

A SCALABLE APPROACH FOR DECIPHERING CORE RATIONALES AS THE
FOUNDATION OF NEW PRODUCT DEVELOPMENT

Except where reference is made to the work of others, the work described in this thesis is my own or was done in collaboration with my advisory committee. This thesis does not include proprietary or classified information.

Jason E. Robertson

Certificate of Approval:

Shea Tillman
Assistant Professor
Industrial Design

Tsai-Lu Liu, Chair
Assistant Professor
Industrial Design

Tin-Man Lau
Professor
Industrial Design

Kristin Heist
Senior Design Strategist
Continuum

George T. Flowers
Dean
Graduate School

A SCALABLE APPROACH FOR DECIPHERING CORE RATIONALES AS THE
FOUNDATION OF NEW PRODUCT DEVELOPMENT

Jason E. Robertson

A Thesis

Submitted to

the Graduate Faculty of

Auburn University

in Partial Fulfillment of the

Requirements for the

Degree of

Master of Industrial Design

Auburn, Alabama
May 9th, 2009

A SCALABLE APPROACH FOR DECIPHERING CORE RATIONALES AS THE
FOUNDATION OF NEW PRODUCT DEVELOPMENT

Jason E. Robertson

Permission is granted to Auburn University to make copies of this thesis at its discretion, upon the request of individuals or institutions and at their expense. The author reserves all publication rights.

Signature of Author

Date of Graduation

THESIS ABSTRACT
A SCALABLE APPROACH FOR DECIPHERING CORE RATIONALES AS THE
FOUNDATION OF NEW PRODUCT DEVELOPMENT

Jason E. Robertson

Master of Industrial Design, May 9th, 2009
(B.S.E.V., Auburn University, 2007)
(B.S., Boston University, 2006)

119 Typed Pages

Directed by Tsai-Lu Liu

Strategic plans are usually based on traditional statistical research and market segmentations like age, gender, zip code. Those segmentations do not reflect what people think about when they make decisions to buy a product or use a service. What do people think about before, during, and after they use a product or service, and how can understanding that impact strategic development? This study develops an approach to identify new strategic opportunities using design research to investigate the core rationales people have towards products and services. Once the core rationales are understood designers and managers can use that knowledge to develop a strategic plan that will make people's lives better and businesses more profitable. The second facet to the study is to make the approach ultimately scalable. Large businesses have the resources to outsource research and proposals for strategic actions, but small businesses cannot afford outside help, and typically strategic development does not rank as important as day-to-day operations (i.e. paying employees) to small businesses.

The approach is developed through two case studies. The first, TimeQuake, answers the question: “Why are wristwatches losing footing in the timepiece market due to the ubiquity of digital devices in our daily lives?” In TimeQuake the way people interact with and think about time is explored using an existing method; the result is a new offering that enables people to interact more smoothly with others with different timestyles. Allowing people to work in their own way while collaborating is at the heart of TimeQuake. The second case study, Full-Duplex, is a collaboration with a business local to Auburn: CoachComm. They have a unique offering that is synonymous with football field communication. Now that they have captured the football market, CoachComm wants to find out where else their offering could be sold. Identifying CoachComm’s core benefits and finding people whose core rationales line up with those core benefits is the basis for Full-Duplex. Together, these case studies show that the approach can be applied to projects varying in scope and size. The common thread is that listening to people is the way to understand what they want and need, where current offerings stand, and what should be pursued.

ACKNOWLEDGMENTS

First and foremost, I'd like to thank my parents and my family for helping me get through my first 25 years, especially the last eight I've spent in college. My parents have supported me, in every sense of the word, for as long as I can remember.

I owe my committee so much. Without their guidance who knows where I would be today. I never met a closed door or an unfriendly face. Tsai-Lu, thank you for continuously pushing me to be better and for the good conversations, which became almost biweekly. Kristin, thank you for taking time beyond your full-time position to deal with me, for lending me your expertise and experience, and for always keeping my morale up. Tin-Man, thank you for pushing me to find my own solutions and to make those solutions as good as they can be. Shea, thank you for exposing me to design research early and continuously, and for always being available to talk.

I have learned an immeasurable amount in the last three years from the entire Industrial Design Department at Auburn University. I've been transformed from a lost physics major without a clue of what to do next to a designer who feels somewhat confident about entering the work world (more, I think, than most college graduates). Thank you to the Design Strategy Group at Continuum; during my internship I discovered people and a culture that values people more than I thought any business ever could.

Matt Weiner, my editor, is one of the few people I would trust to edit something so near and dear to me.

Style manual or journal used Journal of Approximation Theory (together with the style known as “aums”). Bibliography follows van Leunen’s *A Handbook for Scholars*.

Computer software used The document preparation package T_EX (specifically L^AT_EX) together with the departmental style-file `aums.sty`. Adobe Photoshop, Adobe Illustrator, Rhinoceros, and Hypershot render were also used.

TABLE OF CONTENTS

LIST OF FIGURES	x
1 INTRODUCTION	1
1.1 Definition of Terms	4
2 LITERATURE REVIEW	7
3 TIMEQUAKE: INTRODUCTION AND ALIGNMENT	17
3.1 Introduction	17
3.2 Alignment	19
3.2.1 Alignment Conclusions	20
4 TIMEQUAKE: DISCOVERY AND ANALYSIS	21
4.1 Discovery	21
4.1.1 Discovery Conclusions	25
4.2 Analysis	27
4.2.1 Analysis Conclusions	36
5 TIMEQUAKE: CONCEPT ENVISIONING AND TESTING	38
5.1 Envisioning	38
5.1.1 The Concept	38
5.1.2 Graphic Interface Development	41
5.1.3 Form Development	43
5.1.4 Envisioning Conclusions	46
5.2 Testing	47
5.2.1 Evaluating the Concept	47
5.2.2 Evaluating Form	48
5.2.3 Testing Protocol	48
5.2.4 Testing Conclusions	51
6 TIMEQUAKE: FINAL DESIGN	53
7 TIMEQUAKE: CONCLUSIONS	62
7.1 Scalability of Process	62
7.2 Identifying core rationales	63
7.3 Creating New Offerings	65

8	THE APPROACH	66
8.1	Stage One: Protocol Development	66
8.2	Stage Two: Recruiting	68
8.3	Stage Three: Interviews	68
8.4	Stage Four: Reasoning	69
8.5	Stage Five: Offering Development	70
8.6	Method Conclusions	71
9	FULL-DUPLEX: INTRODUCTION AND UNDERSTANDING	74
9.1	Introduction	74
9.2	Understanding the CoachComm Core benefits	75
9.2.1	Communication Quality	76
9.2.2	Extreme Volumes	76
9.2.3	Visceral Communication	77
9.2.4	Different Perspectives	77
10	FULL-DUPLEX: ALIGNING CORE BENEFITS WITH CORE RATIONALES	78
10.1	Identifying Opportunities	78
10.2	Understanding the Core Rationales	79
10.3	Full-Duplex Offering Embodiment	84
11	FULL-DUPLEX: CONCLUSIONS	88
11.1	Scalability	88
11.2	Core Benefits	89
11.3	New Opportunities	90
12	CONCLUSIONS	91
12.1	Scalability of Process	91
12.2	Identifying Core Rationales	92
12.3	Creating New Offerings	93
	BIBLIOGRAPHY	94
	APPENDICES	96
A	TIMEQUAKE: TESTING STORYBOARDS	97
B	TIMEQUAKE: FINAL MODEL IMAGES	101
C	TIMEQUAKE: JOAN INTERFACE BASICS	104

LIST OF FIGURES

1.1	Core Rationales	3
2.1	Maslow's Hierarchy of Needs	13
3.1	Continuum's Six-Step Process	18
4.1	Instructions for Homework Assignment	23
4.2	Homeworks Readied to Send Out	24
4.3	Interview Protocol Development	25
4.4	Interview Protocol Structure	26
4.5	Discovery Board	27
4.6	Analysis Board	28
4.7	Analysis Whiteboard	29
4.8	Archetype Maps from Initial Model	30
4.9	Time Modes	32
4.10	Real/Ideal: Timestyles	33
4.11	Productscapes Show No Gaps	34
4.12	Brainstorm Icebreaker	35
4.13	Brainstorm Session	36
4.14	Data Clusters	37
5.1	How Different Timestyles Interact.	38
5.2	Most Basic Joan Illustration	40

5.3	Event Information: Initial and On-the-fly	42
5.4	Joan’s Graphic Interface Structure	43
5.5	Development Form Sketches for Archetype A	44
5.6	Model A	44
5.7	Development Form Sketches for Archetype B	45
5.8	Model B	45
5.9	Development Form Sketches for Archetype C	46
5.10	Model C	46
5.11	Digital Planning Storyboard	48
5.12	Analog Planning Storyboard	49
5.13	Joan Storyboard	50
6.1	Stopwatch Form	54
6.2	Initial Hourglass Form	55
6.3	Hourglass Form Variations	57
6.4	Final Design Back	58
6.5	Final Design	59
6.6	Computer Rendering of Final Form	60
6.7	Final Finished Model	61
7.1	Telescoping Team	64
8.1	Interview Protocol Structure	67
8.2	Route to Core Benefits or Core Rationales	70
8.3	Overall Approach	72
10.1	Whiteboard Capture: Discussion of Core Benefits	79

10.2 Loud Distractions on University Tour	80
10.3 Backwards on University Tour	81
10.4 Wavepool in the Georgia Aquarium	83
10.5 Chatterbox	83
10.6 CoachComm Tour Offering Form A	86
10.7 CoachComm Tour Offering Form B	87
A.1 Enlarged Joan Storyboard	98
A.2 Enlarged Computer Storyboard	99
A.3 Enlarged Watch Storyboard	100
B.1 Joan Final Design	101
B.2 Joan Final Design: Mouse for Scale	102
B.3 Joan Final Design: In Context	102
B.4 Joan Final Design: Form Definition	103
B.5 Joan Final Design: Evolution	103
C.1 Unlocking Joan	104
C.2 Basic Data Inputting for Joan	105
C.3 Zooming with Joan	106
C.4 Volume Adjusting for Joan	107

CHAPTER 1

INTRODUCTION

Design creates value. It can either increase the value of an existing offering by enhancing the human interface, or design can create value by developing a new offering. This study will focus on the latter point: design's ability to aid in the development of a new offering or product strategy using design research. Mike Baxter in Product Design says that “[t]he biggest, and probably most obvious, single factor determining commercial success was market differentiation and customer value” [3]. He goes on to say that products that are better than competitors in “highly valued” ways are substantially more likely to succeed. Product strategies need to address the highly valued attributes. The challenge then becomes identifying the “highly valued” attributes of an offering and answering the question, “Why are they highly valued?” A product strategy that looks forward and creates a new set of highly valued attributes will outpace any competitors who are developing offerings based on the old model of value.

Research identifies what “consumers” value highly in current offerings. Conducting market surveys, or focus groups, and even ethnography only allow a product strategy to work within the bounds of the current notion of “value.” Strategic research needs to transcend the current notion and understand the source of value perception. Henry Ford famously said, “If I had asked people what they wanted, they would have said faster horses.” Design's ability to enhance an offering's aesthetics or functionality is well documented. Every design school teaches a skill set to enable designers to sculpt forms and functions to add value to a product. Designers and students alike

use design research methodologies to understand what users do and how they do it, but not usually *why* they do it.

Research is about trying to understand people; marketers use segmentations because one offering will not appeal to an entire population—people vary too greatly. The goal of a business or offering can largely determine the most useful segmentation; furthermore, the saturation of the market can determine the type of segmentation. But, once several competitors have saturated a market using values derived from all manner of different segmentation combinations, research must strive to surpass traditional segmentations. Design research can play a strong role in extending our understanding past those traditional segmentations and towards grasping why people interact with products and services. The late James Pilditch, founder of one of the first design firms in the UK, said, “I have always argued for what I have called ‘psychological segmentation.’ I mean identifying the whole nature of people, not just the size of their house, but satisfying their wants as well as their needs” [7]. What Pilditch calls “psychological segmentation” is similar to the core rationales talked about throughout this study. The term core rationales describes the deepest level of reasoning associated with a decision (Figure 1.1). For example, if a person plans a ski trip they will need a jacket. The first level of segmentation is environmental: they are going to be in a cold area. For the first company to mass produce winter jackets that was the only level of segmentation necessary. If another company would like to create a jacket it might use a deeper segmentation (i.e. more sophisticated materials for a high income bracket or differentiation between men’s jackets and women’s jackets). Once the jacket market is saturated with offerings that address the various permutations of traditional segmentations a new segmentation model needs to be developed to create a differentiated offering.

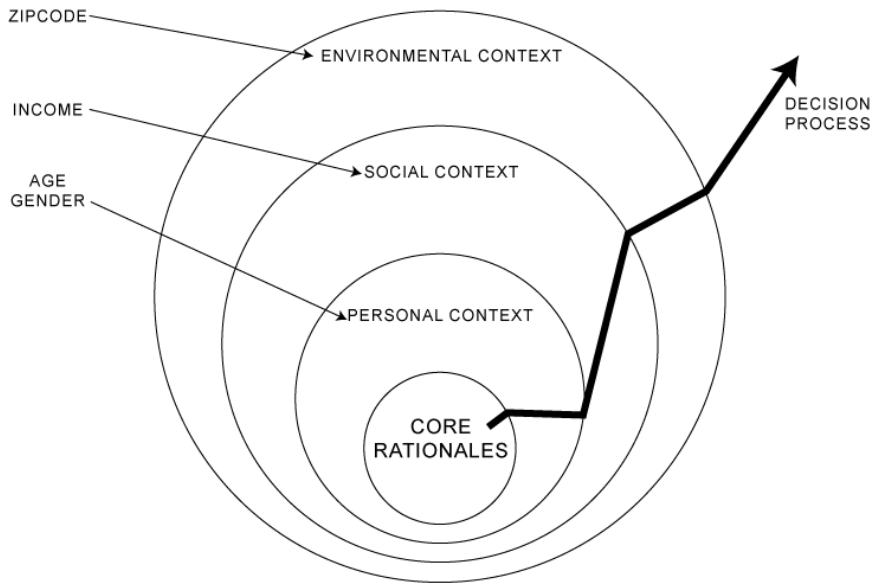


Figure 1.1: Core Rationales

Many companies realize the value of researching and understanding the people who buy their products and services but cannot employ outside help to identify new segmentations based on the core rationales. Small businesses often cannot compete with large corporations on the basis of typical segmentations (e.g. price point) but nevertheless need to compete with corporations to be commercially successful. Small businesses need this form of design research but cannot afford to do it in its current form. There needs to be a scalable model for strategic research that small businesses can use to compete.

The following study outlines a brief description of the ways segmentation is currently conducted and what research is being advanced in “psychological segmentation.” Then the author uses a design firm’s method as research in developing a formalized scalable approach to identify core rationales. As a test of the formalized approach the author utilizes it in a project with a small business with limited scope, funding, time, and resources. It is this author’s belief that design performs best within

a project—that necessity begets innovation—so this thesis consists largely of two case studies.

1.1 Definition of Terms

The following is a list of terms and their definitions. These terms are used throughout this study; they are assembled here for ease of reference.

