visual representation to explain their reasoning to their teammates and/or clients – and they found that this process of discussing and debating their thoughts was critical to recognizing and focusing their insights from their work. A few designers also noted that playing with old products and prototypes was also critical to helping them think about the insights they were trying to make sense of.

When asked about their current practice compared to their school training, many designers noted that they found their work required much more writing, project management and organizational skill than in school. These requirements further necessitated good communication and idea translation skills, for which they found their sketching and prototyping abilities were well suited, both for clients and project team mates; as one designer noted "Sketch models and mock ups are relationship builders". Being aware of the requirements for manufacturing as well as tight project timelines meant that there was much less creativity room, forcing designers to be very practical in their proposed ideas and accepting of the incremental nature of their proposed solutions – one "can't do the crazy ideas" like in school, as one designer lamented. With these constraints in mind, several designers advocated that students in design should be encouraged to do even more team work and learn to make decisions and stick to them as

they guide projects to completion. Some felt that more report writing and tracking of projects was a critical skill set to develop, as well as pragmatic creativity and the ability to critique one's own work effectively; one designer further noted that students in design want "to be the star" and do not want to work on other people's half-finished projects, even though that is more common in the work world.

In summary, designers often carry out their projects in a team environment with different stakeholders and client concerns to address, necessitating strong controls on project development and reporting. Consistently there is a need to use effective communication and translation techniques via writing, sketching and prototyping to help break down preconceptions and facilitate discussions about possibilities; while creativity was seen as important, pragmatics and the ability to keep in mind manufacturing and client concerns were highly prized. Insights were recognized almost as a by-product of working and playing with concepts and mock ups, as well as by carrying out participant observation – more than a few designers highlighted the benefit of dealing with front line workers and end users in helping to realize true needs.

4.2 Anthropologist SME Responses

Out of the 12 anthropologists that were contacted by email, a total of 5 agreed to be interviewed – four of them were full time faculty evenly split between sociology/anthropology departments at the University of Ottawa and Carleton University while the last anthropologist had completed their PhD and was beginning to work in a consulting field. All of the anthropologists had multiple years of fieldwork experience abroad and had carried out several large scale research projects academically; some of the Carleton faculty had additional experience working for non-governmental organizations

and they all brought their experiences to their responses to their interviews, as summarized in Table 2 below:

Table 2 - Anthropologist SME Responses

Question	Similar Answers	Unique Answers
1. Can you describe how you typically approach a new fieldwork project?	-use social media and literature to situate questions – triangulation (4x) -must spend some time building relationships (2x) -must do participant observation/be physical/visual (3x) "anthropology is a bodily research process"	-shorter time necessitates interviews – less time to build relationships (1x) -far away fieldwork requires more planning but fewer distractions (1x) -drawing and handwriting are critical to getting things together (1x)
2. What is your definition of an "insight" or "Aha!" moment?	- seek out paradoxes/put alien ideas together/recall odd events (3x) -talk informally – find right questions to ask; don't pre-plan questions (3x)	-insight I define as find something true in this context – contextual truth (1x) -aha moments are variable and come from the subconscious (1x)
3. How do you gather data?	-latch onto puzzles/ask questions (3x) -jot down notes, expand on them – engage with social settings, formal and informal (4x) "sometimes you just write things down for sake of the routine" -hand around until people think you should be interviewing them – know what to ask (2x) "anthropology is much more about questions, design seems to be about answers"	-take photographs (1x) -data is 'lots of jumbled stuff' (1x) -
4. How do you analyze that data?	-reject quantitative approaches /don't turn world into numbers (2x) -meta-communication (what people say/don't say) – intuitive grasp of issues – revealed by coding/journal analysis/writing (3x)	-research is an iterative process – seek right questions - people won't tell you things if you don't ask correctly (1x)
5. How do you pull things together from your fieldwork?	-writing a paper for a conference/journal/thesis (4x) -carry out coding of journals/diaries – compile and question (3x)	-use triangulation (what different groups say/do) (1x) - move between details and big picture, between ideas and observations; between experiences and expectations (1x)
6. How does your daily practice differ from what	-writing and framing your research in terms of dialogue of academia is key	-use mapping techniques and qualitative/quantitative to pull

you were taught in school?	(writing good for thinking and for grants) (2x) -more open ended in my PhD and professional work – undergraduate is much more structured (2x)	together trends (1x) -key is asking questions and you "need to be comfortable with being uncomfortable" (1x each) -one lamented that they did not have the quantitative skills needed to get jobs with research firms (1x)
7. What would help you in your work with regards to improving the process of gathering and analyzing data?	-must teaching more about how to write and how to read (2x) "What is the argument – PhD students have lots of data but no story" -need theory to help give you a new way to think and a way to link the themes you see with wider issues (2x) -need to code and figure out things by writing your notes/puzzling/actively questioning (2x) "fieldwork is both with the body and the pen"	-"as anthropologists we are not here to find the answer but how to ask the question and how to answer them" (1x)

Anthropologists tended to use much more literature and social media review to set up their fieldwork project, with about half of them noting that they need to spend time building relationships with key people before they could begin their work. Most of the anthropologists noted the use of participant observation as a key component in this preparation process, both to understand what questions to ask as well as get the sense of the bigger issues in a particular area; one anthropologist put it, "Anthropology is a bodily research process", and the physical engagement with the planning and the people a critical step in knowing how to craft a research plan

Insights were defined by most of the respondents as a form of 'aha' but also of knowing the right questions to ask about an issue; most of the anthropologists would seek out paradoxes or put alien ideas together to tease out important areas to examine more closely. These methods would spill over into how they gathered their data as well, for

many would latch onto puzzles and questions to explore issues at the edge of common society. Virtually all of the anthropologists noted that jotting down notes and expanding those notes while engaging in social settings and working with people was critical to capturing important information. The process of note taking, however, varied – for some it was a process of jumbled recollections and photographs, while for others it was almost a ritual process where "sometimes you just write things down for the sake of the routine", because you may not know what to look for until later. Some anthropologists saw value in a laid back approach to gaining data, advocating for hanging around until people think you should be interviewing them; the key, through either approach, is to determine what questions to ask – as one anthropologist noted "people won't tell you things if you don't ask correctly", while another stated "as anthropologists we are not here to find the answer but how to ask the question and how to answer them".

Most of the anthropologists rejected the validity of quantitative data, arguing that one should not "turn the world into numbers" or that "my village won't speak for the world". Instead, they argued that a more in-depth qualitative analysis would yield better insights into people's behavior, particularly when looking at meta-communication, or what people do or don't say. This intuitive grasp of issues comes from the active coding and analysis of one's field notes and encounters, which requires time and patience to sift through the different meanings and positions one uncovers in the field. One anthropologist noted that triangulation was useful – if multiple people say the same thing you may be on to something relevant, while another noted that mapping techniques could help visualize the connections between ideas. Writing was cited as the means to pull ideas together by all of the anthropologists interviewed – whether it was to present ideas

at a conference, prepare a thesis or journal article. The key through the analysis process was to "move between details and big picture, between ideas and observation, between experiences and expectation" and make these clear to oneself as well as to one's audience.

Writing was also considered to be an even more important skill within and outside of school – serving both as a way to think and to frame your discussion in terms of the bigger issues present in the discipline, as well as secure the funding grants needed to gain access to the field. Most of the anthropologists interviewed insisted that writing and reading were critical skills for anthropologists, both to be able to articulate the meaning of one's findings but also to use theory to link the themes one sees in one's fieldwork with wider issues. As one anthropologist lamented "I am constantly asking my PhD students what their argument is – they have lots of data but no story".

In summary, anthropologists tended to focus much more on the question generation and observation of social paradoxes and puzzles for their project set up – and they, like designers, prized participant observation both as a means of understanding people's actions and thoughts as well as to improve their relationships with those peoples and their lived reality. Writing is critical to the anthropologists' work, both to record information in the field as well as to code and translate that information to a wider audience; some also used visual mapping and hands on techniques to make sense of their experiences. Unlike designers, anthropologists tend to draw on initial theoretical currents to help situate their particular field work in the broader discussion about human societies and cultures, perhaps reflecting their intent to focus more on qualitative, as opposed to quantitative, differences between cultures.

4.3 Contextualizing SME Responses in Terms of the Literature

Having spoken with both designers and anthropologists about their approaches to setting up projects and finding insightful information about people, I am now prepared to make some comparisons to the broad themes first outlined in the literature review, where the suppositions about participant observation, means of recording information, iteration towards either a written document or a finished product and using theory and abduction all contribute to the active process of understanding and realizing meaningful insights. The goal of this comparison is to distill the essential elements that underpin deeper understandings of qualitative information and then to hypothesize what changes to current design pedagogy could best bring out those elements in design student practice.

First, designers use participant observation as a means to engage with people and their lived reality – one designer, for example, related how working on the job helped them to better understand the "pain points" where design could assist workers with their jobs. In a similar vein, anthropologists use participant observation to feel and understand the lived reality of the people they study with, by doing the same tasks and living in the same conditions – to understand through the body. Where anthropology and design differ, however, is in the amount of time dedicated to participant observation and fieldwork and the goals of that observation. Most anthropologists spend months in the field, and use participant observation as a means to enhance working relationships and build rapport with the community members they are trying to understand. Designers, by contrast, may experience some rapport with the work process when engaging in participant observation, but the focus is much more on the work processes themselves and understanding user needs, not building close relationships with the users themselves.

Second, designers use a variety of means for gathering data and recording that data, using reports and critical process drivers to help keep the project oriented, while recording useful information with writing, sketching and other visualization techniques. Several designers have noted the benefit of design research methods such as affinity diagramming and mapping customer journeys to understand work flow and user engagement processes. Some anthropologists have similarly noted the need to visualize information as well, both to help engage communities in the process of meaning making (map making is one example) as well as to help the anthropologist keep track of their findings and connections. Both designers and anthropologists see great value in writing down information, keeping track of detailed requirements and special findings, and keep information well managed. While many designers have seen their writing levels increase once they are working in the professional world, anthropologists spend far more time writing and using writing to think in their work, particularly when iterating meaning.

Third, designers and anthropologists both use iteration to figure out solutions to problems and ways to understand people and their actions. For designers this process typically involves creating and playing with mock ups and prototypes to explore concepts, examine specific physical details and break down preconceptions about possibilities. Anthropologists will also engage with the physical world through participant observation, but the way that they typically iterate their ideas is through coding and re-examining their field notes, field sketches and other records. It is when they begin to create a sense of what the main themes are that they hear in the field that anthropologists begin to see what questions they need to ask; in a sense, the field notes are the prototype of the field environment, and the sense making the recoding of those notes. As a means to contrast

the two approaches, one anthropologist noted "anthropology is much more about questions, design seems to be about answers" – with the goal of research being to find that "master question" that underpins the entire work. What is clear, however, is that both anthropologists and designers use their prototypes to externalize what they are thinking about, to make it easier to articulate, and perhaps recognize, insights about a product or behaviour, and to set up a space to play with the ideas that come out of those prototypes.

Fourth, another difference between anthropologists and designers comes from the output of their work, which affects their motivations and methods for achieving that goal. For designers the projects are typically client driven towards producing a product (whether digital or physical) that will solve an existing problem or issue. Much of the work is constrained by technical schematics, product cost demands and other very quantifiable reasons. Most anthropologists, by contrast, typically work with people to produce an ethnographic account that form the basis for a conference paper, a journal article or even a thesis. The interest begins with the anthropologist wanted to study a particular issue – it may well be modified by the interests of the community they study with, but it is, for the most part, academic interest; as one anthropologist noted "anthropology is unique because you pick questions to ask about a problem, define that problem in relation to a context and work on things for a long time". This does not, however, apply to all instances of design or anthropology research. One of the designers interviewed did service design where the goal of interviewing and working with users served more to provide an understanding of issues and methods for improving outcomes – not a physical product. In a similar vein, some anthropologists interviewed had worked

with non-governmental and government organizations in program evaluation and development – in both cases their work was more highly constrained and had dictated outcomes that they had to match, while working in teams, similar to the situation of product designers.