- **Archetype:** An archetype, or persona, is a representative personality associated with a particular theme that arose through the analysis of data. Effectively archetypes are personified illustrations' key themes.
- **Brainstorm:** A brainstorm is when a group of 6-8 people get together to generate ideas around a focused topic.
- **Core Benefit:** Core benefits are used to describe the generalized internal processes regarding a business's ability to develop products and services. Core benefits are specific to a particular business and limit the types of offerings the business is capable of developing. Core benefits are abstract concepts that businesses might have trouble expressing because they are only able to talk about the products and services they offer.
- **Core Rationales:** Core rationales is a term used to describe the generalized internal processes regarding people's intentional interactions with products and services. Core rationales are specific to a particular arena of offerings (e.g. timepieces is one arena of offerings). Core rationales are abstract concepts that people might have trouble expressing because there is not a direct, concrete proxy for them.

- Cultural Probe: Also, just “probe” or “homework.” A cultural probe is a stimulating project given to participants days before an interview. The purpose of a cultural probe is to collect realtime data from participants and to get the participants ready to talk about the topics in the interview.
- Download Session: A download session is a discussion that occurs directly after a participant interview. During a download session the interviewers talk about themes that arose during the interview.
- Dreamer: A “dreamer” is the third archetype developed in TimeQuake to explain a person whose actual time interactions can be defined by the phrase “I care about time,” but whose ideal time interactions are defined by “I don’t care about time.”
- Event: An event is any task or meeting that occurs during the day. In TimeQuake, Joan organizes events dynamically.
- Extreme User: An extreme user, or an outlier, is a person who interacts with an offering in an unusual way. It might mean that the person interacts more frequently or in a different environment than what was intended. Extreme users show short comings in an offering quickly and may have workarounds or wear patterns that can be very helpful to designers.
- Happily Removed: “Happily removed” is the fourth archetype developed in TimeQuake to explain a person whose actually and ideal time interactions can be explained by the phrase “I don’t care about time.”
- Offering: An offering is a generalized term that can refer to a product or service a business develops in hopes of generating revenue through its interactions with people. Also, a business offering.

- Participant: A participant is a person who the investigative team interviews. Also, a respondent.
- Perfectly Punctual: “Perfectly punctual” is another archetype developed in TimeQuake to explain someone whose actual and ideal time interactions align under the heading of “I care about time.”
- Productscape: Productscape is a term that refers to the diagram of how current offerings fill people’s core rationales.
- Protocol: A protocol is the minimal outline of material that an interviewer needs to cover in an interview. Protocols keep the interview focused, where it is the interviewer’s job to keep the interview open.
- Time Piner: The “time piner” is an archetype developed in TimeQuake to explain someone whose actual interaction with time is that they do not care about time, but in their ideal interaction with time they would care a great deal about time. The resulting archetype is someone who wishes they dealt with time in a more focused manner.
- Timestyle: Timestyle is a term used to describe how a person actually interacts with time. This is a generalized term that refers to “perfectly punctual”, “dreamer”, “time piner”, and “happily removed.”

CHAPTER 2

LITERATURE REVIEW

New product research can very cleanly be split into two categories: quantitative and qualitative. Quantitative research accesses a large number of people but the information is typically very shallow, whereas qualitative accesses a small number of people and the information is very deep. Numerous industries conduct consumer research as a part of strategic development to more aptly attend the needs of consumers, typically with the goal to make more money. Quantitative research is conducted for three reasons:

1. To inform decisions by tapping a large number of people.
2. To understand how current offerings fit together in a market.
3. To check that an offering might resonate with a particular segment of people.

Market research is the quantitative research on the opinions of people in a particular market. Markets are defined by demographics: age, income, gender, zip code, etc. Gauging the opinions of a demographic segment can give a clear advantage in product development, but people's actions often do not align with their opinions [10]. Furthermore, the decisions people make are not solely based on age, income, gender, or their zip code so why does their research govern our product development?

Market research has expanded to take into account consumer motivations, but the methodologies market researchers use lend themselves to understanding markets and consumer segments instead of the real people who make up the markets. When

market researchers use qualitative methodologies to study a demographic group the results are often watered down and appeal to the lowest common denominator within that demographic range: “Moreover, seeking to capture large markets always favors the most common denominator and opposes the least expected: true innovations” [10]. It is accurate that an offering developed through market research is likely to appeal to a large group of consumers, but that appeal will be weak for most of that demographic group.

Obviously market research can be effective, at least on the “market” level, otherwise it simply would not have developed into such a lucrative industry:

As the middle class grew, marketing, advertising, public relations and other new fields were invented to promote the things companies made. In this ‘push’ model, marketing theory and methods became powerful means to help companies sell. Models that focused on ‘product, distribution, promotion and price’ were refined and grew because they worked. [11]

Industrial design is one of the “other new fields” that was born out of the industrial revolution. Now that market researchers have developed a strong understanding of what will appeal to consumers based on demographics it is difficult to create an offering that is differentiated from existing offerings if they are all developed using the same marketing research model.

It is becoming more difficult to create value from market research for a variety of reasons:

1. What people say and how people act can be very different.
2. Market research operates within current offerings (i.e. people cannot talk about new offerings without a reference, the very reference that designers are looking to develop) [10],

3. When competitors use the same methods of market research the outcome for both competitors is going to be similar.

Something needs to be different. If the data and the steps of creating a new offering are not sufficiently unique, then that new offering will not be differentiated; so, either the research approach needs to be different or the people interpreting the data need to have a different perspective. Certainly, market research is an important and useful tool in business and product design, but it has a limited usefulness.

Vijay Kumar and Patrick Whitney of Illinois Institute of Technology put it this way:

Our contention is that ‘customer-centered’ strategies normally fall short because marketing and development teams miss what is fundamentally important to their consumers. They make the mistake of thinking they can achieve customer delight simply by refining research on markets. Companies do market research using as a starting point their current offerings, which are defined by product, distribution, promotion and price. The problem is that the first three are all company-centered, not customer-centered. This leaves price as the only factor that both the company and the customer care about. Companies who do not want to compete on price alone need to find factors that are important to consumers.[11]

In their paper “Daily Life, Not Markets: Customer Centered Design” they argue investigating people’s lives will create better product design. Marketing as a profession is embracing more qualitative research methods. James Siddall writes, “In order to circumvent all these difficulties [with statistical research], marketing men began to call on the expertise of behavioural psychology, and this led to what is variously called

depth research, motivation research and projection techniques” [13]. Qualitative research methods use smaller samples than quantitative methods and delve deeper into consumers’ reasons in addition to their actions. There is an ever-growing list of qualitative research methods, but they fit into a few groupings: unstructured interviews, focus groups, observation, ethnography, and qualitative surveys. IDEO has published method cards with 51 different methodologies they have used to inspire design.

Unstructured interviews are effectively more focused conversations where the interviewer has a rough guide of what topics the interview needs to cover but is very open and receptive to unexpected answers [10]. This type of research is most valuable at an early stage in design research and least valuable with detail design. For example, asking a respondent what color he or she prefers for a product presupposes that the product has the correct function let alone the correct idea. These specific, directed questions are better answered with a quantitative method near the end of the process once the concept and embodiments have been proven. Talking to a participant about what he or she likes and dislikes about getting dishes clean will lead to more valuable qualitative data, and has a greater possibility of uncovering a latent need because it allows the participant to talk about any information.

Focus groups are, effectively, unstructured interviews with multiple respondents at once; there is a moderator who focuses the conversation and prompts the respondents to specific topics. One benefit of focus groups over individual interviews is the “social approval”; ideas are vetted through the group and may be more relevant because there is more than one person involved [10]. Conversely, focus groups are prone to other problems: meeker participants may not voice their opinions and bullies can dominate. Focus groups are more beneficial after the design process has yielded a tangible result to evaluate the tangibles of the new product or service.

Observational methods are really beneficial when a physical task needs to be understood or analyzed. Often, people act unconsciously, which means that you can not ask people about what they do; you have to watch them do it. Observational methods can be used quantitatively as well as qualitatively (i.e. you can catalog every time someone makes a specific motion and design for the high-frequency motions). The problem with using observational methods quantitatively is that one person may have a work-a-round that could help masses of people using the product. Researchers employ video to further analyze observed behaviors.

Ethnography is an observational technique where stimuli are presented; the difference is that ethnographers observe people in naturally occurring situations [10]. For some situations this is the only way to get valuable data because artificial settings are so far removed from a given situation. Ethnographers probe their subjects to watch what happens; they add stimuli (a new product for example) and watch how people interact with it within the context of their lives or how it changes that context. Ethnography often employs video cameras to observe people naturally over longer time-spans, for example, setting up a camera to observe how a family interacts with their entertainment center.

Qualitative surveys, or cultural probes, are, effectively, homework for respondents. They often accompany ethnography or other observational methods. William Gaver talks about cultural probes this way:

Probes are collections of evocative tasks meant to elicit inspirational responses from people—not comprehensive information about them, but fragmentary clues about their lives and thoughts. We suggested the approach was valuable in inspiring design ideas for technologies that could enrich people’s lives in new and pleasurable ways. [6]

An example of a qualitative survey is a daily journal about skin care that a respondent is assigned. The probe may be directed, asking the participant to photograph a specific event, or it might be open, only covering the general topic of study. The content is not prescribed to predetermined answers, making it harder to analyze quantitatively. Even if the probe is directed and specific in nature it will be followed up with an interview where the participant is asked to talk about the probe. Probes elicit emotional responses from participants, adding richness and depth to the data.

All of these methodologies are valid, but the motivational goal needs to shift. People's thoughts and dreams, or core rationales, drive their decisions, and currently many research methodologies do not come close to understanding the core reasons people make decisions. Core rationales are the most basic, often unconscious, ideals people make decisions on. Core rationales may have components of market research, but people from wholly different demographic groups may have similar core rationales. If designers can understand the core rationales for decision making, they can design to address those rationales and create unparalleled offerings. An example from Kristin Heist from Design Continuum: many juice boxes have straws encased in plastic and attached to the outside with adhesive. The problem is it is fairly common for the straws to detach from the juice box leaving the juice considerably harder to drink. If you combine this problem with shortening lunch periods at schools, "At many schools across the state, children have to gobble their lunches in 20 minutes or less" [15]. Many children may abandon their juice. As a design problem this seems trivial: create a solution where it is easy to drink the juice even without a straw. But if you probe mothers, the people who buy the juice, about the problem you gain a different perspective. Mothers associate their children's juice with nutrition, and then it is a short leap to "if my child doesn't eat right, how will he concentrate at school?" If the child cannot concentrate at school, they may not achieve their potential, do well

in college, or get a good job. Once the designers understand that a mother feels this way about juice they gain a new perspective and the design problem is no longer about juice and straws, it is about child nutrition and making sure that moms *feel* like they are helping their children do their best in life, two very different design problems indeed. Now, if a company can design and market with those mothers in mind they have a better chance of a successful, differentiated offering. In short, it is the job of the design researcher to understand the core rationales of why people do what they do, and link those reasons back to the highest level reasonably possible on the Maslow hierarchy, i.e., a mother's need to provide for her children is above the base needs the child has (Figure 2.1).

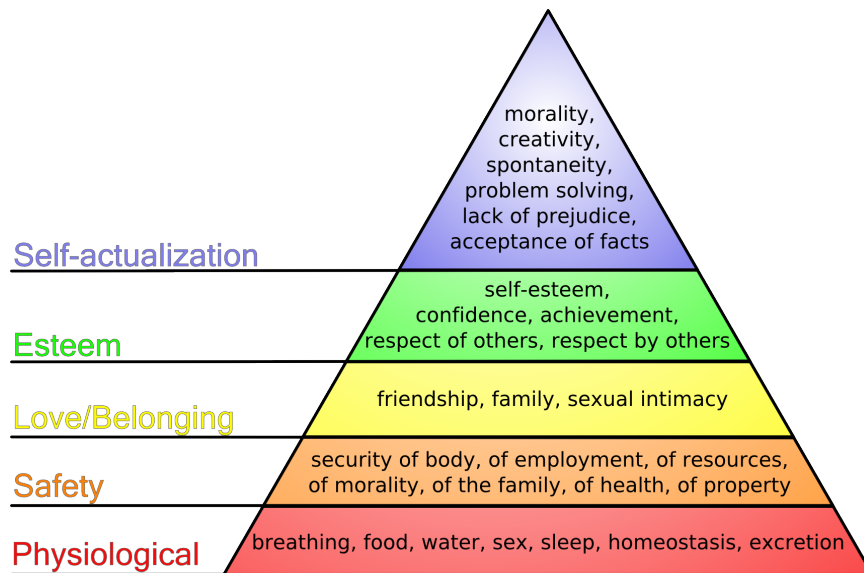


Figure 2.1: Maslow's Hierarchy of Needs

There is design research that is leaning away from traditional quantitative and qualitative research; in a paper titled "Needs Clusters: A Research Strategy for Accelerating User-centered Design Innovation," Jeremy Alexis says, "Needs clusters are created by the intersection of two models: requirements (what they are trying to

achieve / do) and behavioral modes (how they go about trying to achieve / do it).” This is the basic tenet of “Needs Clusters” and, therefore, it is the basis of the entire methodology. But the two models are too superficial. In addition to asking “What?” and “How?” the research should be based on “Why?” Seeking “Why?” repeatedly forces the respondent to really consider the reasons instead of giving the easy answer.

Vijay Kuman and Patrick Whitney write about understanding people’s lives better but they promote activity-based research because it is “actionable.” They also suggest that specific opinions of the respondent should be avoided:

The most common questions the interviewer may ask are “Why did you take this picture?” and “Tell me more.” Leading questions, including questions about specific opinions, attitudes, and views, ought to be avoided. In this way the conversation remains unbiased and valuable insights can naturally evolve. [11]

Specific opinions are relevant because they are an important intermediate step in getting to the reasons behind specific opinions and feelings, and the goal should be to identify the reason, beliefs or core rationales behind the specific opinions. Jane Fulton Suri of IDEO puts it this way: “The intent is that ideas about possible new offerings are informed and inspired by in-depth understanding of people’s aspirations, attitudes, behaviors, emotions, perceptions, processes, and motivations within their prevailing and evolving social, cultural and technology context” [14].

Quoting the chief creative officer of IDEO in Palo Alto raises another interesting problem of design research: The people commissioning and performing design research do so with six-figure budgets for large corporations and highly trained and experienced people. Small and medium sized businesses (SMEs) may benefit from design research more than the large companies, yet small and medium sized companies almost never

implement design research. It is a given that any business could benefit from better understanding the people it interacts with, and that is why design research should be scalable to any business or service. Design research does not enter into most small business models, but according to the Design Innovation Centre in Sligo, Ireland,

78% of SMEs that use design brought new products and services to market in the past three years. This compares with just 51% of SMEs not using design. How is this linked to growth? 72% of businesses developing new products and services experienced growth, this is significantly higher than the 56% of businesses that developed no new products or services [9].

The Design Innovation Centre is working with SMEs attempting to inject design into what they do, “The Innovation by Design programme will initially take six companies through a 15-month programme where they will use design research tools to better understand their end-user needs and develop these insights into new products and services,” [9]. The Innovation by Design program pairs designers with small businesses; the designers shepherd the SMEs through the process “all with the common goal to grow their businesses” [9].

Currently there is not a formalized approach of identifying the core rationales people have when they interact with specific product or service sectors. Developing strategic positions based on these insights can improve the way products and services interact with people, therefore enhancing the lives of the people and the business alike. Furthermore, small and medium-sized business do not have the resources to outsource research, and conversely they need the research and strategic development to be able to compete with large businesses who can afford to outsource research and strategic development. Therefore, the goal and scope of this thesis is to explore how to create a scalable, qualitative research approach that identifies the most basic core

rationales or values that affect people's buying decisions in the hope of creating new, differentiated offerings that appeal to people because of the way they think and feel about a product or service instead of how they interact with products and services.

The following chapters follow TimeQuake, the first case study, as its team works through an existing process to understand how to get to people's core rationales and develop a scalable process.

CHAPTER 3
TIMEQUAKE:
INTRODUCTION AND ALIGNMENT

In nearly every design methodology there is some form of research. It can be as simple as a “mood board” to capture the feeling of what a designer is trying to achieve or it can be ethnographers observing someone using a product. This study focuses on a more in-depth, primary research method; TimeQuake is that research. TimeQuake is a concept that demonstrates a proven methodology in order to examine, first hand, how design research can be better implemented with a given business problem. TimeQuake is the primary research on which this study is based.

3.1 Introduction

If an increasing number of people are using mobile or web technology to tell the time, then what are the implications for companies like Timex and Seiko as fewer and fewer people rely on (and purchase) wristwatches? The essential question for these business models becomes, “What is the future of time?” This frames an ideal problem for this study because design research can develop criteria to create and evaluate creative solutions to what can often seem an ambiguous problem. Furthermore, because the problem is a question of the future and not what currently exists, a qualitative research methodology can be useful because people are often struggling to talk about the future.

The structure for TimeQuake is based on a six-step process employed by Design Continuum (Figure 3.1). Design Continuum, one of the top design firms in the United

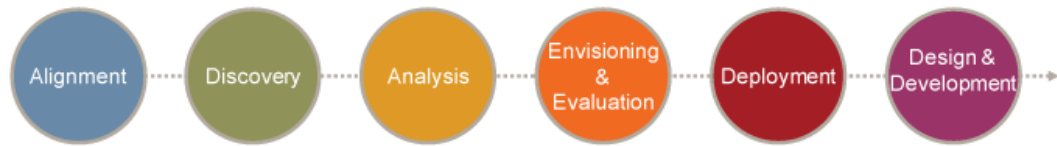


Figure 3.1: Continuum’s Six-Step Process

States, bases their process on the belief that better understanding people is essential to creating meaningful, successful designs. Each phase is briefly introduced below and will be explored in more depth in the following chapters; each will be discussed with regards to TimeQuake and conclusions about the methodology will be presented at the end of each phase. The more people are involved in the design process the more holistic the outcome, so every effort has been made to bring people into each phase of the process.

It should be noted that these phases are not as discrete as they may seem on paper. Each phase melds with each other phase, but organizing them in a linear fashion facilitates analysis of the process.

Alignment, the first step in this process, ensures that all parties involved are on the same page and have the same goals. A schedule is developed and deliverables are agreed upon in this phase. Another important aspect of Alignment is that it engages the client in the process very early on; getting the client engaged increases their emotional stake in the outcome and that will be beneficial in Deployment. Discovery is where the project team researches and understands as much as possible about the areas outlined in the Alignment. Discovery is the cornerstone of the work, as the next

three phases will be based on it. The Discovery phase has two components, primary and secondary; the team learns what is necessary from secondary sources, but focuses on learning from people. This research study focuses on the qualitative methods of the primary research. Analysis is the interpretation of data collected from the Discovery. This process is highly subjective, and the quality of the analysis often depends on the people and time devoted to the work. Analysis concludes when the team closes in on a major theme or idea that both excites the team and matches the goals outlined in the Alignment phase. Once the team identifies a major theme or idea through analysis, the idea(s) needs to take shape through Envisioning. Through this phase the team defines more closely the major idea that fits the Alignment, Discovery and Analysis. After the new offering(s) are refined and developed they are evaluated through testing with external people. These people are presented with the new ideas and through the same conversational process from the Discovery the respondents evaluate the new idea and its embodiments. The final phase is Deployment. Deployment involves the team developing a plan to communicate the new ideas and embodied concepts to (and up through) the client's organization to make sure the ideas thrive.

While this process is well-defined as an outline, formalizing the specifics has been slow to evolve. The benefit to this is that the process is suitable to a myriad of projects and allows the team to tune the process to the project on hand. The problem, however, from an academic perspective is the difficulty that lies in analyzing it.

3.2 Alignment

TimeQuake's Alignment process is atypical because TimeQuake has no client, per se. It is modeled as if the client is a company like Seiko or Timex whose primary business is the timepiece industry. The timepiece industry was chosen because of the

recent downturn in wristwatch sales: “In the price category most frequently purchased by teens and young adults, watch sales have fallen by 10 percent in the last year” [8]. The article supposes that devices like mp3 players, PDAs and smartphones are taking away market-share from the wristwatches. Given that wristwatch sales have declined sharply over the last ten years, the goal becomes to understand why: How has the way people interact with time changed so that the demand for wristwatches is declining? And how can a company like Timex or Seiko use the way people interact with time in today’s world now to create meaningful and financially successful offerings in the future?

3.2.1 Alignment Conclusions

It is difficult to draw precise conclusions from TimeQuake’s Alignment phase because it was not directly associated with an actual business. However, even limited experience with the Auburn University thesis requirements makes it clear that ensuring that everyone is on the same page from the beginning can save a lot of trouble. One can only imagine the financial and even legal issues that could arise if terms are misunderstood.

CHAPTER 4
TIMEQUAKE:
DISCOVERY AND ANALYSIS

4.1 Discovery

The Discovery phase mirrors this research: understanding people and what their lives are like, with regards to a specific area, enables designers to create the most meaningful experiences possible. Thus, if a company can create meaningful experiences for people the company will be more successful. It is a win-win situation: people get more value from their interactions with companies and companies get more value from their interactions with people. Details of the Discovery methodology vary greatly to fit the project on hand but the basic tenet remains the same: the Discovery phase always involves studying people. TimeQuake’s methodology is outlined and analyzed here.

The information gathered during the Alignment phase is the first input of the Discovery phase; the project’s goals define what information will be sought from people. TimeQuake’s alignment called for an investigation of how people interact with “time” and how that interaction has changed in recent years. Next the team can begin to explore the best possible way to understand how people interact with time, first by beginning to categorize the specific information that might help understand how people deal with time.

“Homework assignments” or cultural probes add an important layer to research [6]. They record people’s thoughts and feelings in real-time, offering more candid and

emotional information. With TimeQuake this proved to be difficult because often people interact with time unknowingly, making it less visible than interacting with a product or service. The decision was made to have our participants keep track of every instance they looked at a “timepiece”, or anything that indicated, in any way, the time. This ranged from looking out the window at the sun or moon, to pacing your mile time while training for a marathon. The probe increased the awareness of time interaction with participants, and provided the researchers with information with which to probe in the interviews. People have vastly different ways of interacting with time, and giving them flexibility with the homework would increase the value of the data by adding another layer of information. The way people noted their times could also be interpreted and analyzed. In addition there was a biographical information section in the probe, where participants were asked to fill in information about themselves. Each participant was provided with Post-it notes to use, but if the participant thought of a better way to keep track of time they were encouraged to use their own method. The homework was delivered a few days before the interview was scheduled, and the participant was asked to complete the assignment in a convenient 24-hour period before the interview took place.

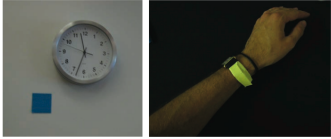
The interview protocol has three sections with length guidelines. Each section has goals, and the written protocol merely facilitates reaching the goals; the interviewer is obligated to diverge from the written questions and probe interesting or unusual remarks. The first section is a “warm-up” used to get to know the participant and hopefully ease any anxiety the participant may have. In the second section, the interviewer probes about the homework assignment. The interviewer starts by asking about the homework assignment in general and then progresses more specifically. The participant is asked to explain all of the timepieces they use and talk about the most important attributes of those timepieces. Next, they are asked to walk

Intro

We would like to find out how, when, and why you tell time. To that end we have an activity to help you to start thinking about how you use time. The idea is that you record whenever you tell time throughout one day; that can be as vague as looking out the window or as specific as timing your daily run to the tenth of a second. Here is what we have in mind...

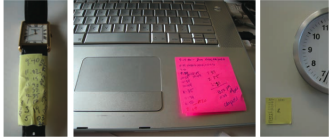
2

Put a post-it note near the "timekeeper" so that you can access it easily whenever you use that "timekeeper" (i.e. put one on the tv remote in case you check the cable box).




4

The notebook is for all the irregular "timekeepers" you use, e.g. someone else's watch. Keep a log of what you use and at what time you use them.



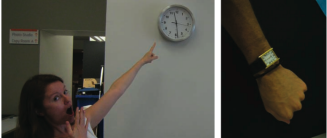
supplies

- Post-it notes
purple
red
yellow
green
blue
- Pens
- Notebook




1

Find every possible way you tell time throughout the day. Don't forget places like you're car and work. It might look like this...



3

Note the time when you place each post-it, on the each post-it. And every time you use that "timekeeper" note the time on the post-it.



5

For (roughly) 24 hours keep track of when you use your "timekeepers", and when you're done leave the post-it notes in until we come take pictures of them. If you have any questions contact me...

Jason Robertson
jrobertson@dcontinuum.com
813.220.3393




Figure 4.1: Instructions for Homework Assignment

through their day and talk about what is going on at each point, why they looked at a timepiece, and why that particular timepiece. Throughout this description the interviewer listens for patterns, workarounds, and unusual happenings to probe about. Then, the interviewer probes on what timepieces the person uses the most, least, and why; when is it most and least important to know the time and why. Finally, he or she asks the participant to rank the timepieces they use with regards to the attributes they mentioned as being important to a timepiece. The participant has now set up a framework to explain how they interact with time. The framework enables the participant to relate less concrete, more emotional ideas. The researcher probes on the meaning of time, and how it has changed throughout their life. Along with patterns the researcher listens for stories that help explain the person's viewpoint.

The Alignment may outline the target audience, but learning from "extreme users" can be particularly helpful. Extreme users create workarounds, modify, or find problems faster; they have more problems and strong feelings about the problems.



Figure 4.2: Homeworks Readied to Send Out

An example of an extreme user in TimeQuake would be someone who completely removes time from their life or, conversely, someone who feels that they must know the time every moment of the day. Within the group of six people that participated there were several extreme users: a man who has avoided dealing with time most of his life, an assistant whose job it is to keep track of someone else's time, and a woman whose entire family lives six time-zones removed from her. The participants were people suggested by coworkers or family members ranging in age (all over the age of 19), gender, income, and race. Diversity among subjects eliminates grouping based on age, race, gender, income, etc. The research reveals how to group people.

After each interview the interviewers discussed relevant information. This “download session” is critical, as it happens when the interview is still in recent memory. If the team had multiple people it would also be prudent to have download sessions with the entire team. Here the team discusses possible changes, emerging trends, oddities,

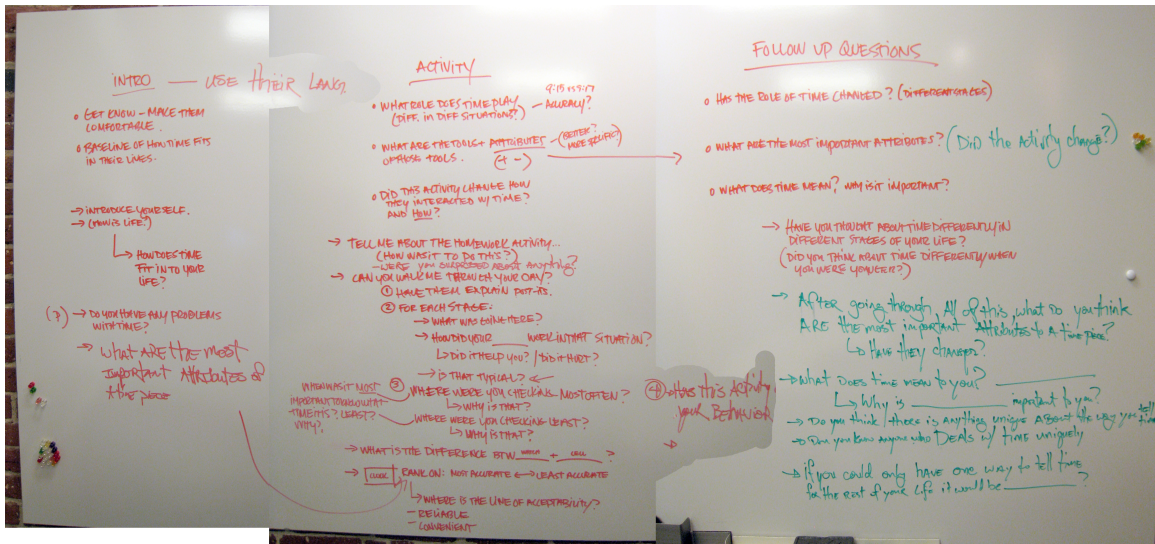


Figure 4.3: Interview Protocol Development

etc. The download session bridges the Discovery and Analysis so adjustments can be made to enhance work.

4.1.1 Discovery Conclusions

With any data-gathering methodology there are critiques. The major critique of this methodology is that it is a very small sample, a highly qualitative study done with the goal of creating something that appeals to very large groups of people. While statistically, this may seem unsupported, there are instances in the design process in which it is very valuable. Using a large sample in quantitative research finds a common answer to a question where a project's outcome is geared more towards not offending most people than really exciting anyone [2]. The goal of this qualitative process is to create a new product, system, or service that people feel strongly about, rather than a statistical approach with a presupposed question. Statistical methods group people in ways that make sense in numeric form; grouping with regards to age, income, gender, etc. allows for critical groups to be overlooked. In markets where

qualitative research has been exhausted, creating successful, differentiated offerings within the same segmentations proves increasingly difficult. Using new segmentations based on a new understanding of people can inspire unparalleled ideas.

The cultural probe is a useful tool in order to get participants thinking about the topic so they are prepared for the interview. Probes also record real-time information creating a method to tell the person’s story. The probe design should allow the participant to get intimate with it, making it possible to record more than just data. The team can extract the data, but the stories are unique and have to be captured. The probe has three parts: an introduction, framework, and stories (Figure 4.4). The

Protocol Phase	Protocol Content	Result
Introduction	Talk about interview process and logistics.	Easy participant and set tone.
Framework building	Talk about tangibles. Problems, benefits, etc.	Data recording: actionable
Storytelling	Talk about intangibles. Desires, hopes.	Story recording: inspiration

Figure 4.4: Interview Protocol Structure

framework gives the participant a way to document in a removed way and to create the framework through which intangible stories can be woven.

4.2 Analysis

With two or three participant interviews complete, the team can start to evaluate the data's relevancy. If the data are not useful, then the Discovery setup needs to be adjusted. If the data seem promising then the team can start Analysis. In this phase all of the collected data are clustered, and the team develops a model to explain the information. The type of model depends on the project. Once the appropriate model is developed the team uses it in conjunction with people's stories as inspiration for the new offering. Analysis is a multi-sensory process, so to begin each participant's



Figure 4.5: Discovery Board

picture is placed on a board (Figure 4.6). During download sessions, the team notes relevant themes, ideas, and quotes on three-by-five cards and pins them under the participant's picture. The team also reviews the taped interviews to pull out more information and pin it up on the board. Soon after the Discovery phase concludes several boards are filled with raw information. Next the team clusters the information so that larger themes could be identified. Similar quotes or ideas are tagged with colors and arranged together on the board. As the information gets clustered, major themes can emerge. In TimeQuake two themes emerged early on. For some, keeping track of time connects them with other people. For others it is about defining "my time." "My time" is the personal time people have when no external rules apply.