Fifth and finally we see that both designers and anthropologists use abductive reasoning to puzzle out connections and solutions. Designers frequently have to understand not just the user but also the needs of the client, and most designers rely on the design brief to keep that process of managing expectations and competing needs under control. Design tends to be solution oriented, and designers will approach projects with a combination of expertise and experience to allow them to shape possibilities and reframe problems into something understandable. That process of framing is helped by prototypes, visual sketches and group discussions – insights are created not so much by sudden 'aha' moments so much as figuring out new things to try and evaluating how they work in light of the desired goal. To a degree, this process of 'abductive sensemaking' (after Kolko 2010) is similar to the anthropologist's desire to find the right questions to ask. Another way to foster abductive thinking and make new connections is to use methods to break down preconceptions and foster communication between design team members or anthropologists and collaborators. Designers will use a variety of prototypes to test ideas and provoke new discussions and debate; anthropologists will use triangulation as well as intuition to decide what themes to explore more thoroughly.

Anthropologists will form conceptions of what they think is going on, or is a particular paradox that they can't resolve, and then they will ask more questions of informants to better understand that issue. Anthropologists will, much like designers test

prototypes, test their conceptions of what is going on – finding the right questions to ask and then determining the right issues to examine is how they are relatively more sure they have 'figured out' how things work. Ultimately the goal of cultural anthropologists is to contextualize the actions of individuals into the larger whole of culture and work iteratively towards that deeper understanding – a deeper focus on meaning systems in general. Anthropology also has a large body of theory to examine with regards to human social action and meaning – this provides, as some anthropologists noted, a "new way to think" about your research. Design research does not have the same types of theory, for design problems tend to be project-based and seen as more individual – yet a growing number of studies (c.f. Kolko 2010, Lawson and Dorst 2009; Schön, 1983, 1987) show that design practice does use techniques to frame design issues in light of others – because, as one designer noted "There's not much new in the world". The challenge for design is to make explicit this tacit knowledge and systems of meaning making to integrate it into the daily practice of design researchers, as it is integrate in the training of anthropologists.

Anthropologists and designers spend much of their time working to figure out the scope of the problem they are working on and the means to move towards a solution. Interviews with practitioners and researchers in both disciplines has revealed that the work is in finding the right questions to ask and the right way to show what you are doing and what you think you've found. Participant observation and actively making things, whether as prototypes, sketches, written entries and coding of data, all serve to break down preconceptions about problems and help with the generation of insights about human activity, as well as what they want and need. Both designers and anthropologists

actively create meaning through their work, and it is this process of trying to make sense of that meaning that helps give the small 'aha' moments that either reveal previously unseen connections and/or possible areas to explore and question further. The next step is to see if that process is the same or different for novice designers – students who are learning how to carry out this research for the first time.

4.4 Student Responses to interviews

All of the responses were set out in a matrix for ease of comparison (Table 3 below) and some key trends are apparent.

Table 3 – Synopsis of Design Student Responses to Interviews

Question	Most Common Answer	Unique Answers
1. Can you describe a typical research process for a project?	-start with project brief (6x) -desktop research (ie google and/or literature) (6x) -sketch forms, make prototypes and test (4x) 1b – need more guidance from prof/unclear on concepts (4x) -lack time to do the follow up interviews (2x) -confused over research methods application (2x)	- "how do we create good questions?" -"interviewing is really about having a conversation"
2. What methods do you use to gather data?	-Internet desktop searches (5x) -observations and interviews (6x) -literature review (3x) -sketching/prototyping (4x)	-"prefer making models to thinking – I'm a hands on person" -"hard to find people to interview"
3. What methods do you use to analyze that data?	-affinity diagrams to sort interview data then into actionable statements in KANO (3x) -storyboards and journey maps (-sketching things out (3x) -prototyping for form/dimensions (2x) -look for pain points or dominant trends (2x)	-"I really like the random ideation tool – rolling dice is fun"
4. What is your definition of an 'insight'?	-something unexpected or previously unknown that is useful (2x) -shows the real problem/solution – clarity (3x) -not something new but recognized from your experience (2x)	-"I have no clue, but I always hear about it in studio with WonJoon" -"It means different things to different people – in studio I've heard completely different definitions" -"It comes from building on what you've done…you need experience to realize you've had an insight"

5. How do you recognize insights from your fieldwork?	-recognize patterns (2x) – KANO and affinity are really good for this -test ideas with interviews and market research (2x) -try to anticipate results from interviews then ask if they do not match (1x)	-"I would show options to users and then ask them 'so what does that mean to you'" to get at how they were perceiving the solutions -"I need quiet to get insights so I often work at home"
6. How useful did you find the fieldwork for your later prototyping and concepts?	-very useful to talk to non-designers and challenge assumptions/get ideas (4x) -need to do sketching to apply knowledge – it's fast and shows iteration – let's me think (4x) -find storyboards, mind mapping to be repetitive and reflect my biases (2x) -find storyboards and mind mapping to be useful for finding biases and issues (3x) -KANO and affinity diagrams useful (3x) -prototyping is needed to really understand (2x)	"We don't have enough good fieldwork data for studio and yet we have to go to the prototyping phase" -"We need deep problems and well-defined problems" -"We didn't get to do enough user testing"
7. What would help you in your work with regards to improving the process of gathering and analyzing data about users?	-need more rapid prototyping and materials use experience and practice (2x) -need more explanation and guidance (3x) -we need to do more user testing (2x) -separate lectures and studio/methods teaching (2x)	-"We need a solid direction and what questions to ask" -More awareness about subject matter experts that we could tap into for knowledge/guidance -"Make ethics more flexible" -"We need to see more people in action and put ourselves in the context of use; the fourth years do this and that's why their projects are so much better than ours"
8 What would you change about the methods teaching in the SID Program?	-make studio projects more defined with more clear guidance (3x) -move Chantal's class to second year then give quick refresher early third year (3x) -more studio and protyping space access (2x)	-"Get students to build their brand and focus on their portfolio. Teaching us about graphic design would also help us with these presentation skills" -"More mandatory design classes in the MDes - I was hunting for electives" -"It would be great if we could encourage more work with other faculties and subject matter experts – they would give great advice"

All of the students interviewed described a typical research process as beginning with receiving a project brief, and they noted that they had two projects that they had been working on in the Fall term: one for table redesign in the Discovery Centre of the library in their methods class (with Professor Trudel) and one for LED lighting in their studio class (with Professors Chung and Dogan). All of the students stated that they used

a desktop review to determine what kinds of materials were available on the project, including what other types of products had been generated before; this was usually achieved by online searches on sites like Google or Pinterest. About half of the students noted that they also read what was available in the literature, including product specifications and published sources. The students noted that they spent the first month of their studio class in this stage, trying to figure out the parameters of the project but also wondering, as one student did, about how to create good questions to ask. Beyond desktop and literature reviews, all of the students carried out some form of fieldwork, either observing people or interviewing them.

Once they had gathered all of their data from various sources, most of the students used sketching to articulate the useful possibilities; as one student noted "sketching allows me to apply knowledge – I can see the iterations on the page". A couple of students preferred to work on rough prototypes early on to help them think about the feedback they had received from interviews and what they had seen in their desktop reviews, stating that they thought better with their hands. All of the students used affinity diagrams to sort the interview data into groups that showed the patterns that could be turned into actionable statements in KANO[9] - most of them found that process useful for helping them to make sense of what people were saying. Students were more divided when it came to using journey maps and storyboards; about half found that these helped them find their biases and articulate issues the other half saw them as repetitive and serving only to provide visualization for others while not teaching them much about what they should design next.

[9] This is also called an "Entities Position Map" (Kumar, 2013, p. 153).

Students were even more uncertain about what constituted an insight; one student joked "I have no clue, but I always hear about it in studio with WonJoon", while another stated that "It means different things to different people – in studio I've heard completely different definitions". When pressed, however, most of the students were able to qualify an insight as something was something new, likely unexpected, that showed what the real issue or problem was; in short, a true insight was "unGoogle-able". Two students commented that insights were not something entirely new but rather something that you recognize so that "it comes from building on what you've done…you need experience to realize you've had an insight". The need for experience to be able to put observations into context was part of one student's further observation that insights were "something that you derive yourself from what others say" – so that it was a process of recognition and creation. Recognizing insights, for some of the students, involved looking for patterns, whether as similar statements about use from different groups of people, or similar problems that were observed among people. Time and again, most of the students stated that talking to users who were not designers was critical to the process of recognizing insights – both for the unexpected results but also for trying to understand how they perceived objects and objectives. One student, for example, would take great pains to always ask users about the different products and ways of approaching the design and ask them "what does that [lighting/style] mean to you?", because finding a common language was critical to really understanding how they were perceiving the goals of the project.

While many of the students felt that fieldwork was an important part of the process of gaining useful data for research they also were concerned about the quality of

the data that they were able to gather with the research techniques they had just learned. Some felt that they did not know what questions to ask users, while others lamented that they did not have enough time to ask enough users or engage in enough user testing. The problem with this process, as one student noted, was that the studio class had set timelines for the stages of the research process, and so "we don't have enough good fieldwork data for studio and yet we have to go to the prototyping phase". One of the ways that the class dealt with the uneven results in their fieldwork was to share their observations and interview data with each other so that everyone would have a bigger pool of information to draw upon for their ideation and prototyping. Despite this sharing of resources, students felt that they had only a very rough idea of how to approach their LED studio project and wished that they had more time to do further user testing and interviewing.

In summary the students find project research to be a challenging process of applying newly learned research techniques to the process of gleaning useful information from users about how products are used and experienced. Looking for patterns and trying to make sense of the 'true problems' characterize student approaches to understanding the issues for design, where experience and taking time to reflect are critical drivers of gaining insights about users. Students generally find research methods very useful for their work, but lament the lack of time for applying these techniques their studio projects and would like to have more changes to work with users to better improve their designs.

4.5 Contextualizing Student Responses in Terms of SME Responses

When we compare the themes expressed by experienced designers and anthropologists versus those of design students, we can see some interesting patterns (as summarized in Table 4 below). Experienced designers and anthropologists both value participant observation, but the designers' time constraints make that process a much shorter and more object-use oriented approach; student designers similarly find the process of engaging with users to be highly valuable but time consuming and they often lack the time to put into the participant observation and interviewing. Students were told (in their studio project) to use interviewing as a repeated measure to test their prototypes and ideas through a research iteration process but none were able to do so due to time constraints – and they felt that it was very difficult to know what questions to ask.

Table 4 – Comparing Student to SME Views

Theme	Designer	Anthropologist	Student Designer
Participant Observation	-important to find pain points -short sessions and focus on work itself	-important to feel and understand lived reality -long sessions and build relationships with the people	-get unexpected ideas -more of a conversation than an interview -have to engage with people more
Data gathering and analysis	-reports and critical progress drivers – need to keep information organized -affinity diagramming and journey maps -writing and sketching/visualization – use sketching to think	-writing field notes important -keeping data organized -visualization also important – mapping in field -use writing to think -ask questions and find questions – learn what you should ask	-heavier use of internet and google searches -sketching and prototyping to think -affinity diagrams, journey maps – some value it, some do not -
Insight definition and use	-insight is unexpected and useful -gain insights by doing (play with mockups/old projects) and participant observation -process of sense making – incremental progress, not revolutionary idea -writing and presenting	-seek out paradoxes/put alien ideas together -it's the meta-communication of what people don't say – reveal it by coding and analyzing your journal or writing up results	- insight is undefinable/unique -insight is unexpected and useful – not 'google-able' -**comes from building on your experience – takes experience to see it** -look for patterns across groups/odd things that stick out

	on ideas brings it out **-experience helps you to see it/recognize it**		-ask questions of users
How to improve?	- students must emphasize writing and information sharing skills -students need better organization skills and ability to work with tight deadlines -students must make decisions and explain those decisions to show how they get to solution -students must learn that teamwork and research are important – letting ego go	-much more is about writing and publishing -need theory to help organize your work -students must learn how to tell a story and situate your research in the literature -students must learn to figure out material by questioning and coding -discipline is about finding questions, not answers	-have research methods in second year and refresh skills in third year -more direction and clear goals for studio project -more SME guidance to improve questions

Experienced designers are much more likely to rely on writing of reports and tracking documents to keep their design projects in check, and they see the organization of information as a critical part of the design research process. They analyze that data using a mix of visualization techniques as well as active sketching and prototyping to work through ideas. Design students, by contrast, are much more likely to turn to internet research to look for ideas initially, but then they too use a mix of visualization techniques and prototyping to work through their ideas. For anthropologists, writing is the cornerstone of their data collection and analysis process as field notes serve as a repository for what was said and seen. Anthropologists spend much time re-coding and re-interpreting their notes and continually trying to seek the right questions to ask; unlike designers, they will re-engage with informants and others multiple times in the course of their fieldwork and slowly figure out what is going on. Some anthropologists will use visualization techniques (flow charts, mind mapping) to help them see the connections and to convey that information to others.