Figure 4.6: Analysis Board

One participant keeps track of time largely to keep a connection with her family in England. Conversely, many people keep track of time so they know when to stop working and go home.

People are split in four groups depending on how they feel about time:

- Love planning and plan as much as possible,
- Love planning and do not get to plan as much as they like,
- Hate planning and have to plan, and
- Hate planning and resign themselves from planning at all.

Based on these models there is a significant group of people that wish they dealt with time differently than they do. Creating an offering that helps people deal with time how they wish they could would almost certainly be successful. The team also noted

that it was amazing how differently people interacted with time and it is a wonder that people with different “timestyles”, or ways of interacting with time, get along in the same environment.

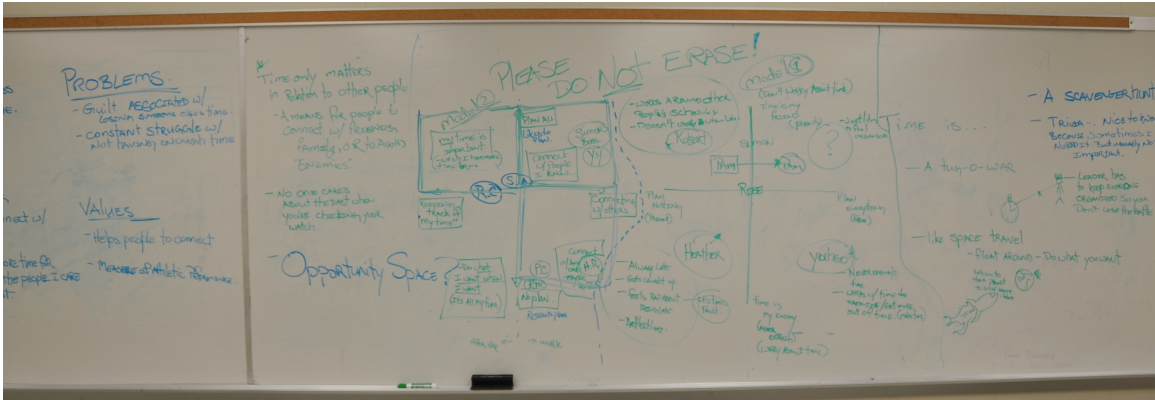


Figure 4.7: Analysis Whiteboard

From these criteria the team started to develop models. By developing models “Archetypes” are defined. Archetypes are stereotypical types of people who epitomize the model. With two-by-two matrices there are four archetypes corresponding to the four quadrants of the matrix. The participants do not have to exemplify the archetypes, rather they have to fit into the archetypes only to a degree. For example, a person might often be split between two archetypes, but the combination of those two archetypes can explain the person’s behavior. The advantage to talking to extreme users is that they more completely fit archetypes and can make Analysis easier.

Each model that is developed is checked against the Discovery. If the model fails to describe the people and situations from the Discovery, it is discarded for a more accurate model. This cycle continues until the best possible model is created. The more people that are working on the problem, the faster and more accurate the model will be. Figure 4.8 consists of two archetype maps based on the initial information models. These maps could not explain the participants, and, worse, they created

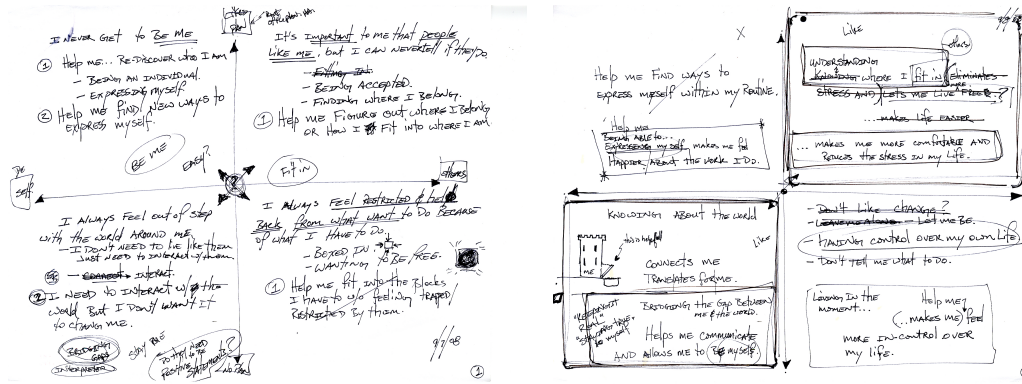


Figure 4.8: Archetype Maps from Initial Model

false information by attributing reasons to the archetypes that did not come from the Discovery. This raised a red flag about the models. The process of creating or altering models and archetypes to match the data went through several iterations before the single two-by-two matrix was deemed inappropriate to explain the information.

Since a single matrix could not explain the Discovery information, two matrices were employed: one to describe the general archetypes people filled, and a second to describe the different modes of time people experienced (Figures 4.9 and 4.10). On the first matrix the horizontal axis represents the forces associated with time from “internal forces” to “external forces.” “Internal forces” describes times where the person is in complete control over his or her time; this happens when a person is alone and enforces his or her own rules about spending time. “External forces” are associated with times where some other entity enforces its rules about the use of time. An example would be the time one spends at work, typically controlled by the employer’s rules. The vertical axis conveys the importance of time in a given situation ranging from “time does not matter” at the top to “time matters a lot” at the bottom. Given these two axes the following four possibilities arise:

1. Periods where time does not matter and it is controlled by external forces (e.g. time spent with friends outside of a deadline).
2. Periods where time does not matter and is guided by internal forces (e.g. the time before one goes to sleep).
3. Periods where time matters and is controlled by external forces (e.g. time spent working for an employer).
4. Periods where time matters and is controlled by internal forces (e.g. free time where one sets his or her own deadlines).

The second matrix describes the way people act versus how they want to act, or the real versus ideal time interaction (Figure 4.10). On the horizontal axis is the actual way people interact with time ranging from “don’t care about time” on the left to “care about time” on the right. The same labels are attached to the extremities of the vertical axis but it describes how people wish they interacted with time. Given these two axes four archetypal timestyle possibilities arise:

1. People who do not care about time but wish they did more.
2. People who do not care about time and are happy about it.
3. People who care about time and wish they did not have to.
4. People who care about time and are happy about it.

The team checked this model with the knowledge of our participants, and it was found to be accurate.

As the models are developed, the team uses them to create a product position map or “productscape” to find gaps in current product offerings. The competing

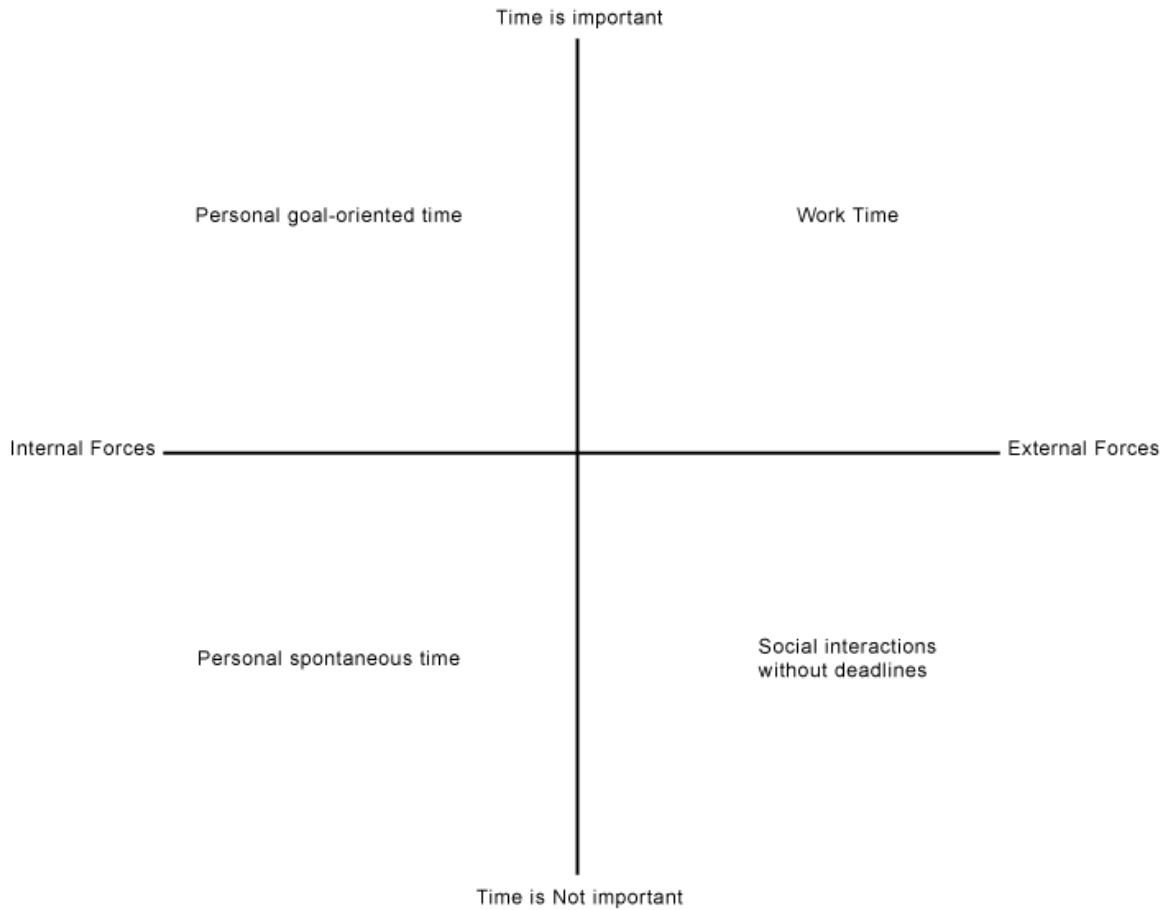


Figure 4.9: Time Modes

products at this point were defined as anything that can inform a person of the time, and the Alignment noted the probable effect cellular phones, PDAs, smartphones, etc. were having on wristwatch sales. The difference between the aforementioned devices and wristwatches is that watches typically do not provide *informed* time. So, the competing product chart takes into account timepieces that not only tell time but provide information relevant to the time as well.

The problem with the competing product chart is that there were no gaps (Figure 4.11). Cellular phones and particularly smart phones could cover the entirety of both maps. A cellular phone can serve the needs of any of the four archetypes and

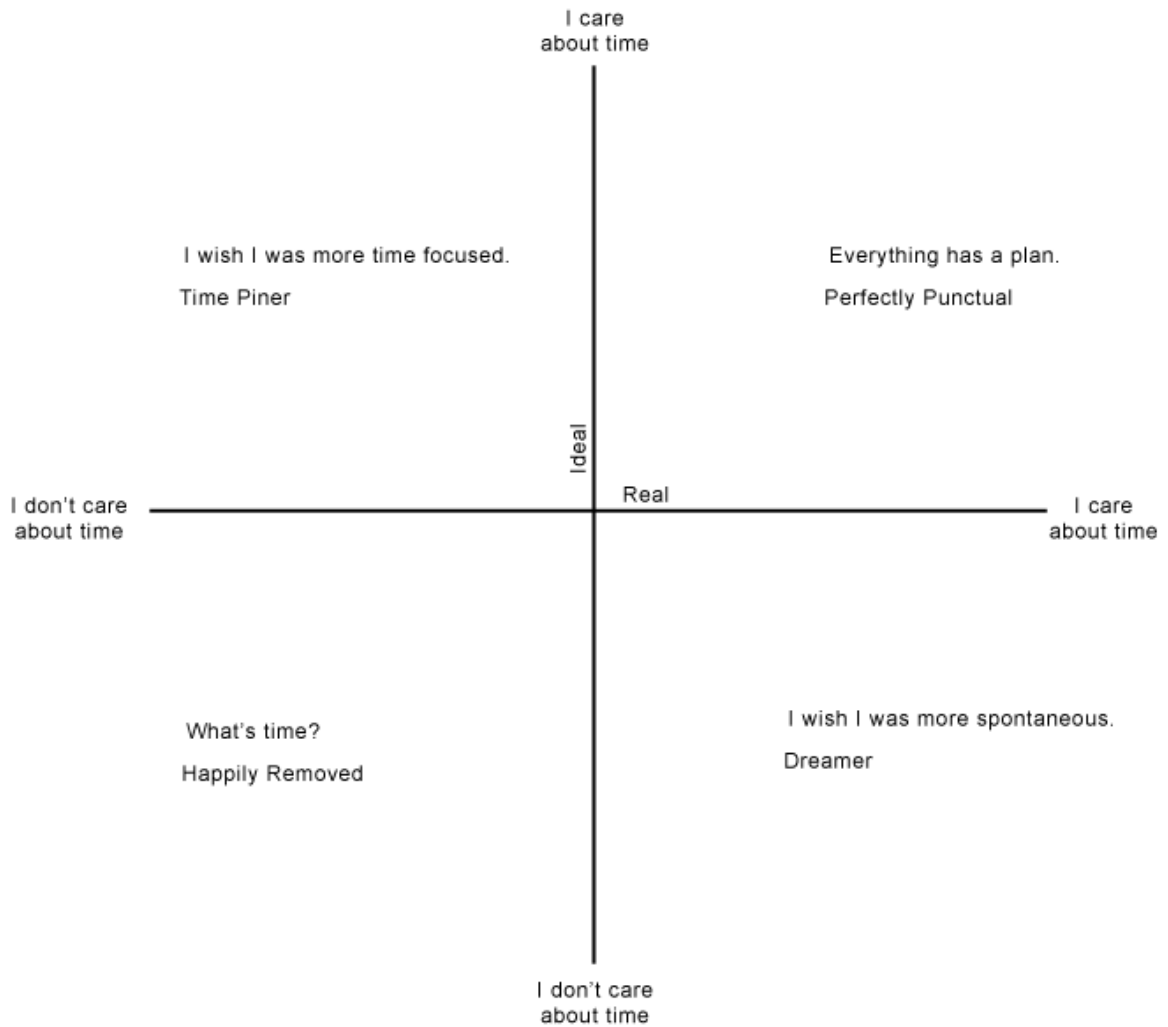


Figure 4.10: Real/Ideal: Timestyles

modes, and it can even facilitate a person’s movement from one mode to another with notifications of up-coming events.