Insights are constructed fairly similarly among most designers and student designers – some see it as a novel discovery that is unexpected but useful for their project – not a revolutionary finding but rather an incremental process. Finding insights is often a by-product of doing something else, whether it's building prototypes or playing with old projects or looking for patterns from across users – and both students and experienced designers alike stress the need to have experience under your belt to see and recognize something as truly new and important. Anthropologists also see insights as a reflection of something new that comes from old information and they also stress that it is subtle, often part of what people don't say; some anthropologists trigger insights from data by deliberately seeking out paradoxes and things that don't make sense and juxtaposing them against the patterns that they see on the surface.

Improving the process of learning how to do research, interpret data and use the results requires similar approaches between experienced designers and anthropologists. Both stress the importance of writing and keeping information organized and that students must learn how to make decisions about what they are doing and how it relates to the bigger aspects of their work, whether it's to follow the literature for publication in anthropology or to justify a change to a product conception to one's team. The ability to communicate effectively and work on tight deadlines is the cornerstone of mainstream design practice, along with teamwork and letting go of one's ego in a project. For anthropology, students learning to research must learn how to tell a story with their data, which means questioning and coding the material repeatedly and finding questions, not answers, to guide the path. Once a student has that story clear in their mind, they need to

use theory to help organize that work in the bigger stream of the academic literature to see where they want to publish, because writing is the cornerstone of the discipline.

In summary, then, we can see that student designers are well aware of the need to engage often and repeatedly with members of the general public to better understand how people really use products and what challenges they face in their daily lives. Student designers, like experienced designers, are heavy users of visualization and prototyping techniques to help them make sense of the wealth of data they gather, and they find research methods very helpful in this process. Many experienced designers use more writing, reporting and data organization techniques in their daily practices as compared to student designers, who tend to prefer sketching and making things as their preferred activity. Design students perpetually lament that there is insufficient time to carry out research in enough detail, to test prototypes and to figure out project directions; the irony is that this is precisely what professional design practice is all about – tight deadlines are the norm, as is juggling multiple projects that are often started by others. Decision making and deciding on where to go with one's project, or how to situate one's anthropological research in the broader literature are also part of the difficulty for students in anthropology and design to learn. It is ironic that design students keep asking for so much direction and clear project goals – many experienced designers lament that they do not have much space for innovation and have to learn how to design with many constraints. What is most intriguing about all of these responses, however, is that good design and good anthropology rest on two key abilities: first, the ability to use your experience to guide you and to judge your research and pull out what demonstrable insights from that research; the second is to ask questions and look for the right questions

to ask of that data and of others. Now that we have a firm grasp on some of the challenges facing experienced designers, anthropologists and design students, we can now turn our attention towards providing recommendations on how we can better stimulate insight recognition in design.

Chapter 5. Conclusion

This research project began by asking about how we might better understand the process of gaining "insights" from users and what anthropology could contribute to that process. The topic of insight, however, has really served as a touch point for a much deeper issue of how to carry out research effectively and get at the deeper meaning behind how people engage with the world. Both designers and anthropologists use a variety of methods and approaches to gain an understanding of people and how they engage their world; both use participant observation and interviewing, visual and non-visual means of recording and analyzing information, developing or recognizing insights, iteration to refine a model or prototype of reality to test and then, finally, to produce a final ethnography or product. As an anthropologist who has gone through a Masters of Design degree, participated in design studios and interviewed professional designers, anthropologists and design students about the nature of making sense of research, I am now prepared to pull together these disparate threads into an understanding of the best practices in research for design as well as suggestions for how to improve the process as well as plans for future research in this domain.

5.1 Key Comparisons between Designers and Anthropologists

Participant Observation

Participant observation is heavily used by both anthropologists and designers to engage with people in their everyday life and both see and feel that lived reality; both use interviews and questions to uncover what people are thinking and to help break down the preconceptions that the designer may have about the world. The big difference between the disciplines lies in the time horizon, for anthropologists typically spend months or

even years in the field, logging thousands of hours with the communities and individuals that they study with, and being able to build relationships – as one anthropologist noted "You spend enough time in the field until people start to ask you if you are going to start asking them questions". Designers, by contrast, do not have the luxury of time – they work with very tight project deadlines and must carry out participant observation and interviews very quickly, often in a matter of days or at most a few weeks. Necessarily their approach to relationship building tends to be focused on looking at the problems or "pain-points" in an organization or environment, and less towards more intangible aspects of everyday life. When designers have more time to dedicate to their participant observation, however, the results can be quite impressive; as one expert designer noted "By working at Canada Post for a week we were able to better understand almost every problem than we could have if we'd asked questions of users for much longer".

Writing and Visualization

Both anthropologists and designers use writing in the context of their daily reporting and recording of what they observe and hear in their fieldwork. Experienced designers, in particular, have found that the need to keep information under control with report writing and presentation has pushed writing to the forefront of their work, as compared to when they were design students. Anthropologists, of course, have relied heavily on writing for field notes and use it to translate and re-contextualize the data they observe in the field. Designers tend to favour quantitative data, seeing it as "more reliable" and necessary in order to extrapolate to a wider market for products and product offerings; this they combine with qualitative data to understand how and why. Anthropologists, by contrast, tend to favour more qualitative data for the ability to see the

deeper picture about a people and bring in relatively little quantitative data; most of the anthropologists I spoke with had an active disdain for quantitative data, stating "my village does not speak for the world". The type of data gathered, and how it is gathered, however, is a reflection of the demands of one's project – one designer, for example, who was working in experience design, only gathers qualitative data and seeks to understand how people construct their reality. For myself, as an anthropologist who has worked on many program evaluation projects, the need for balancing qualitative and quantitative data is paramount; this sentiment was echoed by one of the anthropologists I spoke with who worked with non-governmental organizations – they found that the amount of data gathered forced quantitative approaches to make sense of it.

Designers will use several visual techniques for analyzing data, tending to create affinity diagrams with post-it notes of interview statements or observations and then gathering the patterns and plotting them on an entities map to show their relationship to the overall goals of the project – this tends to make the extreme positions or hidden needs more apparent to the design team. Some of the anthropologists I spoke with also noted using visualization techniques to see patterns in their notes, from mapping out comments to sketching connections between ideas; most, however, tended to use pattern recognition on the basis of coding their field notes and then re-writing those notes into patterned forms. Design students see affinity diagrams and entities mapping as fairly useful ways to approach data analysis – they note that the amount of data that they can gather from speaking with users, as well as the mass of desktop research data, often makes it difficult to really pull together enough to get at a "deep understanding" of the problem.

Prototyping and the Importance of Process

The path to the final ethnography or designed product/process involves iteration of prototypes – both are means to translate experiences into a tangible form that can be further examined and manipulated. What is interesting about these processes is that both designers and anthropologists use their prototypes to help them start asking questions about what is going on. For designers these prototypes start often as sketches, where they will have a conversation with the possibilities and then work to make a physical prototype to understand form, dimensions and feel. Several designers stated that they needed to build or sketch in order to think about the problems, and they frequently would look at a particular issue in a prototype and ask "How might we do…" and then try to come up with a solution. The work of generating a final prototype and the accompanying storyboard and journey map of the users to justify the proposed solution to the issue was considered an important step by experienced designers, for projects are team based and client centred and so the final solution must speak to their needs and clearly demonstrate why it is the right choice. The ability to communicate effectively in writing and visuals was an absolute must in the corporate design world, for methods were only as effective as one's ability to translate results so that others could understand them. As Figure 10 (below) demonstrates, prototypes serve to facilitate insight recognition (Sanders and Stappers, 2008), idea generation (Chung 2009), or to refine solutions, and are used at different points during the design process – from initial research to synthesis and evaluation to realization.

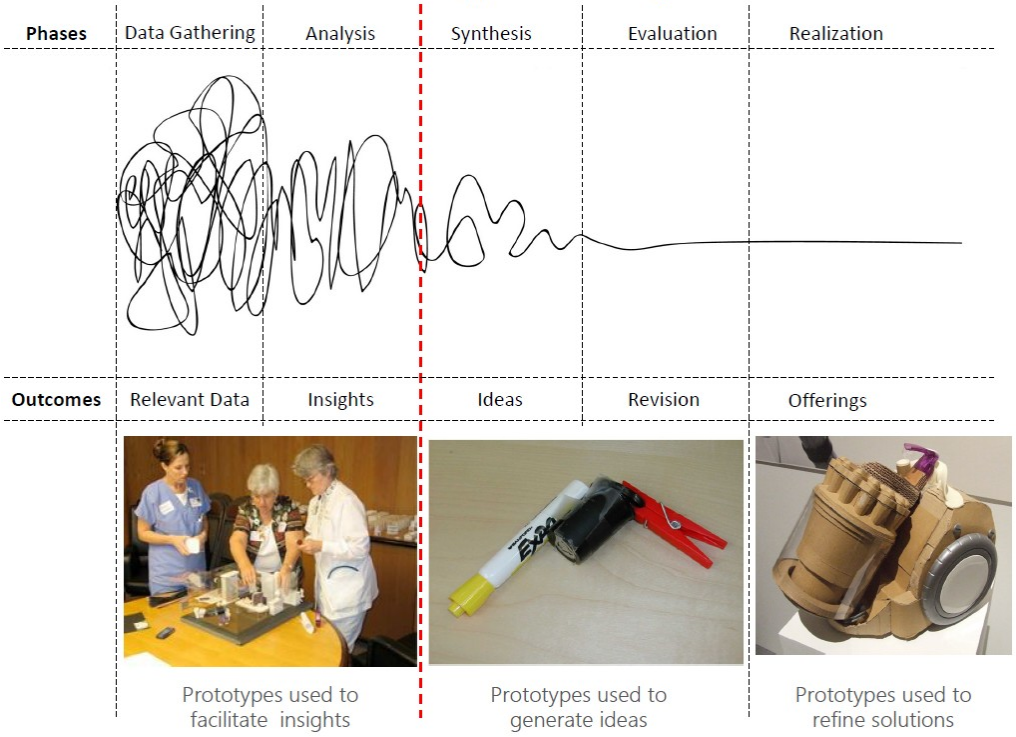

Figure 10 – Conceptions of Prototype Use in Design

Prototyping for anthropologists also flow through the process of expanding the range of possibilities and difference – and for this, we can represent the process using the double diamond model to reflect the four key phases of prototype use in the process of creating an ethnography (Figure 11). The first type of anthropology prototype are the field notes, which are the combination of accounts from the field as well as one's personal diary of the experience of the field; all of the anthropologists stressed the need to continually ask questions, both of one's field notes and the reason for one being in the field, as well as trying to articulate the best questions to ask of others. The second type of prototype, the process of writing and coding, was also integral to making sense of the world – one anthropologist noted that "you just have to write notes sometimes even if you don't know what to write – the act will help you begin to understand".

Anthropologists will also use sketching and mapping to help articulate connections, but field notes are most likely to be used as a means to both record and then re-interpret through coding; in this light field notes can be thought of as a liminal space (Jackson, 1990) where one refines the questions suggested by the first coding that need to be asked of one's informants and collaborators. The third type of prototype involves drawing on the literature and theoretical views of the literature to position their interpretations and observations in light of the broader discussions about those communities and cultural processes they undergo. All of these conceptions, definitions, questions and processes of comprehending how your fieldwork and the community you've studied with are pulled together into a monograph, which serves as the anthropologist's attempt to best represent what they see as the issues, the ways of being.

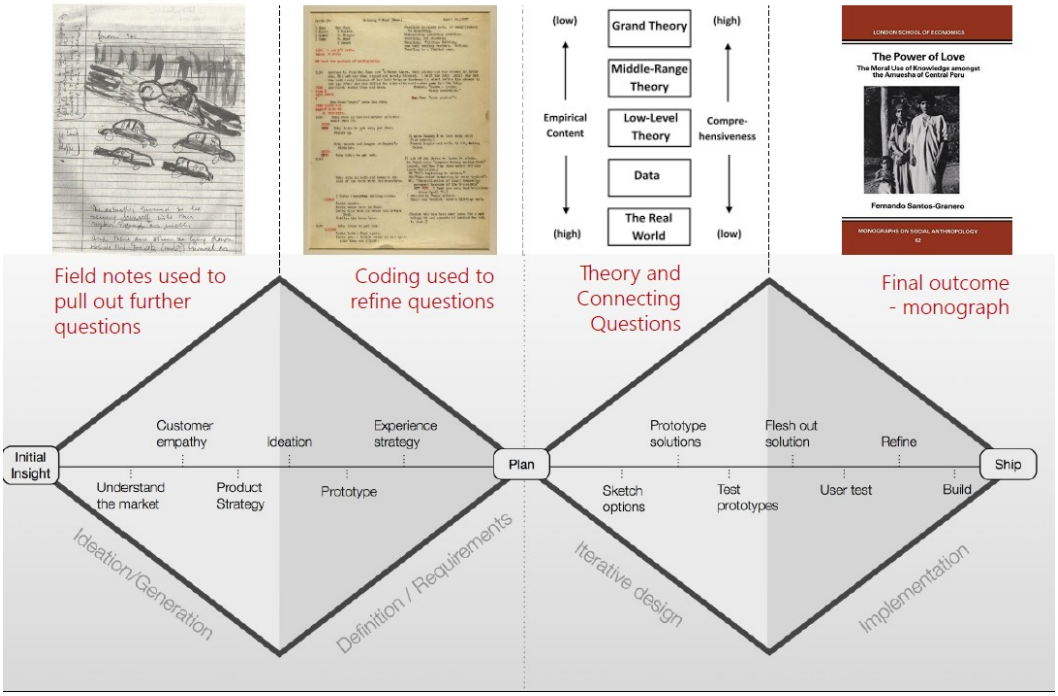

Figure 11 – Prototypes in Ethnography

The research process for anthropologists and designers differs, however, in that there is a clearer distinction between the process and the product for design, while for anthropology the ethnography is both the process and the product. Expert designers, when interviewed, did stress the need to continually use prototyping, sketching and visualization as means to understand the product potential; storyboards and written reports were also considered an essential component of communicating and defending one's ideas to the team and/or client. This process of making sure that you understand what decisions you were making at each step of the design was sometimes missed by design students, who felt that storyboards were a less necessary step that was not germane to the final prototype that they had to present. While design research manuals stress that design should be an iterative process, where one spends a fair amount of time researching and assessing options, the reality for designers working in professional firms as well as design students carrying out design studio projects is that most research is compressed into a shortened time window. Several expert designers noted that 'research' was rarely supported by clients, stating "They won't pay for it"; design students noted that they did research and interviews but then had to "move on" to coming up with prototypes that they could refine to a final product, even though they were still unclear on what they were trying to do.

5.2 Reflecting on the Process of Research in Design

I began this research as a reaction to the process of learning how to do design research as a Master's student in the Masters of Design program; as an anthropologist I had been steeped in a tradition of writing many papers, using theory and asking questions. Most of the design research techniques I was taught seemed like ways to visualize

information – but I found it hard to do, as I could not see how it would help me see patterns in data that seemed self-evident. It was not until I worked on a design team in my Design Studio class, where we had to use design research techniques to figure out a solution to improve enrolment levels in a government program that I started to see how those processes of visualization could be useful. I spent much of my time painstakingly drawing graphs and trying to display information to the team in a visual format; many times I would re-draw what others were doing and I found that it helped me see a bit differently. What was particularly remarkable was that the process of working together in studio would open up vast amounts of creativity and excitement; it was a case of the whole being more than the sum of its parts.

My reason for relating the above is to emphasize that I found that experience sensitized me to the value of using visual methods for examining data; not because it was strictly visual, but because it was, for me, like Michael Taussig's laborious seeing – so difficult and thus not something I could do on auto-pilot, like writing. I was forced to focus on the process and forget about my background – every step was a discovery of how hard it is to learn a new method and learn how to use it effectively. It is this understanding at a personal level that I bring now to the teaching of research methods to design students, and why they find the process of learning how to research users to be challenging.

The design students I spoke with found that they could see how valuable it was to study users, both for the amount and type of information they could gain as well as helping them to break free of their biases. Working together as a team was common practice for these students, and they were quick to share resources with each other as well

as critique and push each other's designs and prototypes. Their challenge, as they were quick to point out, was to figure out what users really wanted – the "deep needs" and "real problems". Research was considered an important component of this, but many felt that most desktop searches only showed them a solution that had already been made. What struck me was that the design students seemed largely unaware that the point of their projects was actually not about coming up with solutions, but rather understanding the process.

What is now more apparent to me, having spoken to designers and anthropologists about their work, is that good design and good anthropology are both about actively asking questions about your data, your solutions and your ideas, and working through those questions in a variety of means – by talking with people, by writing and coding, by sketching and making. Experience helps guide your recognition of insights but the actual generation of those insights is that active process of trying to make meaning, trying to articulate connections that are apprehended by hunch or suggestion. Both anthropologists and designers stress the need to communicate your ideas effectively to others: for anthropologists it's the story in the data, for designers the storyboard and final product that shows why this solution is appropriate. For design students, however, research is consistently seen as what comes first and then you use that material to help you make your prototypes – and there's no time to go back to do the research again if you've made a mistake. To a large degree this time crunch is understandable, since the real world of design is heavily governed by time constraints and client demands.

When we look at how designers and anthropologists best pull out meaningful insights about people and things, we see that there are some common themes that overlap. While the methods may be different, the underlying approaches to gaining insight about a product or a community follow, in my opinion, ways of understanding the problem. By highlighting these shared ways, we can then articulate a way of encouraging abductive thinking and the articulation of "hidden needs" in the learning approaches of design students.

The first of these common themes is that every project is somewhat unique, whether it is designing a service or engaging in a study of a particular community of people, but there are previous experiences, patents, products and theories that one can draw on to help reframe the issue in light of previously understood solutions. Both designers and anthropologists draw on the literature and their own experience to help them narrow down more effective lines of inquiry and start their questioning about the problem.

The second theme is that most design project work is client-centred and based on shared teamwork – similar to applied anthropology work. The use of tracking reports to indicate key desires by the client as well as progress made on the research and design plan all serve to enforce constraints on what can be done and should be done. The need to design according to a schedule and avoid simple 'blue sky thinking' sets up the parameters for the work, as well as being able to use presentation skills, prototyping and mock up skills, to argue for your version of the design. The process of explaining why you did what you did, and where you see the design going forces you to confront your own biases and make explicit your tacit assumptions. This is also what anthropologists

must do when they begin to craft conference papers or reports for clients about communities – the same process of explaining why and how come into play, and the recognition that other voices will shift the project (particularly in collaborative approaches).

The third theme revolves around iteration and learning by testing repeatedly, whether with prototypes/mock ups or with questions for end users/communities. Anthropologists will seek good questions to ask as they start to better understand the process – and designers will use sketching and prototyping to think through possibilities; perhaps combining the asking of questions and articulating new questions to ask about the nature of the problem itself, instead of solely the solution to the problem will add depth to design research at the fuzzy front end. The goal here, then, is to find questions – not solutions.

The fourth theme acknowledges the diversity of means to record and analyze information – from sketching and mocking up to writing notes and painting pictures, both designers and anthropologists use different ways to record and analyze the data that they gather, but the process of writing/visually communicating is a necessary component of creating meaning out of raw data – the ability to tell a story about the process and explain it so that someone who was not there can understand. Anthropologists will continually reframe their experiences through repeated writing and journal entries, and they see the writing up of their experiences as the second half of their fieldwork – so the recording of research and the ongoing interpretation of that research is, in itself, another form of fieldwork. In a similar vein, the process of explaining users and issues is part of the

work of design, but it is also the process of making/sketching/writing/thinking that is equally part of that process of working things out – the process of making sense.

The final theme pulls the above four together – that of breaking down preconceptions and encouraging divergent, abductive thinking to develop solutions to problems. In the visual conception of the design process (Figure 1) we see that the phases of data gathering and analysis are where designers typically are supposed to use interviewing and shadowing to gain data about users, then use mapping techniques to articulate the issues and gain insights that then get used to create product ideas to evaluate and create. Instead, I would argue we need to start the analysis as we gather data – using writing, mapping, sketching and mock ups/prototypes to help articulate the problems that are being observed. Once the designer thinks they have an idea what is going on, and what questions to ask about the issues, they can try to summarize it and then test it with the users they've observed, thereby generating more questions and issues to examine.

Participant observation is also a critical component of this process – designers repeatedly find solutions when they engage in the work of others to better understand what problems they face and where the pain point are; anthropologists, in a similar vein, use their physical experience to help attune them to the subtle issues facing the people they study with. For design students, this participant observation should include note taking not just of the user, but also of their own reactions and thoughts. Translating these observations and questions into a series of story boards to articulate the problem and issues would be a good way to focus those thoughts; these story boards could then be shared with users and new questions found. True insights about users find the hidden or

latent needs, but these are, quite often, not clear to the user – it is the designer who sees and conceives of those needs – in effect, creating them, just as an anthropologist creates, in part, a 'culture' of a community in an ethnography by seeing connections that may not be readily apparent to the community living them. Anthropologists use participant observation and repeated questioning of themselves and their collaborators to determine what the real issues are; this quest for questions and the struggle to explain the connections is what helps them get at the deeper meanings below the surface of everyday life. For designers to get at that meaning, they must begin to analyze their data as they gather their data – and be prepared to repeatedly engage with users as they work to clearly articulate what the issues really are.

In light of these observations I think the following areas may help more design students learn how to carry out research more effectively:

1. Design research should continue to emphasize participant observation and interviewing but with even more attention placed on repeat interactions with users and environments.
2. Additional emphasis should be placed on creating and refining questions – both for content and clarity but also to allow for a refinement of questions after they've been asked of participants.
3. Instead of using the term "insight" we should use the term "deeper understanding" as the goal of the research – not to create a new buzz word but rarely to reflect what is actually happening during each stage of the prototyping and refinement process.

4. Anthropology should continue to promote and emphasize the use of visualization, mapping, note taking and other paths to understanding – continuing to stress that participant observation really extends through the whole process of creating an ethnography – that learning is an active process of making and doing, conceiving and communicating.

5.3 Limitations of this Research Study

Although this study has made a valuable contribution in terms of articulating the connections between design and anthropology's approaches to qualitative research, it does have some limitations that limit the impact of its findings. These limitations have to do with the choice of sampling groups, challenges surrounding the number of participants in those groups, confusion around the term "insight", and the lack of any measure to 'test' how well "deeper understanding" might work.

For the first limitation, choice of sampling groups, the focus was on expert designers and anthropologists and design students, but not on anthropology students. This may have affected the comparability of expert approaches to student ones, as it might be useful to see how anthropology undergraduate students internalize the teachings of anthropology professors; is this problem of wanting to get to the solution solely for design students or really an issue common to undergraduate students in other disciplines?

The second limitation, sample size, affects the design student population that was engaged – only five students were interviewed – despite the best efforts at recruitment. While these students did give very thorough and engaging answers to the questions, it might be beneficial to have a broader range of student input, from second through fourth

year in design and larger numbers of respondents to have a sense of the broader perspective.

The third limitation had to do with the term "insight" itself, which often tripped up interviewees as either a "meaningless" term or one that was confusing. While the point of the research was to investigate "insights", it may be useful in future to focus investigations away from specific terms and rather on the products of the prototyping/research processes for clarity.

The fourth, and final, limitation was the absence of a workshop or testing mechanism to demonstrate that increasing questions as part of the design research process would provide deeper understanding of users and their latent needs. That being said, the understanding of the whole process only came together after the interviews with the students and once the entire thesis was written and constructed; this thesis has provided that foundation for future research.

5.4 Suggestions for Future Research

Like any piece of research, this thesis can only scratch the surface of the much larger field of design pedagogy and design thinking. While the survey of the design literature was fairly comprehensive it is by no means exhaustive, and the range of opinions that could be gained from subject matter experts and students was limited to a small and decidedly qualitative sample. That being said, this research has revealed that the process of meaning making and asking questions is critical to the process of recognizing insights and developing more effective understanding of people and things.