The team organized a brainstorming session. The focus was placed on the “Time Piner” archetype: The person who hates planning but is forced to because of external forces. Seven people who fit the archetype were invited to participate in the brainstorm. The session’s format had three sections: a ten minute warm-up/icebreaker, a

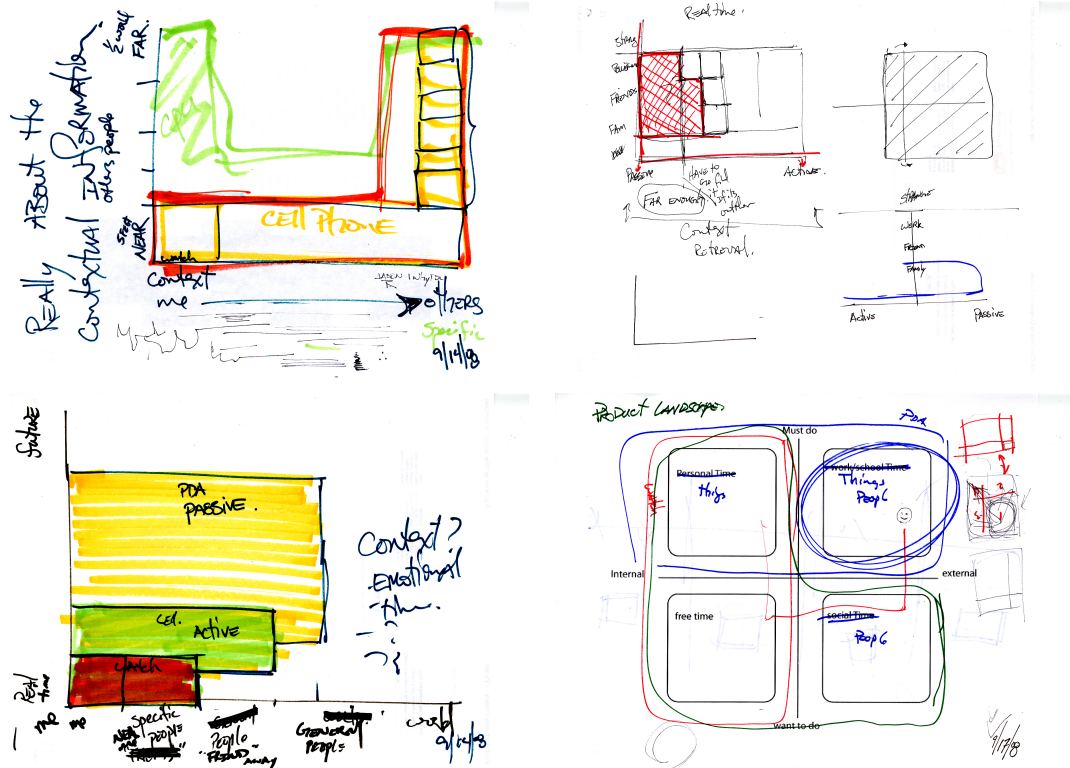


Figure 4.11: Productsapes Show No Gaps

thirty minute general time brainstorm, and a thirty minute TimeQuake brainstorm. Food and drinks were provided for the participants to relax the atmosphere.

The brainstorming session failed. Only one participant arrived on time, the rest being anywhere from thirty to ninety minutes late, frustrating the mediator and the participants who arrived on time. The session began an hour behind schedule. The icebreaker worked well, but the second and third sections ran together into a protracted, aimless discussion. However, the session yielded some interesting ideas about how a person could interact with a timepiece. After the session the Post-it notes were clustered to glean information.

The next idea generation used was storytelling; storytelling is a one-on-one (or small group) brainstorming session where the moderator creates a scenario and leads



Figure 4.12: Brainstorm Icebreaker

a discussion on the problem. Storytelling fits closely into the process by mirroring the Discovery interviews. The story was built around the Dreamer archetype. After the story, the tension is explained to the participant(s): the character wants to continue to be engaged with the current person but also feels the need to break away to attend a prearranged appointment. Then the interviewer asks if the participant could relate to this situation, and if so, how they deal with situations like this. The interviewer probes and discusses possible new ways to alleviate the tension. Through the course of these discussions planning systems similar to Microsoft Outlook and Google Calendar were mentioned as one method to solve this tension, but they work best for people who like to plan and do not feel the same tension.

The team turned to an idea that was noted early in the Discovery: it is a wonder that people with different timestyles can get along in the same environment (i.e. the external forces modes). With the focus now on the interactions between the archetypes the product gap becomes clear: there is no system that facilitates people with different timestyles to work within their timestyle. Devices like PDAs



Figure 4.13: Brainstorm Session

and smartphones are the touch points to planning systems like Microsoft Outlook or Google Calendar and those planning systems are designed to work very well for the two archetypes that want to care about time. The team decided to focus on the interaction of different timestyles in two modes of time where time is important.

4.2.1 Analysis Conclusions

Analysis requires a team to be highly effective; the larger and more varied the team, the more collective experience they can draw from, and a greater variety of ideas can take shape. The majority of the analysis for TimeQuake was done by the author, alone. But, key breakthroughs came when the author was engaged with other people in discussion. Given that the analysis team would be limited to a single member it



Figure 4.14: Data Clusters

would be vastly helpful to create a more regimented process with discrete steps as well as goals to reach with each step.

CHAPTER 5

TIMEQUAKE:

CONCEPT ENVISIONING AND TESTING

5.1 Envisioning

5.1.1 The Concept

The Analysis identified a new opportunity: a system to allow people of varied timestyles to work within their own style without creating tensions between people with different styles. With this new focus the team began to look at the ways people interact at work and how they plan or do not plan their interactions. The team

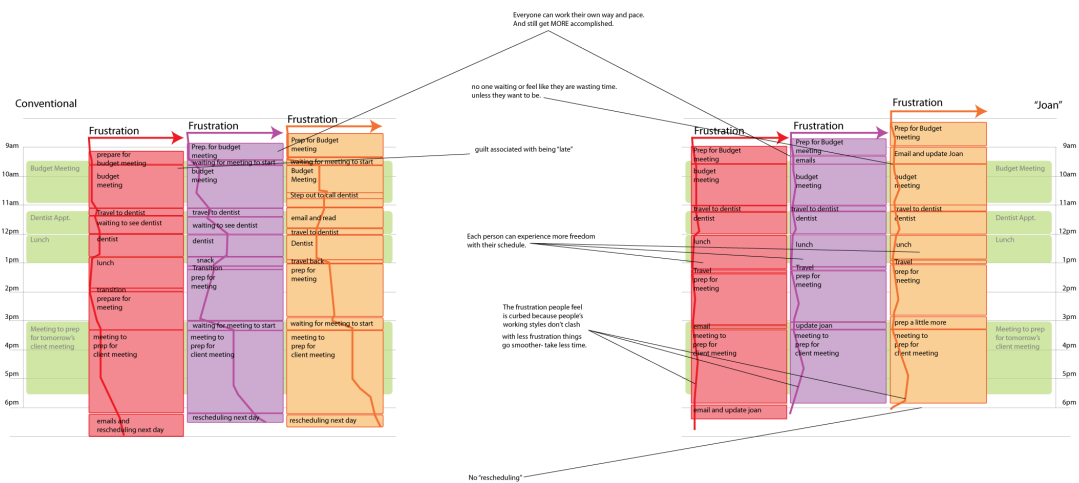


Figure 5.1: How Different Timestyles Interact.

returned to the Analysis boards to look at what the participants said about their work modes and different methods people use to interact in that mode. It showed that

only the “perfectly punctual” archetype liked the existing products. The other three archetypes had feelings ranging from mild dislike to total avoidance of employment that would require planning in that way. There are several tensions created by people with different timestyles:

1. Often the interaction of people with different timestyles would cause one person to be waiting on another person.
2. The tension of an appointment and what a person is engaged in at the moment.
3. Other times something scheduled would make for small pockets of time where one archetype might avoid engaging in a new activity, creating a feeling of wasted time, and another archetype might engage in something that takes longer than the allowable time, causing one or both of tension one and two.

The resulting concept dynamically updates the schedules of the different archetypes: “Joan.” With Joan, scheduling moves from an hourly basis to an “event” basis. An “event” is the generic term for anything that a person has to do; meetings, personal and group tasks are all considered events. Events throughout the day comprise work. The benefit of Joan is that it allows people *not* to look at it. Three of the four timestyles are addressed with Joan, and each style interacts with Joan when they want to, with Joan rarely making interjections into their day. The “time piner”, who does not care about time but wishes they did, can set Joan to interject more often. The “dreamer”, who cares about time and wishes they did not have to, can set Joan to interject a minimal amount and only check Joan when they want to. This allows each archetype to work in their style. “Perfectly punctual”, who cares about time and likes it, can add everything to Joan as an event and their time can be as organized and efficient as possible. Joan does not serve the “happily removed”, the person who

does not care about time and likes it that way, because, based on the Discovery, this person would avoid a job where Joan would be used.

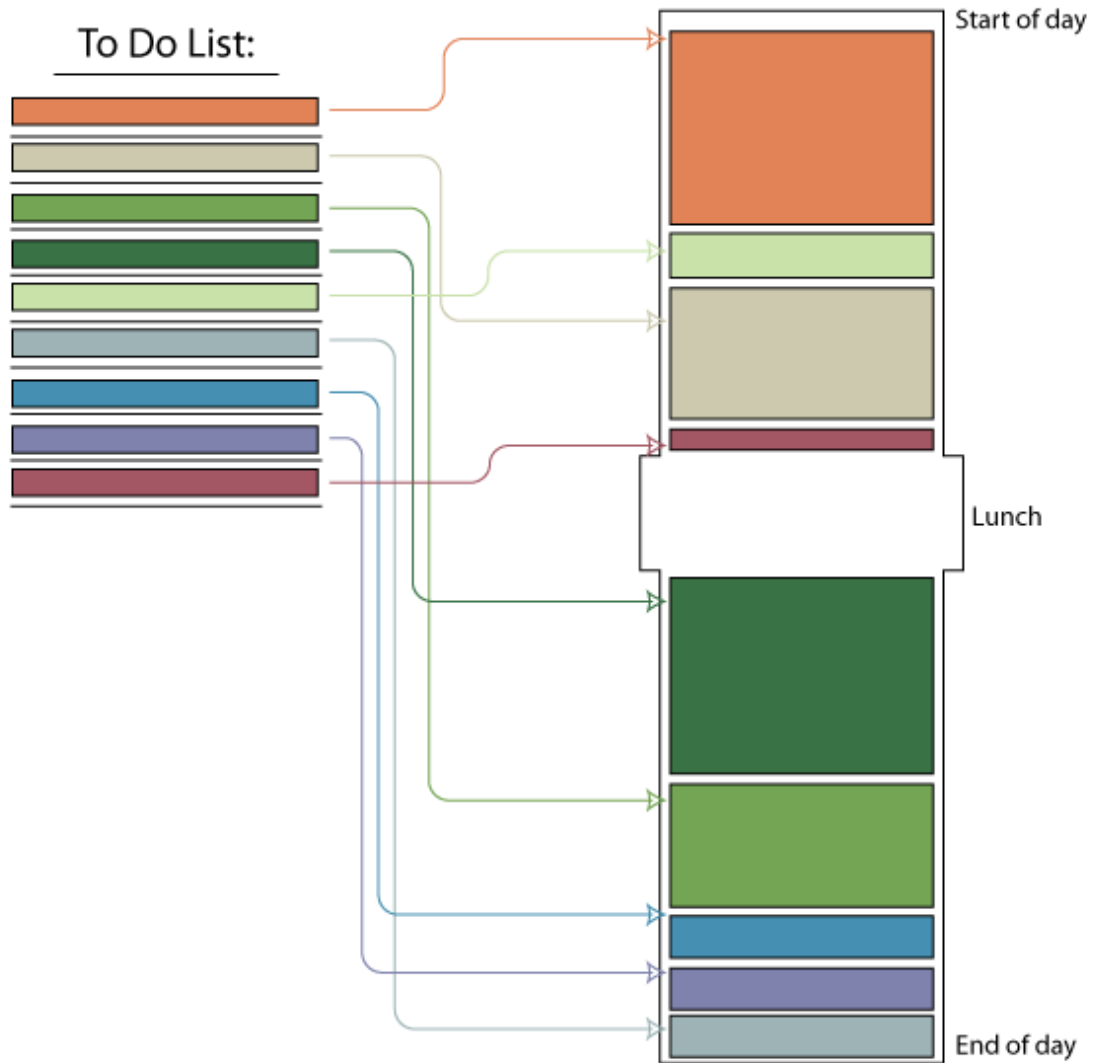


Figure 5.2: Most Basic Joan Illustration

Each event would have an estimated length and a priority associated so that Joan could order events appropriately. Priority has a base value assigned by the person inputting the event, then it is increased by the number of events tagged to happen

after the event and a deadline for the event. In structure Joan is similar to existing planning systems. It would have a server that would do the work of organizing the events, then it would push the event information out to the touch points. The touch points for Joan would also be similar to other systems: the primary input device would be a computer connected to the server, and the outputs would be pushed back to the computer and to a handheld device. The handheld device would also have the capability to input rudimentary information for events. The handheld could be integrated into an existing handheld device like a cellular phone, PDA, or smartphone, but initially it makes sense to design a new device to emphasize the contrast from existing offerings.

Two areas of development were needed: Interface and Form development. Both parts of the handheld design are intertwined. The type of information that needs to be inputted into Joan has a lot to do with the type of physical interaction a person needs to have with it, and the type of human interaction can affect how the interface works and even the amount of information that is inputted using the device.

5.1.2 Graphic Interface Development

As mentioned above, the majority of the information needed for an event would be inputted via computer and not the handheld. The handheld's purpose is mainly an output device, but it would still be able to create placeholders for events, edit and delete existing events. The majority of the handheld's use will be to view and manipulate event sequences and to act as a link between people's separate event information.

Joan sets up meetings only when people are ready; to accomplish this, "Ready. Set. Go." was developed. Once relevant tasks are completed the person becomes "Ready." Once the last person is "Ready" the event is set to happen and a notification

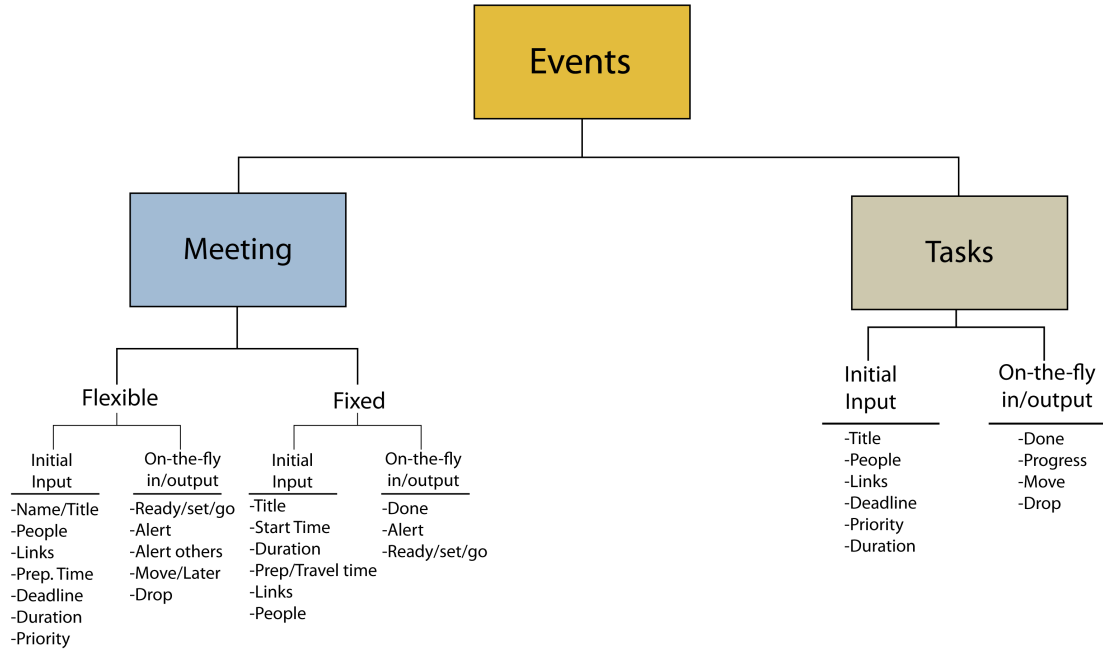


Figure 5.3: Event Information: Initial and On-the-fly

goes out to each person. If every person is “Set”, meaning everyone is available, then the meeting is a “Go.” If some people are not “Set” the meeting is worked into each person’s sequence of events. At the meeting individual Joans recognize that they are in close proximity and the meeting is marked as completed.