There has been a growing call for the use of theory in design research for while the design research process has been well articulated, the connections that justify those methods are less clearly defined (Friedman 2002). One possibility that may assist with this linking of higher level theory to the ground level observations is the use of middle range theory; first developed by Robert K Merton as a means to assist sociological theorizing by integrating theory and empirical research, and develop those measures to assist with the research process on a more limited case by case basis.

There is also the changing nature of design to consider, with the blurring lines between designer, user and maker (from conventional to participatory, co-design and open design approaches) that impact design research and design, opening new design domains process to focus on the purpose of design (as conceived by Sanders 2013 – Figure 12).

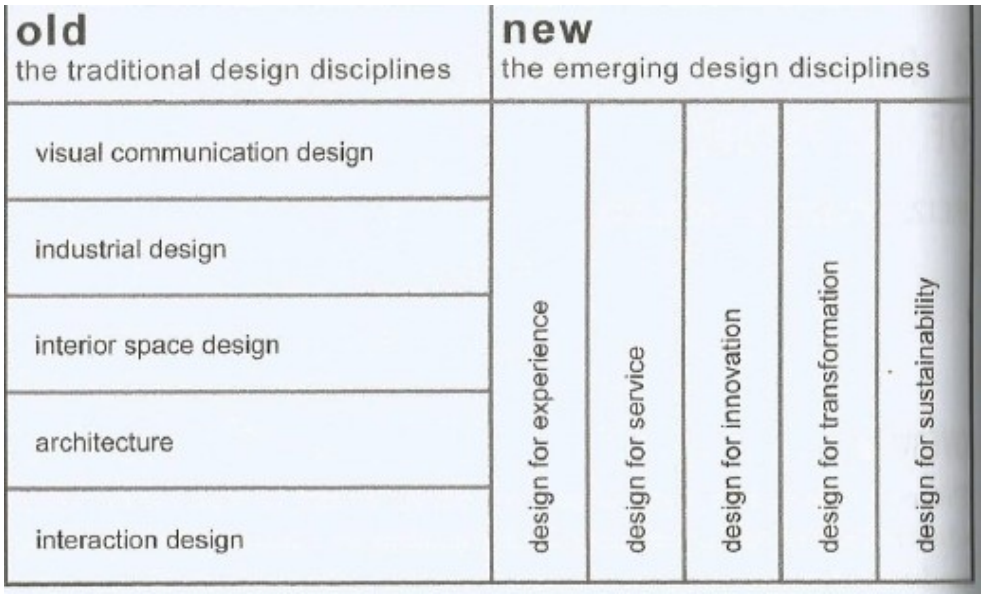

Figure 12 – Emerging Design Disciplines (Sanders 2013 fig 4.1 p60)

Many of those same challenges to reconcile applied and public approaches to a discipline are being dealt with in anthropology, as the lines between informant, participant, anthropologist and the right to control the outcomes of research are being re-examined and re-contextualized (c.f. Field, 2008; Lassiter, 2005; Peacock, 2008; Squires, 2002). In addition, there is the growing field of anthropology of design that explores some of the connections between the disciplines (c.f. Murphy, 2016; Korsby et al., 2016); clearly there are many new areas to explore within this cross-fertilization of method and theory between the disciplines. Finally, the use of toolboxes and prototyping to enhance research and study could be investigated in more depth to add to the generation of future avenues for research (Sanders and Stappers, 2012; Sanders and Stappers, 2014).

In order to better test some of the observations that I've developed in this work, I would like to expand the research in the following directions:

1. Carry out much more extensive interviews with a diverse group of designers and students both in anthropology and design and at different levels (graduate and undergraduate)
2. Create experiments to test new methods for improving student interviewing and participant observation techniques within design courses, in conjunction with design professors carrying out design research instruction and studio instruction.
3. Develop appropriate mid-range theory that works within design research principles and evaluate its effectiveness for guiding design research
4. Dive more heavily into the literature on design and anthropology and position this future research in those conversations.

As design research has grown over past few decades to deal with ever more complex issues, products and services, the need for improved techniques for recognizing and capitalizing on insights has only grown as well. It is clear that the term “insight” may well be better replaced by “deeper understanding” and the use of a variety of ethnographic and design research techniques can be refined to help assist design researchers and students to better articulate latent needs of users and seek out the questions that underpin that process of knowing.

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Glossary

Designer	For the purposes of this thesis, the word “designer” refers to individuals who have been trained in a studio-based program such as industrial design, architecture or graphic design, where sketching methodologies are taught as part of the training syllabus.
Expert	is defined as an individual with 10 or more years of experience in their field and as a result has developed distinct professional skills that are reflected in the way they solve problems in their field.

Appendix A

Interview Questions

Designer (Professor/Professional) Questions

1. Can you describe a typical research process for a project?
   (Probing sub-questions)
   a. What were the sticking points in the process for this project?
   b. How did you overcome them?
2. What methods do you use to gather data?
3. What methods do you use to analyze that data?
4. What is your definition of an 'insight'?
5. How do you recognize insights from your data, your work?
   (Probing sub-questions)
   a. Are there preferred processes for 'pulling things together'?
6. How does your daily practice differ from what you were taught in school?
   (Probing sub-questions)
   a. How much does sketching, prototyping, visualization, mind mapping serve?
7. What would help you in your work with regards to improving the process of gathering and analyzing data about users?

Anthropologist (Professor) Questions

1. Can you describe how you typically approach a new fieldwork project?
   (Probing sub-questions)
   a. What are your preferred recording and research methods
   b. What are the sticking points you find are part of the process
2. What is your definition of an "insight"?
3. What methods do you use to gather data?
4. What methods do you use to analyze that data?
5. How do you pull things together from your fieldwork?
   (Probing sub-questions)
   a. What are the processes you use to 'make sense' of everything?
6. How does your daily practice differ from what you were taught in school?
   (Probing sub-questions)
   a. Do you think differently about the field and making sense than you used to?
7. What would help you in your work with regards to improving the process of gathering and analyzing data?

Architecture (Professor/Professional) Questions

1. Can you describe a typical research process for a project?
   (Probing sub-questions)
   a. What were the sticking points in the process for this project?
   b. How did you overcome them?
2. What methods do you use to gather data?
3. What methods do you use to analyze that data?
4. What is your definition of an 'insight'?

5. How do you recognize insights from your data, your work?
   (Probing sub-questions)
   a. Are there preferred processes for 'pulling things together'?
6. How does your daily practice differ from what you were taught in school?
   (Probing sub-questions)
   a. How much does sketching, prototyping, visualization, mind mapping serve?
7. What would help you in your work with regards to improving the process of gathering and analyzing data about users?

Design Student Questions

1. Can you describe a typical research process for a project?
   (Probing sub-questions)
   a. What were the sticking points in the process for this project?
   b. How did you overcome them?
2. What methods do you use to gather data?
3. What methods do you use to analyze that data?
4. What is your definition of an 'insight'?
5. How do you recognize insights from your fieldwork?
   (Probing sub-questions)
   a. Are there preferred processes for 'pulling things together'?
6. How useful did you find the fieldwork for your later prototyping and concepts?
   (Probing sub-questions)
   a. How much does sketching, prototyping, visualization, mind mapping serve for your work?
7. What would help you in your work with regards to improving the process of gathering and analyzing data about users?
8. If you were able to have absolute control – what would you change about the methods teaching in the School of Industrial Design Program?
   a. Or in the MDes program?

Appendix B

(Sample Email to Potential Participants)

SME Email Letter
Dear….

My name is Paul Thibaudeau and I am a graduate student in the School of Industrial Design at Carleton University working on a research project relating to understanding the process of gaining user insights to support my Masters of Design thesis research, under the supervision of Professor WonJoon Chung.

I am writing to you today to invite you to participate in an in person interview relating to the process by which social science researchers recognize and develop insights during their research as part of their practice.

This interview will take approximately 45 minutes of your time. We will protect your identity by keeping all responses anonymous. To thank you for your participation in the study you will be provided with the compensation of a $10 Starbucks gift card.

You will have the right to end your participation in the study at any time, for any reason, up until March 31, 2016. If you choose to withdraw, all the information you have provided to date will be destroyed.

The interviews will be taking place during the period of February 15 to February 29, 2016 and held in person at a location of your choosing or at Carleton University. In addition, interviews can be conducted by phone.

If you are interested in participating in this study, or have any questions about this study, please get in touch by or before February 15 by responding to this email so that we may set up a time to speak together.

Thank you in advance and all the best,

Paul Thibaudeau

Please note:
This ethics protocol was reviewed by the Carleton University Research Ethics Board-B (Protocol 16-00-1), which provided clearance to carry out the research. (Date of ethics clearance: January 28, 2016 and Ethics Clearance for the Collection of Data Expires: August 31, 2016). The study number is 16-030.

If you have any ethical concerns with the study, please contact Dr. Shelley Brown, Chair, Carleton University Research Ethics Board-B (by phone at 613-520-2600 ext. 1505 or via email at Shelley.Brown@carleton.ca). You may also contact the Carleton University Research Compliance Office directly at ethics@carleton.ca .

Professor Email to visit classrooms to recruit design students:

Dear Professor xxx

As you know, I am a graduate student in the School of Industrial Design at Carleton University working on a research project relating to understanding the process of gaining user insights to support my Masters of Design thesis research, under the supervision of Professor WonJoon Chung. My purpose for emailing you today is to ask if I may come to your Third and Fourth year classes or studios in Industrial design to recruit students for my study regarding the use of ethnographic field techniques in design research, which is entitled "Drawing on the Write Things: Finding the Hidden Needs in Design".

The study would require participants to sit with me and answer some semi-structured interview questions about their experiences carrying out ethnographic field techniques like participant observation, note-taking, and related approaches to understanding user needs and behaviours. The interviews will likely require 30 minutes of your time.

Participation in this research is completely voluntary and does not count towards nor affect any grades or deliverables for any of your classes. The students may withdraw from the study at any time up to November 21 and all of their responses, as well as their identity, will be kept anonymous and de-identified.

If you would allow me I would come and provide a brief speech to the students (I attach a copy of that to this email) as well as pass out copies of the consent form letter that they could examine and then email me if they would wish to participate.

Ideally I would like to recruit students this week and next week if that is possible – so if you could let me know when and where your classes are and which ones would be appropriate for me to recruit in I would be most grateful.

Thank you,

Paul

Paul Thibaudeau
MDes Candidate, School of Industrial Design

Ethics clearance for the following research has been **cleared** by the Carleton University Research Ethics
Board (CUREB-B) at Carleton University. CURE-B is constituted and operates in compliance with
the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans* (TCPS2).
Ethics Protocol Clearance ID: Project # 105385
Faculty Supervisor: Dr. WonJoon Chung,Carleton University
Research Team: Dr. WonJoon Chung (Primary Investigator)

Paul Thibaudeau (Student - MA student)
Study Title: Drawing on the Write Things: Finding the Hidden Needs in Design [Paul Thibaudeau]
Funding Source (If applicable):
Effective: **October 20, 2016** Expires: **October 31, 2017**.

Appendix C

Consent Letters

Subject Matter Expert Interview Consent Form

Title of the study: Understanding the Process of Gaining User Insights (Study No. 16-030)

Principal Investigator: Paul Thibaudeau, PhD
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School of Industrial Design
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Ottawa, Ontario K1S 5B6
Tel: 613-520-6606
Email: wonjoon.chung@carleton.ca

Invitation to Participate: You are invited to participate in the abovementioned research study conducted by Paul Thibaudeau entitled "Understanding the Process of Gaining Insights"

Purpose of the Study: The purpose of their study is to consult with a subject matter expert about their research project to gain a better understanding of the issues and the complexities surrounding their work.

Participation: Your participation will consist of answering a series of interview questions and the researcher does not expect it take more than 30 minutes of your time. He will contact you by email first and provide you with a list of the questions in advance so that you may gather your information.

Risks: Your participation in this study will entail that you answer the researcher's questions about the issues in your field honestly and clearly. There might be mild social risk as you may discuss some work processes and personal observations of those processes. There might be mild economic risk if you might reveal 'trade secrets' for

conducting qualitative research. To mitigate these risks, the researcher will do the following:
keep your name anonymous (if you choose)
conduct the interview in a non-judgmental manner
respect your wish to not answer any question and not to pressure for answers
maintain confidentiality of the contents of the interview

Compensation: Your participation in this study will result in the compensation of a handwritten card and a $10 Starbucks gift card to thank you for your time answering the researcher's questions.