In Figure 5.3 event information is split into initial inputs and on-the-fly inputs. The on-the-fly inputs include a percent complete, add/remove people, mark to edit, move, delete, create, and a priority input. The screen format was chosen to be landscape to emphasize a “time-line” setup of how events interact. Based on the above criteria an initial interface structure was developed: Figure 5.4.

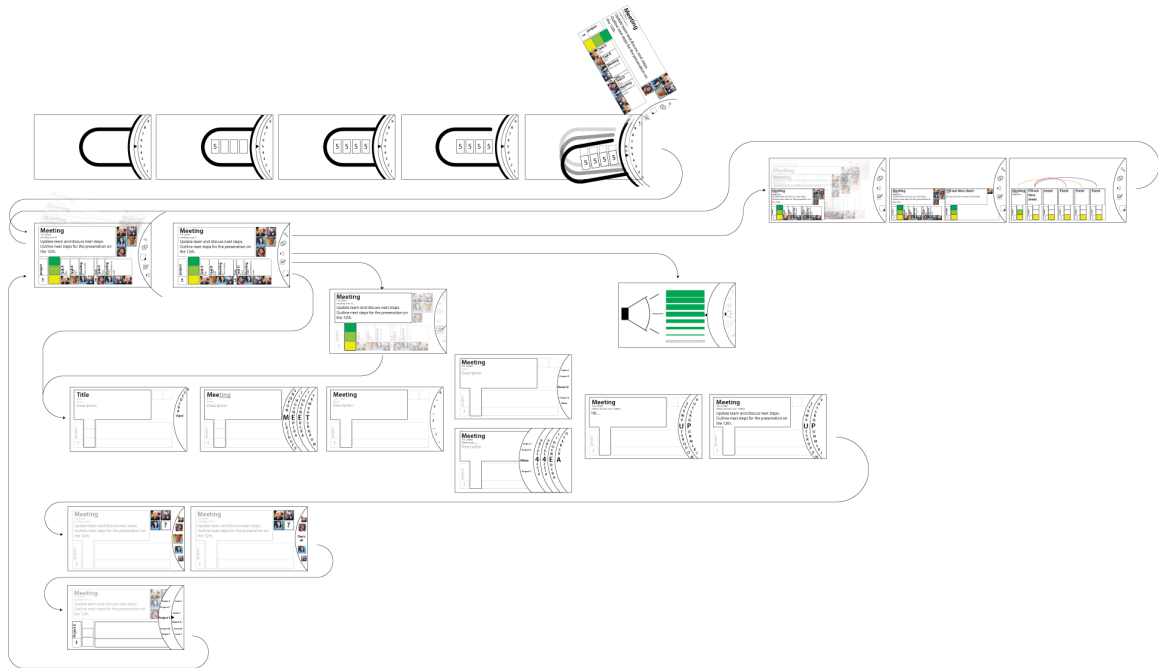


Figure 5.4: Joan’s Graphic Interface Structure

5.1.3 Form Development

Joan’s physical interface developed from the requirements of the LCD screen outlined in the graphical interface and from the Discovery information. The team returned to the Discovery information and the Analysis models to create three embodiments corresponding to the archetypes.

The Dreamer resentment of planning and scheduling led to the “spontaneous button.” When pushed the spontaneous button would suggest something spontaneous to do, and it would look “spontaneous” by abruptly interrupting the surface. The “spontaneous” button was not practical, but it led to the single input style for this form. The single input became a touchpad running horizontally under the screen as in the bottom left image in Figure 5.5.

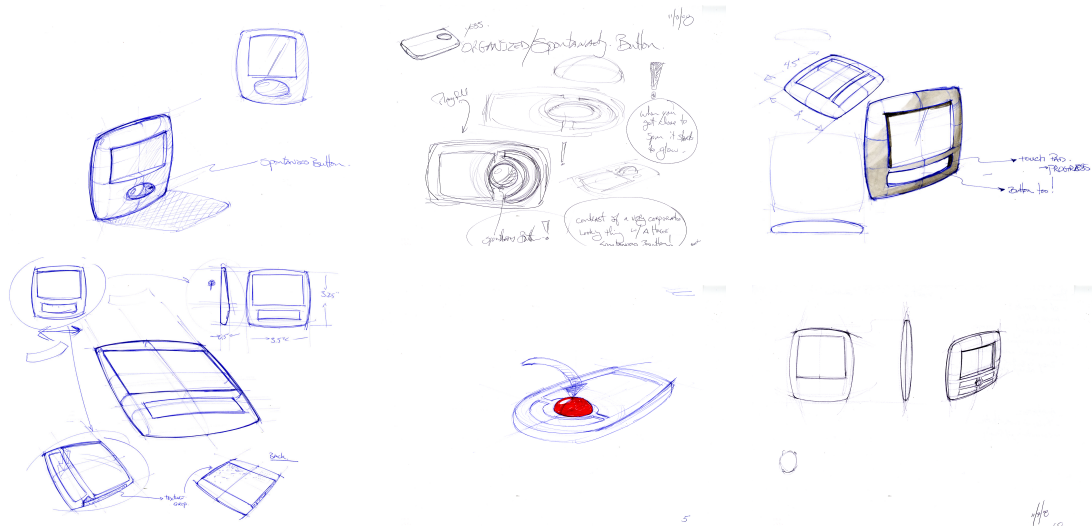


Figure 5.5: Development Form Sketches for Archetype A



Figure 5.6: Model A

The second form, corresponding to the Time Piner, represents a compromise between the Dreamer and Perfectly Punctual. The overall form is larger and less organic than model A, but the surfaces are broken by the interface: a wheel at an angle. The back is textured or rubberized so that the sleek and soft elements are balanced as to mimic the idea of a base of spontaneity striving to be more structured.

The form corresponding to Perfectly Punctual has a larger, more complex interface where the wheel on the side would spin, click in, and then torque forward and backward to enhance the interaction. The challenge with such a large and prominent interface is preventing accidental activation. The wheel was recessed and the

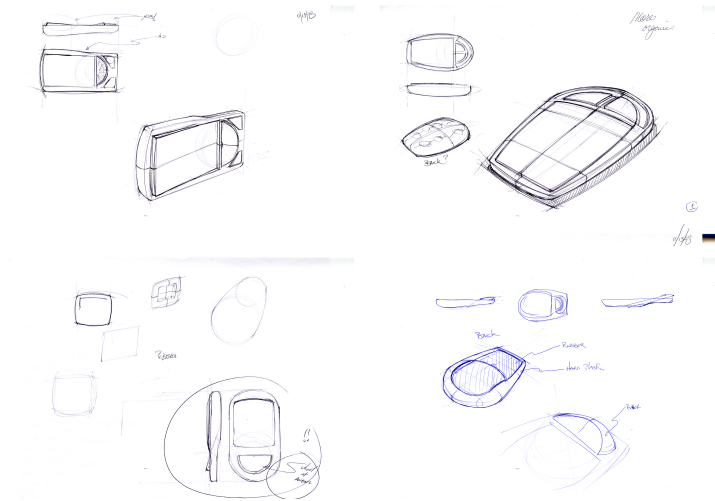


Figure 5.7: Development Form Sketches for Archetype B



Figure 5.8: Model B

body was built up around the wheel to resolve the issue. The rest of the form is clean, sleek, and down-to-buisness. The Perfectly Punctual archetype demands a high functionality from a scheduling device.

Resulting from the Envisioning phase is a fully formed concept. The core functions are outlined and the physical forms are developed, but more input is needed to develop Joan into a complete offering. The graphical interface's skeleton is developed to the point that it could be mocked up and tested, but software development is outside the scope of this project.

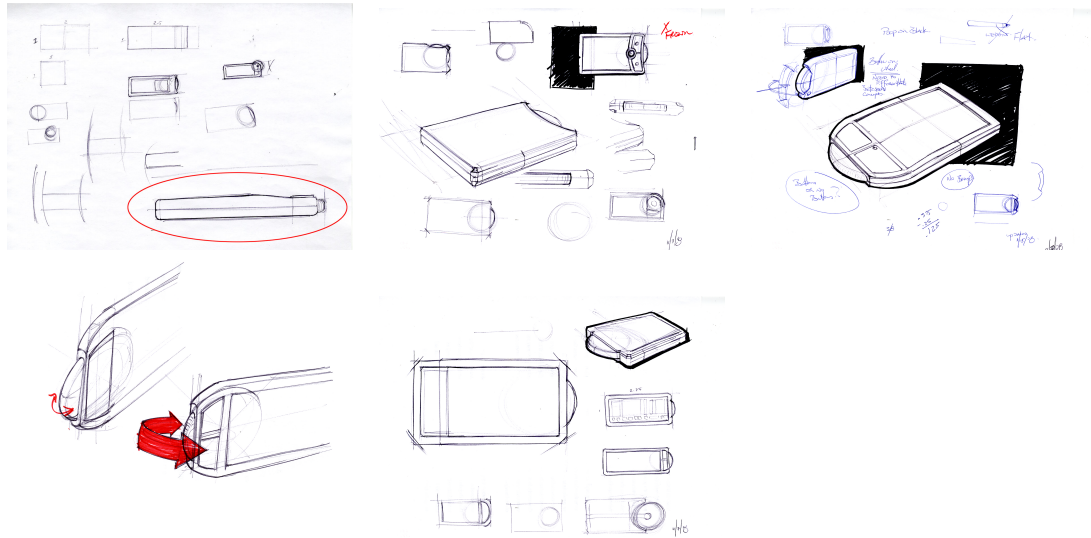


Figure 5.9: Development Form Sketches for Archetype C



Figure 5.10: Model C

5.1.4 Envisioning Conclusions

Envisioning is less sensitive to the number of team members than either the Discovery or Analysis phase. It relies heavily on the data already collected. Identifying the tensions that people experience with existing solutions allows the team to look at the opportunity gap in a new way: different timestyles working together. The forms for Joan relate to the archetypes so they relate to people as much as the function does. If the Discovery and Analysis are done correctly then Envisioning just creates

embodiments to illustrate the new offering. The problem is that without solid information provided by the Discovery and Analysis the development can look promising but be disappointing.

5.2 Testing

The Testing process mirrors the Discovery. It is done with a small sample with qualitative interviews. The interviews are more directed because the goals are more specific: the first goal is to evaluate the new offering and get input on improving it; the second goal is to evaluate the developed forms and get input on them so that a final handheld form can be designed.

5.2.1 Evaluating the Concept

Joan as a concept is hugely complex; to create a working prototype of Joan would take an investment in software and hardware development which is outside the scope of this project. This creates a problem with regards to testing: how to test a concept that does not exist and cannot be prototyped without significant investment of time and money? The solution is similar to one used in the one-on-one brainstorming in the Analysis: create a story-line that captures the concept and illustrates that story to the participants. In addition to creating a story-line that captured Joan the team also needed to create a story-line that capture the existing offerings that Joan would compete with. The team identified two categories of competitors: digital and analog planners.

The planning could be broken into three sections: creating a new event, getting ready for that event, and getting to that event. The storyboards exploited the pattern to highlight the differences between the three systems.

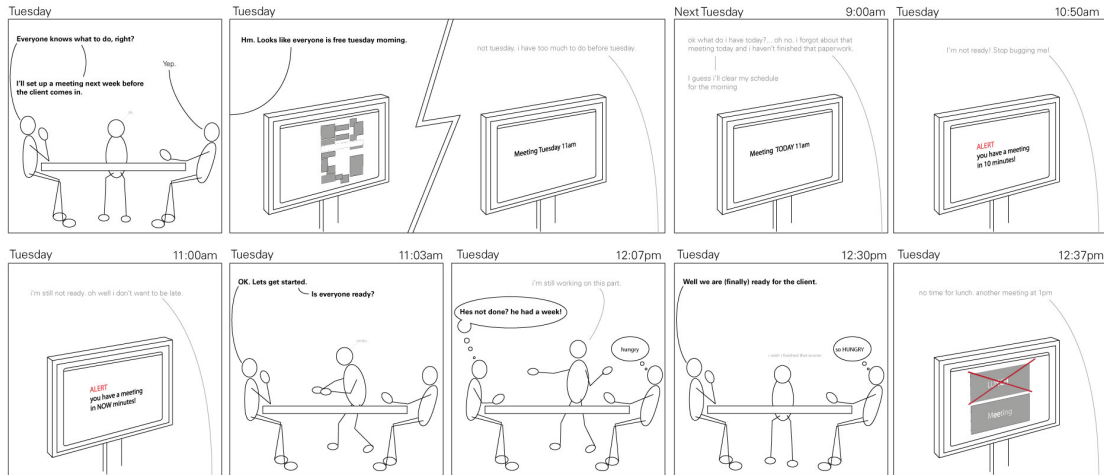


Figure 5.11: Digital Planning Storyboard

The team used the storyboards (Figures 5.11, 5.12, and 5.13) in the Testing interviews to reinforce the idea that Joan was still under development and to help the participants imagine themselves in the situations instead of commenting based on seeing actors in the situations. Also, the participants could refer back to anything in the story at any time with the entire storyboard in front of them.

5.2.2 Evaluating Form

The team created three forms in the Envisioning section with Testing as the goal. The feedback from participants informs the direction for the final form design. The forms were evaluated on the physical interface and on the overall shape and feel.

5.2.3 Testing Protocol

After the storyboards and the foam models were developed, the team focused on creating a protocol for the testing interviews. The protocol would be similar to the Discovery protocol; it would have an introduction/warm-up, a section devoted

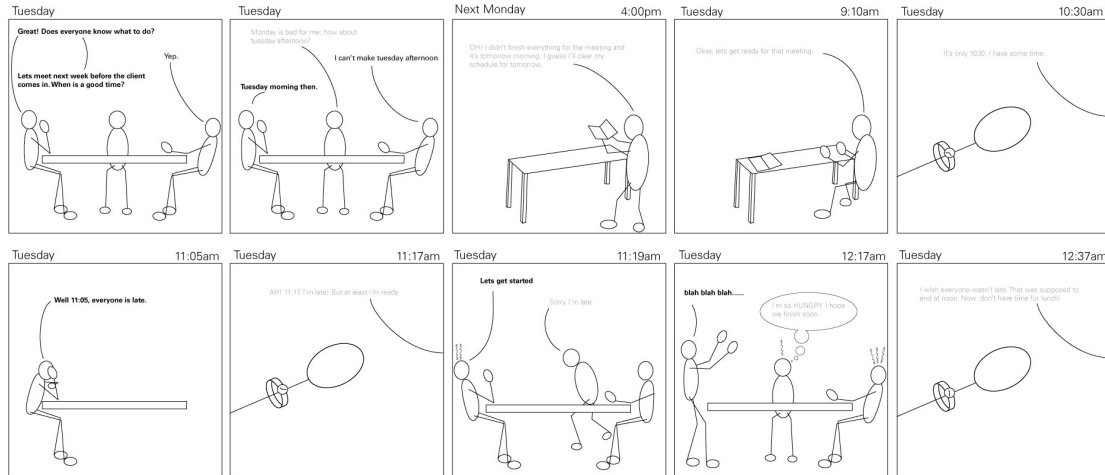


Figure 5.12: Analog Planning Storyboard

to evaluating the concept as a whole, and finally a section to evaluate the forms. However, the structure of the interview is different from the Discovery interviews; in the Discovery tangibles were addressed first to build a framework. Then, once the framework was established the intangibles were addressed. The Testing protocol is the opposite; the concept (intangible) is addressed first and then the embodiments. Here the concept creates a framework that the embodiments can exist in. And, again, each interview is videotaped.

The introduction's purpose would be to get the participant to relax and to gauge where the participant fits in the archetype map or what timestyle they fit most closely. The second section evaluates the concept of Joan. The interviewer shows Figure 5.11 to the participant and walks through the panels telling the story emphasizing the three sections mentioned earlier. After the storyboard is explained the interviewer asked the participant:

1. Can they relate to this scenario?
2. General feelings about this system?

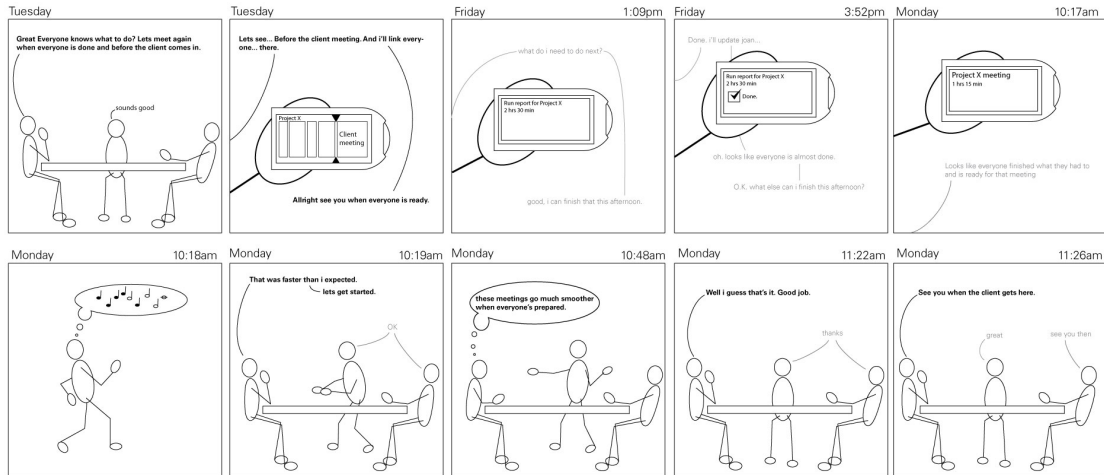


Figure 5.13: Joan Storyboard

3. What are the benefits to this type of planning system?
4. What are the limitations of this type of planning system?

If the participant is finished talking about the digital planning system the interviewer repeats the process with each storyboard asking the same questions. After all three systems have been evaluated independently the interviewer asks the participant to rank the systems on the following five continuums:

1. "Easiest to schedule" to "Hardest to schedule"
2. "Makes it easier to meet" to "Makes it harder to meet"
3. "Sets me free" to "Constrains me"
4. "Enhances my work with others" to "Strains my work with others"
5. "Best for me" to "Worst for me"

The rankings are done using the printed storyboards so that the participant can reference the storyboards to remember the differences between scenarios. The participant

is asked to use distance to express how much one system outranks another. During the ranking process the participant is asked to think aloud about why he or she is ranking and after each ranking the participant is asked to explain why the systems are in that particular order. The interviewer probes about extreme situations. Then each ranking is photographed.

Once the framework of Joan is established, the last section of the interview evaluates the physical forms of Joan. The interviewer presents the three models to the participant explaining how each would work. Next the interviewer goes through each form asking the participant

1. What are his or her general feelings about this form?
2. What are the benefits to this form?
3. What are the limitations of this form?

After each form is evaluated independently, the participant ranks the forms from “Best for me” to “Worst for me” with regards to the physical interface and then with regards to the overall shape and feel.

Finding the right participants is a struggle in the Testing phase. Ideally participants would be screened so that each archetype is represented; however, with TimeQuake the resources were not available to screen participants or compensate participants for their time. However, there were two eliminating criteria: the participants had to be above the age of nineteen and have recent experience working in an office setting.

5.2.4 Testing Conclusions

Evaluating the outcome of the design process is important. It is particularly important when creating new offerings because it can show flaws before a large amount

of money is invested in implementation, and it can only enhance the final outcome. For this type of testing to be helpful the participants need to be picked carefully to find people who can imagine themselves in fanciful situations and be able to articulate their opinions. Getting thoughtful, articulate participants who can relate to TimeQuake was difficult because it called for people who work in an office setting and people who fit that description are busy and cannot take two hours out of their day for nothing in return. However, the Testing was successful; the four participants were articulate and talkative; each interview was an exhausting process. Two of the interviews ran over two hours long. Having multiple lead interviewers would keep each interview as focused as possible by allowing some rest time between them.

CHAPTER 6
TIMEQUAKE:
FINAL DESIGN

Now that Joan has been conceptually defined its embodiment can be developed. The feedback from the testing of the three initial forms was important to understanding how people might interact with a timepiece similar to Joan. The team performed a brief analysis on the testing data in order to conceptualize what people wanted from the form and why. The challenge in creating a handheld electronic device in 2009 is that anything of that size with a screen looks like a cellular phone or PDA. In fact, many of the comments from the testing pointed to a cellular phone form factor (not surprising considering the origins of TimeQuake). The team wanted to create a prototype that subtly suggested that it involves time and at the same time pull away from cellular phone associations. The team used the testing information for logistical criteria like the physical interface and cues on the overall dimensions, but the testing could not offer good information about how people wanted to feel when they interacted with Joan. The team turned back to the Analysis—to the understanding of how people interact with time—to find form cues. Throughout each archetype that was defined in the Analysis there is one common thread: a lack of control of time. Each person was trying to control time in their own way either by fighting it constantly, ignoring it altogether, or parsing it and defining each bit.

The team began to explore different forms that would suggest a level of control over time to people (Figures 6.1 and 6.2). Initially the team focused on the interfaces that allow people to “set” the time on various timepieces (e.g. the knob on the side

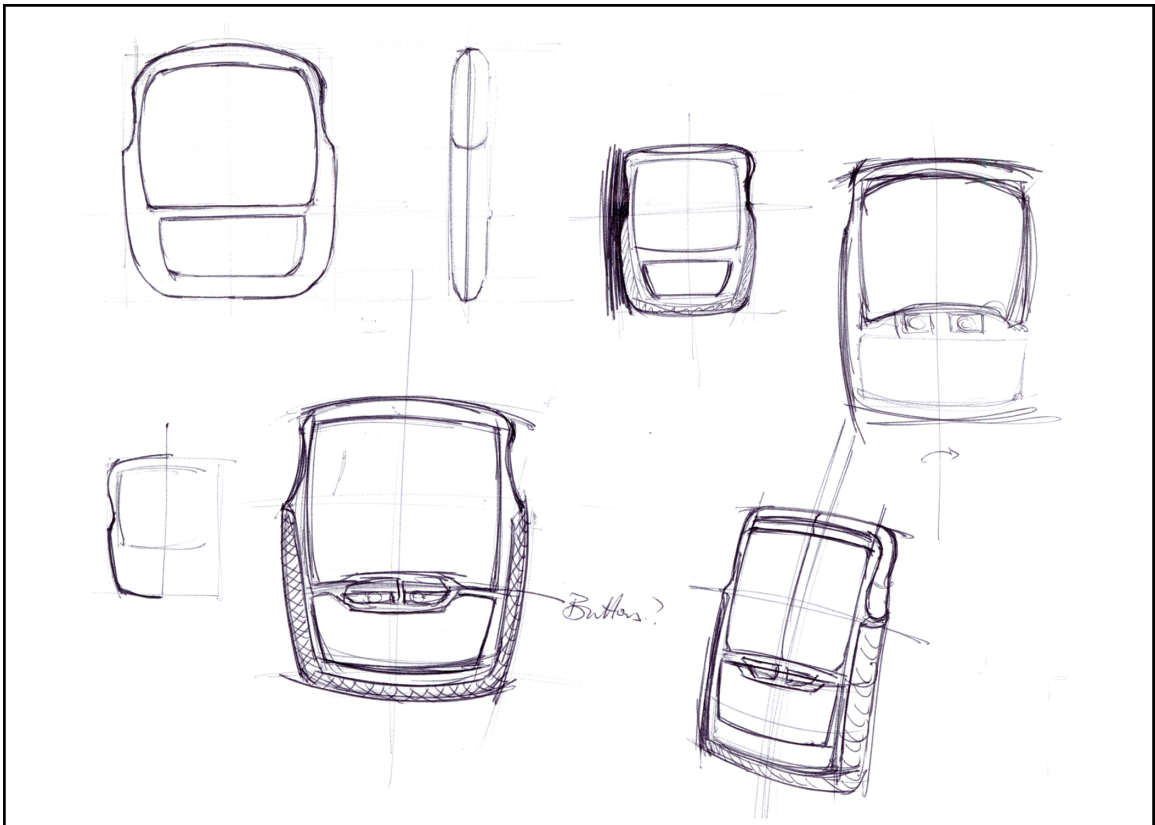


Figure 6.1: Stopwatch Form

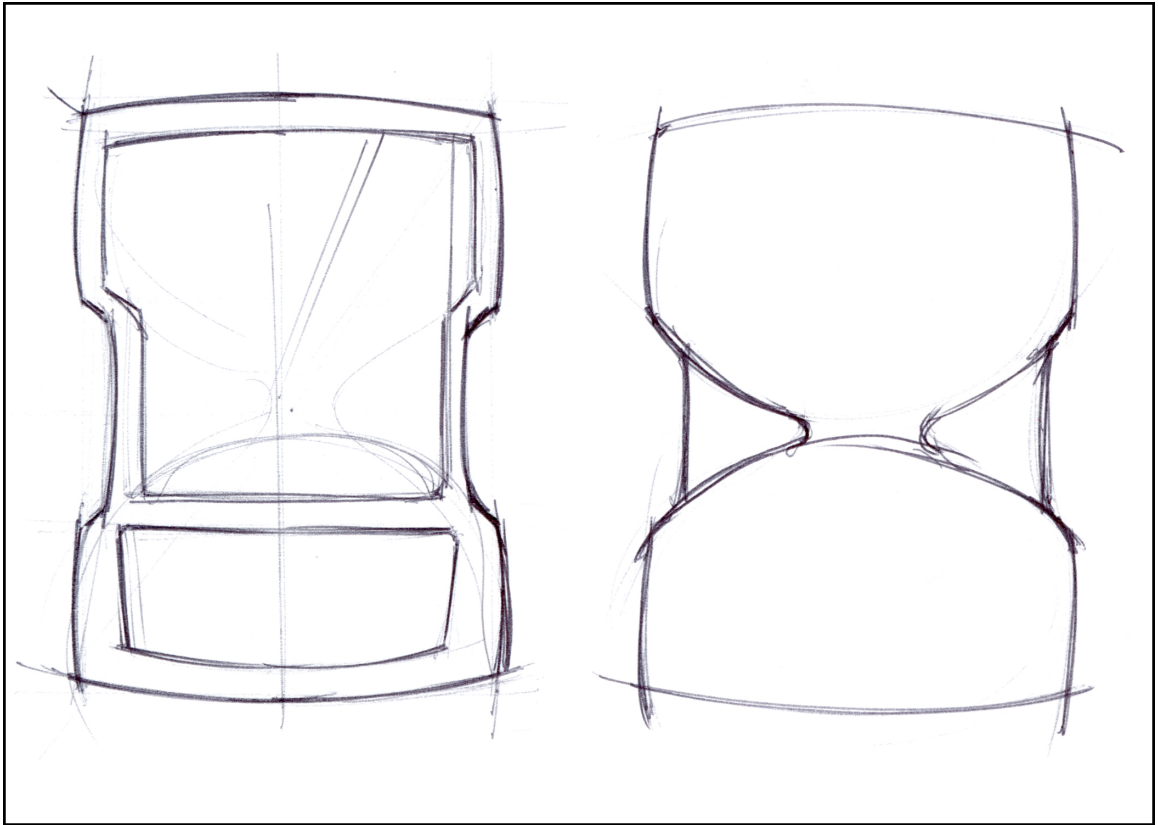


Figure 6.2: Initial Hourglass Form

of a watch or the dials that controlled an alarm clock), and creating a form that exploited those “controls.” However, after exploring different timepieces, hourglasses and stopwatches emerged as the two timepieces that allow people to control time. Using hourglass cues to develop the form made the most sense for several reasons:

- Stopwatches are associated with racing or fighting time.
- Hourglasses are so rarely used now that the form cues are suitably differentiated from current timepieces.
- Hourglasses are perceived by the team to refer back to an era when time mattered less than the present context.
- Hourglasses give the person using it an inherent control over starting time, pausing time, and even reversing time.
- Hourglasses have ambiguous units of time.

The team explored several ways to integrate the data from the Testing and the hourglass motif (Figure 6.3).