Benefits: Your participation in this study will serve first to help the researcher understand the process by which the members of your profession gain insights in their fieldwork and daily practice. Second, these insights will be used by the researcher to help develop better approaches for training students in the field of industrial design to gain insights more effectively.

Confidentiality and anonymity: Each respondent's anonymity will be maintained by provide a unique code to each interview that will be used for the study's purposes. Answers to these interview questions may be used verbatim in the thesis for research purposes. The only persons who will have direct access to all of the research data (including respondent's names) will be the researcher and the researcher's supervisor (Dr. WonJoon Chung). The data gathered during this research may be used in conference papers and/or publications in future, but will maintain the anonymity and confidentiality of the respondents.

Conservation of data: The data collected will be kept in the hands of the researcher during the study period of the thesis and be conserved by the researcher for that purpose.

Voluntary Participation: You are under no obligation to participate and if you choose to participate, you may refuse to answer questions that you do not want to answer. By agreeing to meet with the researcher and carrying out the interview implies your consent to participating.

Right to Withdraw: At any time prior to or during the interview process you may withdraw from the study. You may request that any interview data gathered up to that point be removed from the study or any answers that you have given to some questions be removed. The researcher will ask at the end of the interview if there are any items you would like removed or revised, or if you would like to withdraw from the study.

Acceptance: I, *(Name of participant),* agree to participate in the above research study conducted by Dr. Paul Thibaudeau of the School of Industrial Design, Carleton, which research is under the supervision of (Dr. WonJoon Chung).

Ethics Clearance: This ethics protocol was reviewed by the Carleton University Research Ethics Board-B (Protocol 16-00-1), which provided clearance to carry out the research. (Date of ethics clearance: January 28, 2016 and Ethics Clearance for the Collection of Data Expires: August 31, 2016).

If you have any ethical concerns with the study, please contact Dr. Shelley Brown, Chair, Carleton University Research Ethics Board-B (by phone at 613-520-2600 ext. 1505 or via email at Shelley.Brown@carleton.ca). You may also contact the Carleton University Research Compliance Office directly at ethics@carleton.ca .

There are two copies of the consent form – one of these signed consent forms will be retained by the researcher and one signed copy retained by the respondent.

Participant's signature: *(Signature)* Date: *(Date)*

Researcher's signature: *(Signature)* Date: *(Date)*

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Student Participant Consent Form

Title of the study: Drawing on the Write Things: Finding the Hidden Needs in Design

Principal Investigator: Paul Thibaudeau, PhD
Masters of Design Candidate
School of Industrial Design
Carleton University
1125 Colonel By Drive
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Email: paul_thibaudeau@carleton.ca

Supervisor: Dr. WonJoon Chung
Assistant Professor, Graduate Program Coordinator
School of Industrial Design
1125 Colonel By Drive

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Tel: 613-520-6606
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Invitation to Participate: You are invited to participate in the abovementioned research study conducted by Paul Thibaudeau entitled "Drawing on the Write Things: Finding the Hidden Needs in Design"

Purpose of the Study: The purpose of their study is to determine how design students use ethnographic research techniques to understand hidden needs.

Participation: Those who choose to participate are to send an email to the researcher to set up a time to meet. The researcher will provide any participant a copy of the semi-structured interview questions that will be asked. Both the researcher and the participant will sign two copies of this consent form (one for each party). The researcher will then ask the participant each of the interview questions in turn and write down their responses. The participant may also provide additional information beyond the questions if they so choose. No photographs, video-recordings or audio-recordings will be used by the researcher – only handwritten notes.

Risks: Your participation in this study will entail that you answer the researcher's questions about the fieldwork you have carried out honestly and clearly. There might be mild social risk as you may discuss some work processes and personal observations of those processes that entail the criticism of the process of research. To mitigate this risk, the researcher will:
keep your name and comments/research anonymous (each interview will have a code number that is not connected with your name/course)
respect your wish to not answer any question and not to pressure for answers

Compensation: There is no compensation associated with this study.

Benefits: Your participation in this study will serve first to help the researcher understand the process by which students learn to develop questions and insights about qualitative data, which may be used to improve the teaching of research methods to future design students. In addition, you may improve your own research abilities with regards to question generation and focusing your observational skills.

Confidentiality and anonymity: All participants will be given a unique code number to identify their responses, but these will not be linked to their names in any documentation. Any references made to names in the interview will be changed and any situations that may like the participant to identifiable events will be modified to de-identify them. The data gathered during this research may be used in conference papers and/or publications in future, but will maintain the anonymity and confidentiality of the respondents.

Conservation of data: The data collected will be kept in the hands of the researcher during the study period of the thesis and be conserved by the researcher for that purpose.

Voluntary Participation: Participation is voluntary and will not affect any participants grades or standing in any course or section of the program if a student chooses to participate, does not choose to participate or decides to withdraw from the study at any time within the deadlines (see Right to Withdraw below)

Right to Withdraw: At any time prior to or during the interview process you may withdraw from the study. You may request that any data gathered up to that point be removed from the study or any answers that you have given to some questions be removed. The researcher will ask at the end of the interview if there are any items you would like removed or revised, or if you would like to withdraw from the study. You have until November 21, 2016 to retroactively remove your data from the study if you wish – you may contact the researcher at his Carleton email address for this purpose.

Use of Data: The data gathered from this study will be used for the Masters of Design thesis written by the researcher and may be used for future publications by the researcher. Anonymity and de-identification of research data will be maintained for any and all research uses.

Acceptance: I, *(Name of participant),* agree to participate in the above research study conducted by Dr. Paul Thibaudeau of the School of Industrial Design, Carleton, which research is under the supervision of (Dr. WonJoon Chung).

Ethics Clearance: This ethics protocol was reviewed by the Carleton University Research Ethics Board-B (Andy Andler and Shelley Brown), which provided clearance to carry out the research. (Date of ethics clearance: October 20, 2016 and Ethics Clearance for the Collection of Data Expires: October 31, 2017).

If you have any ethical concerns with the study, please contact Dr. Andy Adler, Chair, Carleton University Research Ethics Board-B and the Carleton University Research Compliance Office (by phone at 613-520-2600 ext. 4085 or via email at ethics@carleton.ca) .

There are two copies of the consent form – one of these signed consent forms will be retained by the researcher and one signed copy retained by the respondent.

Do you agree to participate in the study? _____ Yes _____ No

_____ _____
Signature of participant Date

_____ _____
Signature of researcher Date

Appendix D

Ethics Approval Certificates

Carleton University Research Ethics Board (CUREB)

Certificate of Ethics Clearance

Principal Investigator	Department	StudyNumber
Paul Thibaudeau	**Industrial Design**	**16-030**

Co-Investigators and other researchers:

Researcher	Study Role	Position
Won Joon Chung	Faculty Supervisor	Faculty

Study Title: **Understanding the Process of Human Insights**

Approval Date: **01/28/2016** Expiry Date: **08/31/2016** Approval Type: Final

Submitted Date	Study Component	Approval Date

Validity Term:

Comments:

Certification

The protocol describing the above-named project has been reviewed by Carleton University Research Ethics Board and the research procedures were found to be acceptable on ethical grounds for research involving human participants.

[redacted]

Chair, Carleton University Research Ethics Board (CUREB)

This Certificate of Clearance is valid for the above term provided there is no change in the research procedures.

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CERTIFICATION OF INSTITUTIONAL ETHICS CLEARANCE

Ethics clearance for the following research has been **cleared** by the Carleton University Research Ethics Board (CUREB-B) at Carleton University. CURE-B is constituted and operates in compliance with the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans* (TCPS2).

Ethics Protocol Clearance ID: Project # 105385
Faculty Supervisor: Dr. WonJoon Chung,Carleton University

Research Team: Dr. WonJoon Chung (Primary Investigator)
Paul Thibaudeau (Student - MA student)

Study Title: Drawing on the Write Things: Finding the Hidden Needs in Design [Paul Thibaudeau]
Funding Source (If applicable):

Effective: **October 20, 2016** Expires: **October 31, 2017**.

Restrictions:

This certification is subject to the following conditions:

1. Clearance is granted only for the research and purposes described in the application.
2. Any modification to the approved research must be submitted to CUREB-B. All changes must be approved prior to the continuance of the research.
3. An Annual Application for the renewal of ethics clearance must be submitted and cleared by the above date. Failure to submit the Annual Status Report will result in the closure of the file. If funding is associated, funds will be frozen.
4. A closure request must be sent to CUREB-B when the research is complete or terminated.
5. Should any participant suffer adversely from their participation in the project you are required to report the matter to CUREB-B.
6. It is the responsibility of the student to notify their supervisor of any adverse events, changes to their application, or requests to renew/close the protocol.
7. Failure to conduct the research in accordance with the principles of the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans 2ndedition* and the *Carleton University Policies and Procedures for the Ethical Conduct of Research*may result in the suspension or termination of the research project.

Please email the Ethics Coordinators at ethics@carleton.ca if you have any questions. If a researcher requires a certificate with a signature, they may contact ethics@carleton.ca to have one generated.

CLEARED BY: **Date:**
Andy Adler, PhD, Chair, CUREB-B **October 20, 2016**

Shelley Brown, PhD, Vice-Chair, CUREB-B

Appendix E

Matrix of Designer SME Answers

Question	A1	A2
1. Can you describe a typical research process for a project?	-Physical materials have potentials, "manufacturers can do just about anything" -Use research to figure out what others have done/could do -Research is all along process until product done	-architecture more accreditation and operational procedure – formal process for design -urbanism more data and strategic thinking; more about possibilities and people ("living approach")
2. How do you gather data?	-survey people -more user testing on digital side due to complicated interfaces -less for physical – product market research key	-architecture more client demand base and stakeholders -urbanism more mapping and merging social/quantitative data
3. How do you analyze that data?	-take data in view of where we want to be in market -feedback is qualitative, data is something you quantify -more faith in quantitative than opinions	-"Architects really don't talk to people" -short term and design to procedure -Urbanism has to engage people with narrative mapping and shadowing
4. How do you define a user insight?	-physical easier due to real constraints (standardized forms) - digital more mockups and working with users – less clear Define insight as trail and error use learning by users	-architecture uses evaluation models (post-occupancy) -visual writing and imaging helps see connections
5. How you recognize insights from your data/work?	-is a process -make reports for business if digital testing -intertwine research/making if physical	-urbanism sees city as embedded – to work with, not over -students build real model of Vanier – engage and see the model/reality, engage with real city planners, developers
6. How does your daily practice differ from school teaching?	-20% design/ 80% manufacturing side -need strong mass production and outsource ability	-more writing now, art and creative work
7. What would help you in your work with regards to improving the process of gathering and analyzing data about users?	-students should choose direction and make decisions -use data and insights to decide -functionality good, beauty as well	-need more collegial approach to academic research -teach students to think for themselves -livepedagogy -visit of urbanism lab – students see building model as tedious but helping them to think

Question	A3	A4
1. Can you describe a typical research process for a project?	-professional design is building business networks, for students more literature review and test analysis -you need to work with multiple experts to solve problems (ex: adhesive no outgas) -"Any project is a partnership"	-private practice does not call it research -SOP depends on project – might be collect articles or specs on furniture -lit review on standards and HC guidelines -develop concepts to test -sticking points often difference of opinion; money vs best practices; time spent communicating and building stakeholder relationships
2. How do you gather data?	-lit reviews -test materials and beta runs -mocking and prototyping – innovation comes from this	-lit review -draw on stakeholders -designers as bridge-builders to navigate conflicts -need time to percolate ideas and markup concepts and talk
3. How do you analyze that data?	-take quantitative data about materials/capacities and test -mock up and test "I play, I apply" -"See it for what it is" – practical app. -User tests give intuition and 'oh wow' moments	-quantitative data are hard facts like STC or bldg codes -qualitative – feedback, mockups and prototypes – document it all
4. How do you define a user insight? 5. How you recognize insights from your data/work?	**Subject combined q4 and 5** -'aha' comes from experience and knowledge -gain insight by doing -insight from one industry and transfer to another -jump in and use mockups -fuzzy front end merging lit reviews, talking and doing	**Subject combined q4 and 5** -"never heard that word once in industry" -mostly it's "let's try this" not a big AHA moment -more about asking what to try next – more incremental, not a sudden transition to 'knowing' -team work key – fresh ideas
6. How does your daily practice differ from school teaching?	- more computer tech (CAD) -work with more people – get ideas from engineers to marketing -manufacturing constraints frame what you can do -sketching key to think, clarify and get discussion going "designers are information sharers" -must listen well and "Get people to play and react" – get ideas from them -sketch models and mockups are "relationship builders	-school taught me drawing, communicating and mfg (most useful) - business world gives much less time to do things -need to sketch quickly, investigate people and deal with paperwork and delegation
7. What would help you in your work with regards to improving the process of gathering and analyzing data about users?	-more school projects based on interacting with outside people -work with people that have vested interest -use SMEs and data to push ideas -front lines people have much to contribute	-clients see research as little more than lit reviews -research takes time, attention and care – students see it as something to get through – studio is everything -get student input to projects to increase engagement -research not a straight line

Question	A8
1. Can you describe a typical research process for a project?	- undergrad research is all product focus and solution orientation -MDes is higher level research to improve design methods/develop research questions -exploratory research not just about solving problem but understanding what problems really are -often intent to collaborate (colleagues or clients) -common sticking point is logistics, budgets -undergrads get stuck either not doing the research or not framing question so that it is doable -design phases are more to help students create milestones and guide the process
2. How do you gather data?	-you start with secondary research with multiple information sources -primary research more user focused and relies on physical prototyping, affinity diagrams, card sorting and co-creation -visualizing the data and scenarios through story boards -development work means using prototypes to stimulate conversations with crazy mazungos -tend to have qualitative but I'd like more quantitative methods with stats and surveys
3. How do you analyze that data?	-qualitative data is double-edged sword quick and efficient but not absolute answer -need more quantitative data in design – big data, SPSS, replicability -testing labs will isolate variables and quantify quality and standards -designers need Nvivo skills to enhance qualitative analysis -"design thinking" is really creativity vs explaining
4. How do you define a user insight?	Insight is something that exposes a problem; exposes a behavior I can leverage; unexpected behavior I don't know what to do with -design insights are "things I can work with" – but bias for solutions contra social scientists "that's interesting" and look for questions to generate theories sometimes easy – people say x and I see it -often need analysis – particularly with qualitative data (nVivo or affinity diagram) -insights good for disproving your gut feeling "that's not really the problem" -prioritization of client will shape what you recognize – need to zoom in and out to keep your focus
5. How you recognize insights from your data/work?	--write up brief in industry to display specifications – guiding, cited and living document -report and discussions in teams with clear goals to move project forward -summarize for final patent or executable product -design research is not about getting insights and designing "the thing" but evolving learning in the process – research does not precede design
6. How does your daily practice differ from school teaching?	-industry now sees design research as a strategy – more formal steps now -designers must get used to reports and detail research and work -must educate clients on prototyping benefits and trade show goods to discuss -little continuity between design research and design product -designers must understand design research better and articulate it more clearly
7. What would help you in your work with regards to improving the process of gathering and analyzing data about users?	-realize that design is rarely about the one elegant solution but many contributions -SID must formalize research report writing -protoypes as tangible conversation vs prototype as product -writing is important but can be visual – document decisions -avoid ego – students never want to finish someone's else project but be the star -design is in practitioner vs theorist debate – ISO not design strategists but governance

Question	A9
1. Can you describe a typical research process for a project?	-we use 'critical project drivers' (CPD) with three questions – quality, cost and timing with a focus on QFD (quality, functional, deployment) -CPD is a one-pager living doc that ensures all are on the same page and show client trade-offs necessary – CEO sign off = expectation mgt tool -risk is the fourth and always asked question -for sticking points don't get stuck try, fail, learn, move on -look at desired end state to know where you want to go (CPD to orient) -safety/risk paramount concern
2. How do you gather data?	-patent and product research -get similar products and test them "There's not much new in the world" -2-3% of time get 'blue-sky projects' like Nortel but rare -reach out to SMEs for technical issues and outsource parts where it makes sense
3. How do you analyze that data?	-user and ergonomic studies key -years of experience, trials of products -go to CPD to remind ourselves of what we want to achieve -did we deliver and is it aesthetically pleasing?
4. How do you define a user insight?	-client says "this is what people want" and we do a QED to look deeper -insights happen when you do participant obs (worked Canada Post to find pain points) -look at product use-wear "goat tracks" -look at uses of product already – can use similarity to inform your choices
5. How you recognize insights from your data/work?	-capture images while working -use powerpoint to tell story to team -find similar products/markets -keep old parts around to play with – use mockups and prototypes to think. A 20 year old solution can save you three steps -patents are narrower and more incremental – more evolving of what exists already. Take fundamentals of a product to apply to solve another one -consider processes in your choices – union pushback so convince safety and worker health…but remember risk/safety is no1 -mockup and sketching key to think and communicate – have to sell ideas to colleagues -client important for ideas and honesty
6. How does your daily practice differ from school teaching?	-school taught me mfg and sketching and communication as key – and it is -must keep the hands-on learning – not just UX -Make students do CPD and learn how communication and constantly re-engaging the problem space is key
7. What would help you in your work with regards to improving the process of gathering and analyzing data about users?	-must be pragmatic – use storyboard, prototypes, photos to flesh out assumptions -teamwork important – each has abilities that complement -want pragmatic creativity – write down what you are doing and set constraints to encourage creativity

Question	A11
1. Can you describe a typical research process for a project?	-projects all unique so figure out territory – set up proposal to orient team -clients have set ideas and ID is to hone that view -no client wants to pay for fundamental research. I see a great chasm between applied and academic research in design -sticking points – problems are spurs for design and you always have constraints "no design in a white room" -use past experiences and play with things "everything is an outcome of what went before"
2. How do you gather data?	-data is numbers for me – should be client provided
3. How do you analyze that data?	-qualitative is tougher to get up front -"clients come to us for the qualitative" and use SME experience network to get design/engineering on same page -must do design and use together – clients forget
4. How do you define a user insight?	-insights are not a big thing but rather part of process that networks the ideas and connections -have to get embedded inot the product (baby monitor clip exposed = emotion) -CAD doesn't speed thinking up – still takes the time that it takes
5. How you recognize insights from your data/work?	- next step is the leap to give permission to sketch and play with ideas/possibilities -sketching cheap for exploring possibilities -allow opportunity to play a role
6. How does your daily practice differ from school teaching?	-must emphasize more sketching and drawing ability – must be able to communicate visually -concept is key to grabbing the imagination of the client -put mind on paper then in CAD – avoid falling in love – use to think -must consider time and money budgets -models and prototypes dirty to explore, clean to convince -process is iterative and about solving problems, not making pretty
7. What would help you in your work with regards to improving the process of gathering and analyzing data about users?	-need government to fund innovation (old IRAP grants under Design Canada with Industry Canada)

Question	A12	A14
1. Can you describe a typical research process for a project?	-professional design less research and more client demand projects -tend to do project briefs to frame negotiation and keep track -clients experts on what they want, but miss the user -key roadblocks are conflicting expectations and getting stuck needlessly – reach out to SMEs and team to advise	-for projects we tend to focus on services and systems -pull together stakeholders and frame parameters of the project Sticking points include terminology and knowing the client's spectrum of naivete
2. How do you gather data?	-internet, books, interviews, user questionnaires -look at patents and old products – use anything – time is the constraint -ethics is also needed if do research with students	-SID taught me not just the product but look at the need -we use stakeholder labs (focus groups) to plan activities and see what we want to get -empathy mapping and journey mapping to get participants thinking -engage with people for 3 weeks to 2 months – build rapport/find tidbits to dissect events
3. How do you analyze that data?	-you are always processing and then have 'insight' -we'll use storyboards and prototypes (vary) to convince and show	-mostly qualitative data – much time to analyze to find meaning behind words -do use survey data as quantitative
4. How do you define a user insight?	Define "it's something that's new and has value based on the research and work you've done" -something original you didn't know before and is useful to project	Our process is that we break down the data and then synthesize to recombine it into something – and that process is where we get user insights
5. How you recognize insights from your data/work?	-be immersed but use design brief to keep track, give big picture, move with project -any insights are usually project specific – we do the best we can for the client at this budget and this time	-"need statements" latent vs obvious -put them on floor and categories "bubble up" -things come into focus (caregiver complain sans issues) -use a collaborative team process –talk about why you are thinking a certain way -aha often (bio vs adoptive parents FASD)
6. How does your daily practice differ from school teaching?	-timelines more intensive in work world -can't be as creative – cut down on lateral moves or "crazy ideas" -need more communication skills and people skills – managing expectations	-SID skills helped me to visualize -my work is less about physical things and more experience and the systems -3rd year was when I saw that design is not about stuff but people
7. What would help you in your work with regards to improving the process of gathering and analyzing data about users?	-students should rely less on internet and more on real things and real people -learn time mgt, stress mgt, how to spell out details and big picture -must bring reality of the product to the user -must show the client how you got your ideas and learn how to find loopholes	No comment on this.

Appendix F

Matrix of Anthropologist SME Answers

Question	A5	A6
1.Can you describe how you typically approach a new fieldwork project?	-I am more comfortable now with not being sure of the end state of the research and I enjoy "thinking about things otherwise" -I believe in the standard ethnographic approach – need time to cultivate relationships and networks -social media helpful -not fan of interviews –but reality is shorter time for fieldwork today -listen and jot mini-notes to expand later; listen to music, film, news and media – triangulation to get insight	-start by reading literature to see what others have done and refine plan to ensure new contribution -fieldwork can be way out (my PhD) but can be close to home -who do I want to talk to, what do I want to talk about (ethics app helps) -more initial planning if far away but more interruption if local -to get over sticking points refine focus to a manageable 'master question' – takes lots of time to get it and then seems so self-evident
2. What is your definition of an "insight" or "Aha!" moment?	-think of one situation that strikes you and write loose analytical account of it -"I seek out things that make no sense" – paradoxes are helpful to think with -being able to see things as recurring theme	-talk informally with people "we're anthropologists – we don't structure our questions in advance" -process of understanding is an iterative one – ask questions that lead to an understanding so better questions next time (ex: incompetent local doc – why?)
3. How do you gather data?	-I am post-positivist so my village won't speak to the world -latch onto puzzles -read to get ideas -collaboration and conversation – process is non-linear	-use semi-structured questioning and conversation -visual techniques to discuss issue (rice bar graph for dengue fever) -participant observation important – mosquito larvae hunting -jot things down when have moment then expand in fieldnote journal -things often important only two days later when writing about it -sometimes just write down events like a routine just for sake of it
4. How do you analyze that data?	-I don't use quantitative data and reject its claims of objectivity – instead the goal is to generate questions	-sometimes see connections between people (if 10-15 say same thing) -meta-communication important – what are people NOT saying? Or what are you telling me ex: man never sick boast = masculinity assertion -research process is iterative – research builds on research in the field – it's a feedback system -anthropology is about having the right questions – people won't tell you things if you don't ask correctly
5. How do you pull things together from your fieldwork?	-I will use writing a paper as a means to pull things together -brainstorm and look for thematic clusters – sort and order and visualize -writing is a process and don't let your paper be data driven -can transcend boundaries in understanding	-not much use of quantitative but if needed would hire someone -participant observation helps to give the context to what I write down and then writing things up helps pull out insights – read notes and code data -do conference paper and hear questions/ideas -refine to journal article and see how observations and conclusions are holding together – holes in data to fix
6. How does your daily practice differ from what you were taught in school?	-I come from unorthodox anth dept with sink or swim fieldwork -My students get more structure and guidance -I compress my research and fieldwork to summers so try to read and write a bit each day	-not a thesis but now use a conference paper to get myself thinking -more time spent framing my research in terms of the dialogue out there -lit review is more about how you anchor your thinking about your own research and experiences -writing is a conversation – you choose the

		conversation and how your data relates to it -writing is much more important now – for grants and for thinking
7. What would help you in your work with regards to improving the process of gathering and analyzing data?	-seem to teach more research-driven classes in the past – now teaching students how to read -undergrads need structure and strategies -MA must reign in -PhD – more time to wander to do original work – guide them but not too much	-we train anthropologists to ask and learn about others but not enough time teaching the writing process -PhD students I've taught have common problem "What is the argument?" – students have lots of data but no story -theory is important because it gives you new ways of thinking – when I took risk as concept it changed how I looked at the data, how things coalesced

Question	A7	A10
1.Can you describe how you typically approach a new fieldwork project?	-start with general view to see what's going on -I had done a lit review and proposal to get funding – fieldwork freer -8 mos MA, 22mos PhD -more daily participant observation and daily tasks and ask questions -key sticking points – learning the languages and culture from ground up	-lit review to identify a niche and compare with ethnographic notes to find places to explore -take notes and draw in field "I'm absolutely visual" and pictures/sketches mnemonic devices -use handwriting to flesh things out, makes process more physical and stick things in mind -participant observation key – anthropology is a bodily research process – must feel and embodied experience key to interpreting broader issues or disconnects -sticking points include politics (village to study) and trust process of fieldwork to build trust and reciprocate
2. What is your definition of an "insight" or "Aha!" moment?	-did have aha moment – learned how sorcery and social tensions work together (bruho cousin source of nail step death of brother) -had to learn to talk around issues (sorcery seen as backwards yet real)	-do get eureka moments but variably – subconscious can do work -follow deBono try and fit alien idea in with your data and see connections that emerge
3. How do you gather data?	-participant observation and talking around issues – have 100 hrs of recording -take field jotting and then expand at night to field notes -took thousands of photographs – draw on them for details -not sure what data is – "lots of jumbled stuff"	-interviews, participant observation, casual conversation, social events and focus groups -can do lit reviews, fact finding missions, particularly in development -trust gut feelings and follow up when you have questions about them
4. How do you analyze that data?	Subject merged q4 and 5 -didn't code my notes but made rough notes and margin notes to pull out what might be important -two years to write PhD thesis – first year to get distilled experience out of head and second to overhaul thesis to have more narrative and character-basis -lots of intuitive work – minor insights in field but major ones come out when you	-there is interconnection between quantitative and qualitative data Ex: 93% females stop edu ask why? -open ended questions mean much coding – one survey meant 55,000 entries to code by hand -how do you define your qualitative measures - key
5. How do you pull things together from		-use triangulation (what people say, what policy people do, what academics say, and what you see)

your fieldwork?	pull things together – see the bigger structures -writing and rewriting served to make me think differently	-pull things together with participant observation – need to weed to see the real problems -whole process is iterative and rough pastiche of what is going on – not linear (bubble diagram pictures)
6. How does your daily practice differ from what you were taught in school?	-I enjoyed the open-ended approach to fieldwork but it's best for academics – I wish I had more quantitative skills and coding ability – research firms want that -must seek information from local people – employees and stakeholders are key -must modify your plans as conditions change – emotional intelligence is a must "need to be comfortable with being uncomfortable"	-use mapping techniques to pull ideas together and teach -larger need to understand the politics of your involvement and not take sides -lots of qualitative but use demographics/nuts and bolts quantitative)
7. What would help you in your work with regards to improving the process of gathering and analyzing data?	-you must make intuitive leaps when writing and researching -follow Stephen King – work in home office and write each day – muse is tricky -must have method to synthesize qualitative -writing helps "Something true comes out" -the aha moments of insight are small – the process of rearticulating it to another is when you re-examine your thoughts and how to fit them into a larger narrative -spend equal time in field and writing – fieldwork is both with the body and the pen -pictures and writing are complementary and good for synthesis	-must do grunt work of data analysis to keep handle on research -must actively question as you make sense of things -not Geertz thick description but seeing themes and think how to relate them to theory – think inductively -figure out while you transcribe notes and think where to position the research in the literature -faster timelines but same fundamentals of practice

(A13 on next page)

Question	A13
1.Can you describe how you typically approach a new fieldwork project?	-anthropology is unique because you pick questions to ask about a problem, define that problem in relation to a context and work on things for a long time -must problematize –don't just focus on what people say
2. What is your definition of an "insight" or "Aha!" moment?	-instead of insight I say I find something true in this context. Truth is contingent – and we need to play with ideas -an insight is really something that you understand that you did not understand before and find that it is worth conveying
3. How do you gather data?	-hand out a lot until people ask if you should be interviewing them -it's about questions – ones you want answered and others want answered – what does field want? -take notes – interviews happen once you have trust and know what to ask "anthropology is much more about questions – design seems to be about answers"
4. How do you analyze that data?	-Don't do quantitative = turning world into numbers
5. How do you pull things together from your fieldwork?	-give a talk at a conference and write papers -move iteratively between fieldwork and conceptwork -move between details and big picture; ideas and observations; experiences and expectations
6. How does your daily practice differ from what you were taught in school?	- my training was to ask what am I interested in? -for my students I emphasize not the history of the discipline was pushing them to ask questions
7. What would help you in your work with regards to improving the process of gathering and analyzing data?	As anthropologists "we are not here to find the answer but how to ask the question and how to answer them"

Appendix G

Matrix of Student Interview Responses

Question	B1	B2
1. Can you describe a typical research process for a project?	-start with project brief -do research and interviews -**big issue is finding the right questions** to give variety, challenge assumptions **-interviewing is really about having a conversation** 1b sticking point was not having enough professor explanation/instruction – need more guidance	-first month doing desktop research with only brief to help – would like more prof explaining -need more hands-on to make it real -don't like mind-mapping because it just follows my biases – but KANO, affinity diagrams and behavioural maps all help (learned in chantal's class – should be taught in 2nd year) 1a – desktop research and talking to people – steep learning curves **– how do good questions**? **No time to re-ask new questions**
2. What methods do you use to gather data?	-research on internet – often watch videos to avoid repeating what's out there -talking to people, user testing, sketching to thinking, making prototypes (I'm physical/hands on)	-desktop review, observations, interviews, making prototype for user testing, video analysis, diagramming
3. What methods do you use to analyze that data?	-I use the ones in question 2 to find the obvious but also the not obvious or 'pain points'	-affinity diagrams for interview note sorting, then funnel to action statements in KANO [binary] – and sketching things out
4. What is your definition of an 'insight'?	-not something totally new but from more background information – have to test assumptions	"have no clue" – always hear it from WJ – but **it's what you derive yourself** from what others say – real source of the problem
5. How do you recognize insights from your fieldwork?	- test theories by interviewing again to gain more insights – pull out key points to shape design -look at market target and focus on figuring out how really to use Discovery centre	- not sure how to do it – but look for problems that repeat and overlap between different groups
6. How useful did you find the fieldwork for your later prototyping and concepts?	-very useful – speaking to non-designers shows how much we assume -found storyboards, concept maps, mind mapping and KANO to be repetitive	- talk with people to get at purpose – but form is my job – use drawing to get it -visualization and story boards are just my biases on paper – personas are just fake -**aesthetics should be all me – put myself in design**
7. What would help you in your work with regards to improving the process of gathering and analyzing data about users?	-If I use methods I'm bad at it clouds my judgement -woodshop and rapid prototyping services at Carleton are critical -class works as a unit and shares information -visuals help to "get it out in front of you" so that things are clearer to you	-more awareness about SMEs to draw on -like methodical approach of Chantal's class -need solid direction and **knowing what questions to ask**
8 What would you change about the methods teaching in the SID Program?	Give us more instruction before sending us out – lecture on purpose helps	-move research methods to second year -need more structure in studio – clear game plan -need more deep research

Question	B3	B4
1. Can you describe a typical research process for a project?	-first month desktop is the sticking point – learn tools quickly and so we don't use them well -Chantal's class has one project with clear start to finish and apply tools with time to process -we were told to do observations as we ideate but we don't have time – have to start designing	-go online to find related technologies – Pinterest is inspiring for forms/shapes -sketch forms and alter -reach out to people – get feedback 1a – I ask professors to guide me and then do more research to overcome
2. What methods do you use to gather data?	-observation and interviews (Chantal taught us AIEOU and ONION to guide obs) -literature and google	Methods I stated in Q1 and when I settle on a design I do mockups and show them to users
3. What methods do you use to analyze that data?	-position mapping and personas for LED project but lack good data; storyboards but it's really what I think the user will do -affinity diagrams, KANO (same as B2)	-we learned some tools like mind-maps, scenario building – I really like the random ideation tool (rolling dice – it is fun)
4. What is your definition of an 'insight'?	-anytime you get information that you did not know "Is not google-able" information	- an insight is something I can use that pops out, is not general and is unexpected
5. How do you recognize insights from your fieldwork?	-you recognize insights – not during gather phase – look at patterns across users -affinity and KANO good for this – rest are not	-I ask technicians how to make something -I try to anticipate what users will say and then when I am surprised I used that to guide my questions about why – ask the users
6. How useful did you find the fieldwork for your later prototyping and concepts?	-more sketching and ideating in Chantal's class = better results for designing -studio has us in prototyping phase but with little real data to go on 6a – I do sketching to develop ideas quickly and show iteration -need to do prototyping and storyboards to really understand -mindmaps good but only in a group to show thought processes **- we need "deep problems" and "well-defined problems"**	-talking to people and asking questions when you don't understand is helpful -sketching is fast and cheap -prototyping is great but scary and risky – costs time and money -visualizing with storyboard and scenarios helps find unexpected areas – make things clear -mindmapping goes broad but hard to organize -affinity diagram helps charting
7. What would help you in your work with regards to improving the process of gathering and analyzing data about users?	-Chantal's class structure best because you learn a technique, apply it and evaluate it -studio is too unstructured to really help learn how to use tools -studio should not be for lectures but really getting at the work	-user testing is important but it's hard to find the right people -timing is often an issue
8 What would you change about the methods teaching in the SID Program?	-make chantal's class a second year one – get quick refresher at start of third year -make studio one semester longer -make studio project scope well defined	-need bigger studio space -avoid curriculum overlaps (research methods in Chantal's and studio) -encourage more work with other faculties and SMEs

Question	B5	B6
1. Can you describe a typical research process for a project?	-get a brief and start with literature review -do ethics and talk to people -analyze answers, look for solutions -make prototypes and test them 1a not being clear on the concept – had to ask people for clarity to fix that	-start looking at where there is a need – build up a baseline that you make new territory -1a hard to find at idea at the start – 5th page of Google 'already been done' Constant fight over what do people want and what is worth making 1b - combine things in new ways (LED plus fun) "shift the context"
2. What methods do you use to gather data?	-literature review, workshops, interviews, prototyping/user testing	-desktop and then 'research' -hard to find people to interview -looked up papers on educational spaces and did observations
3. What methods do you use to analyze that data?	-take all data and look for pain points and issues that re-occur -dominant things can be solutions or the problem - evaluate both and make sure it ties to the client mandate	-take all data and look for common ground KANO analysis and affinity diagrams help, along with sketching and thinking Prototyping good for form and scale/dimensions
4. What is your definition of an 'insight'?	-like a light bulb going off "Oh, this is the problem/solution" -complex, unique to person	"It's a crack in the mass amount of information" -a way forward, a window **-comes through building on what you've done and working on other things – need experience to realize you have an insight**
5. How do you recognize insights from your fieldwork?	-bring options to clients and use visuals (I made a style book) to convey information -ask them questions "so what does that mean to you?" -use visuals – need tangible things to talk over	- I need quiet – work at home
6. How useful did you find the fieldwork for your later prototyping and concepts?	-actively reach out with questions -sketch in front of client and make 3D rendering to get further feedback -questionnaires and affinity diagrams in studio was helpful, as were storyboards and journey maps – personas helped me put myself in	-talk to studiomates and my spouses -didn't get to do enough user testing -did affinity diagram for Chantal's class and found that very useful for categorizing things
7. What would help you in your work with regards to improving the process of gathering and analyzing data about users?	-make ethics more flexible (don't know ahead of time what we'll find) and faster turnaround for approval -more instruction about what analysis and interdisciplinary is and should be -I come from industry and not academia	**- need to see more people in action and putting ourselves into the context of use** – 4th years do this and their projects are so much better -need more sold models and put in hands of users – low fi good for thinking but wont' give you the best feedback from users
8 What would you change about the methods teaching in the SID Program?	-more mandatory design courses in MDes – fewer electives -make picking an advisor and thesis topic more central to first year	-increase the hands-on focus -more access to rapid prototyping and materials testing -get students to build portfolios and their brand, as well as training in graphic design – build research skills earlier