The team struggled with the proportions of the form because the screen needed to dominate over the interface in regards to area but if the proportions of an hourglass are pushed too far outside of horizontal symmetry it starts to look like a wine glass or a human’s head and shoulders. The form that was chosen emphasized the hourglass proportions on the back so that the person’s hand would pick up on the feeling of an hourglass, but the front face skews the proportions to fit the screen and interface and focuses more on referring to the narrowing at the center of an hourglass. Figures 6.4 and 6.5 represent the final design as the beginning stages of CAD work. The final prototype is milled out of RenShape on a computer controlled mill, but before

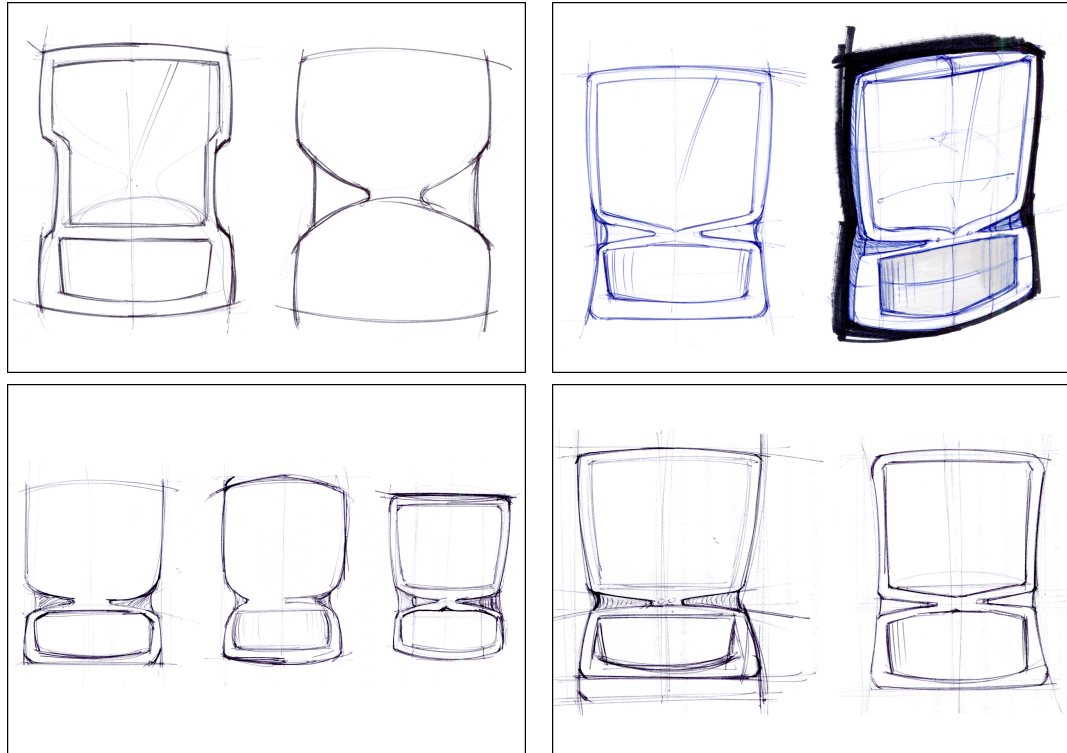


Figure 6.3: Hourglass Form Variations

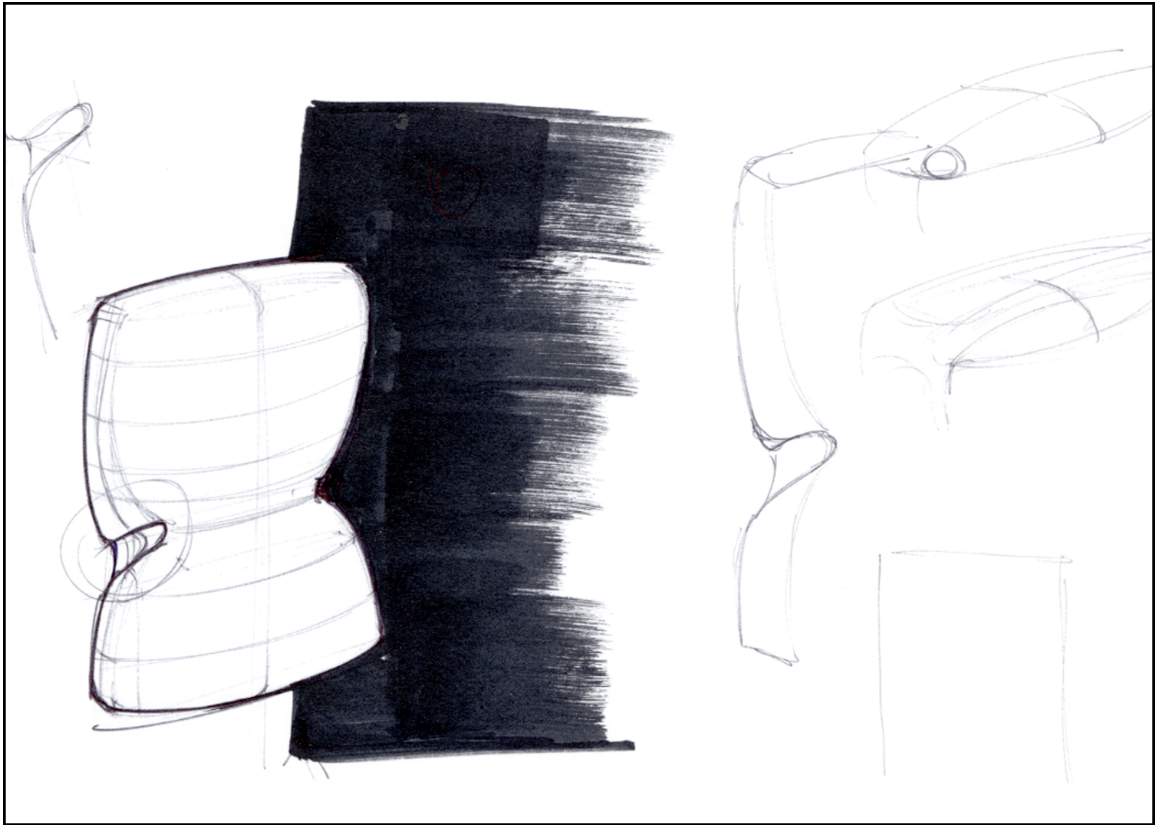


Figure 6.4: Final Design Back

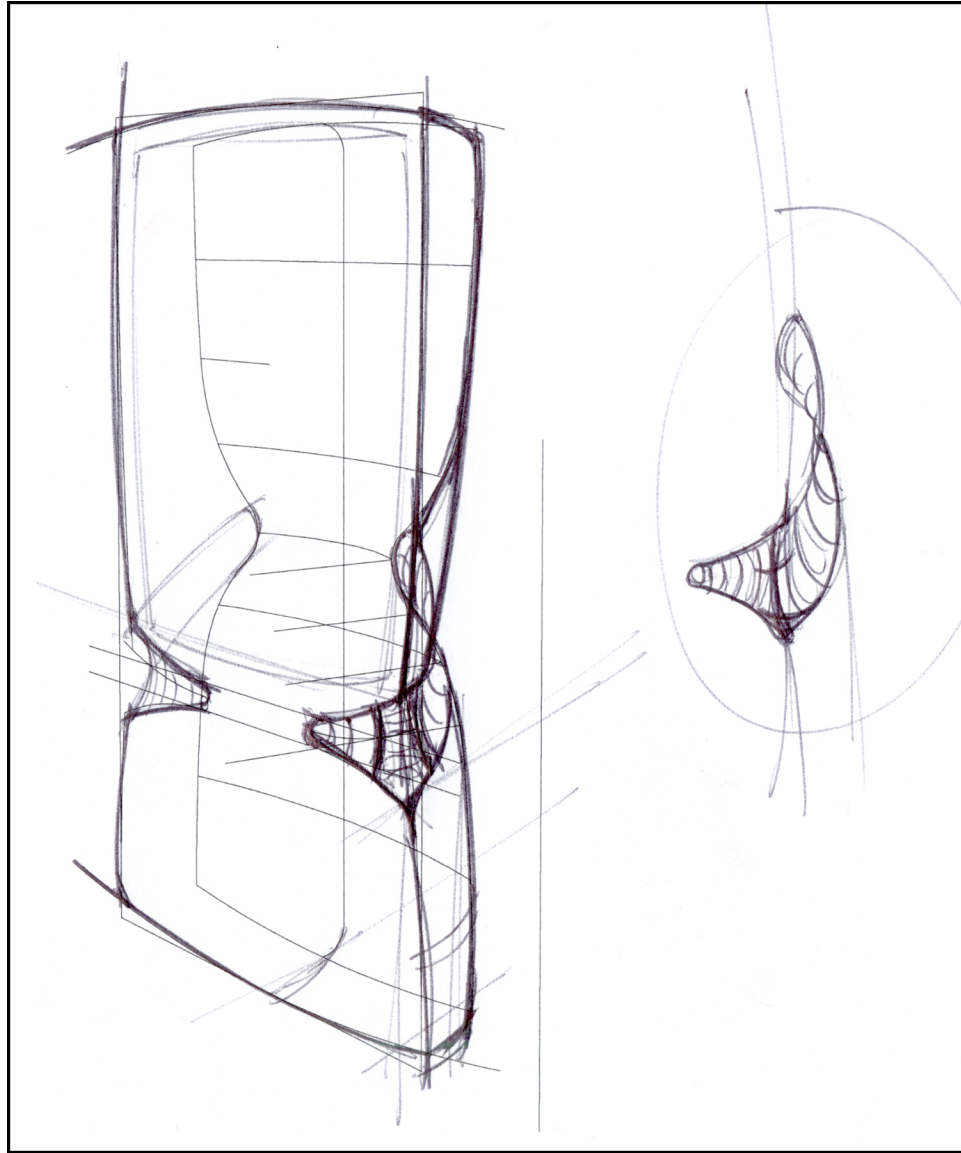


Figure 6.5: Final Design

that can happen the CAD model has to be perfected. The development through CAD modeling resulted in Figure 6.6. The physical model was milled three times so



Figure 6.6: Computer Rendering of Final Form

that it could be tested and adjusted accordingly. After some brief testing, the first model was too thin and light to feel right in people's hands. Then people took issue with the sharpness of the corner in the second model; after adjusting the model by hand, everything appeared correct and the final model was milled and finished. The resulting final design is pictured in Figure 6.7. More images of the final design can be found in Appendix B.



Figure 6.7: Final Finished Model

CHAPTER 7
TIMEQUAKE:
CONCLUSIONS

The four phases concerned with creation and development of a new offering did not run smoothly, increasing the team's frustration but more importantly aiding in the Discovery process. The goal of this study is to formalize a scalable, qualitative research approach, based on the core rationales that people use to make decisions, that facilitates the development of new offerings. This chapter gleans information from TimeQuake to help develop three aspects: scalability, identification of root reasons, and focus on new offerings. Also, this section will focus on the Discovery, Analysis, Envisioning, and Testing because those phases are most pertinent to a successful offering, and because the Alignment and Deployment are an artificial replacement for what would happen in a proprietary project, and they are concerned with the practicalities of dealing with companies instead of value creation.

7.1 Scalability of Process

Much of TimeQuake is scalable to a degree. Every phase works best with a team of four to five but can be performed adequately with two people. It is possible to work this process with one person but the validity of the outcome increases greatly with each additional teammate up to about a six person team. Analysis is the best example. It takes multiple perspectives to do analysis effectively. The Discovery is time-consuming and best done with at least two people—the more people you have

doing the Discovery the more you can learn in a shorter time. The use of video cameras to capture the interviews could allow for one person to collect data, but a second person adds perspective and active participation—both capabilities cameras do not have. The second person in the interview can lend a lot assuming they feel comfortable with the project. Someone who has only a limited knowledge of the project may only serve to break the flow of the interview.

Analysis needs multiple, diverse perspectives. Design is a collaborative process—that is the root of highly qualitative research. Doing Discovery and Testing in this manner is a way to get more people involved in the process. The Analysis and, to some degree, the Envisioning typically do not involve input from people outside the team, but with TimeQuake the Analysis used outside inputs to aid the Envisioning. The storytelling and brainstorming sessions are helpful if the team is small. The process used for Discovery and Testing could be altered to work with the Analysis too, and because the Envisioning relies so heavily on a good analysis it would benefit from the input as well. The best scenario is for the project team to grow and shrink to the project needs at any given time (Figure 7.1) Perhaps the project leader could have a collective of people who are versed in the project and process who are not dedicated to the project, but are recruited by the leader when they are needed and have time. The alternative to having a telescoping team is to reach out to people throughout the Analysis and the Envisioning as with the Discovery and Testing.

7.2 Identifying core rationales

The qualitative open interview style used throughout TimeQuake is an excellent way to get at the reasons people act. However, it relies heavily on an ardent interviewer. If the interviewer loses focus at the wrong time during the interview he or she

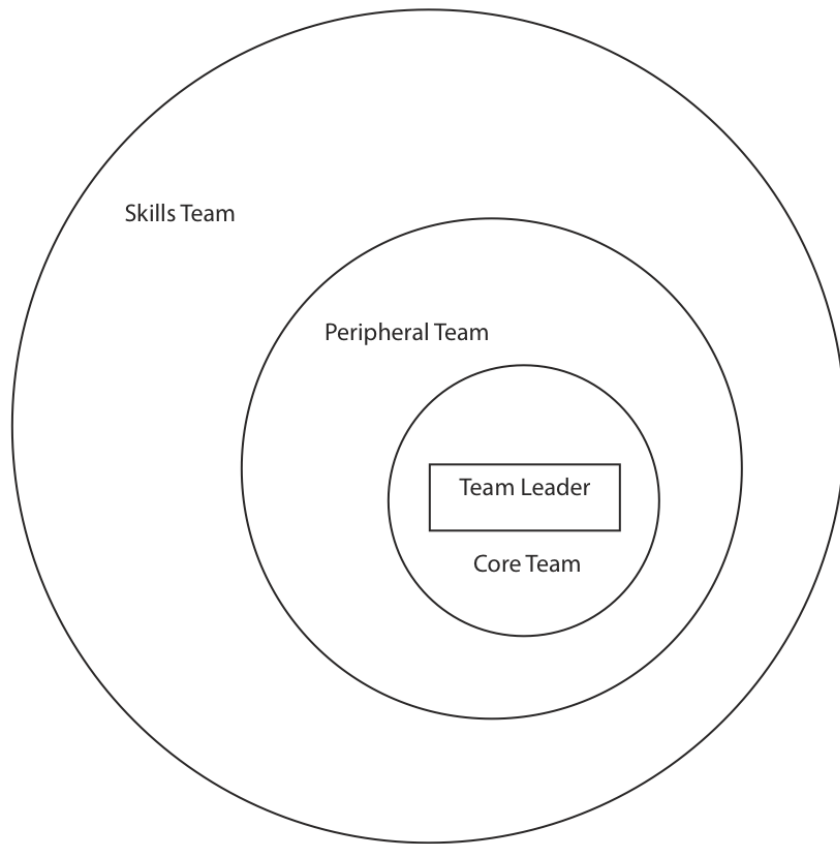


Figure 7.1: Telescoping Team

might not get the chance to probe on a theme that might be groundbreaking. Here is where multiple interviewers becomes important; with two interviewers focusing the likelihood of missing an important theme is slim.

A challenge with such an amorphous process is that the team cannot know how they are progressing, and therefore, the breadth of the data collected must encompass as many solutions as possible. The Discovery has goals and steps but the only way to know when the Discovery is done is to begin Analysis and look at the completeness of the data. If the data are incomplete or not useful then more data have to be collected. Developing a way to generalize the Discovery process without losing its effectiveness, so that it only has to be tweaked for various projects instead of re-invented, could help scale the process down and help the team to know how they are progressing.

7.3 Creating New Offerings

It is difficult to predict the success of a new offering before it is released. Time-Quake's Testing phase can indicate massive failures and wild successes but it falls short in describing the subtleties of success within those extremes. Within the testing if more than three systems are being compared the team can gauge more exactly how an offering fits into a productscape. Also, if a project only had three systems to compare a larger sample would help gauge the success.

CHAPTER 8

THE APPROACH

8.1 Stage One: Protocol Development

Developing a protocol is the cornerstone of this process. Thinking through the goals of the research is the first step in developing the protocol. Is the goal to understand the people who are (or are not) buying? Or, is the goal to better understand what the companies ability to offer is? Either way structuring a way to talk to people will enable anyone to collect data or conduct interviews. The protocol has two important phases: the tangibles and the intangibles (Figure 8.1). For an experienced interviewer the two phases are interwoven; for the novice, it might be easier to draw a line between the two.

The tangible section needs to ask questions regarding the physical objects involved. The who, what, where, why, and how questions. There are two purposes to the tangible part of the protocol, the first is to collect analyzable data about the physical objects and their interactions with people. The second purpose is to develop a framework, or lattice structure, that allows people to weave stories around. For example, a participant might be reminded of an funny story because they started talking about how a switch broke off of their vacuum cleaner. Questions like “what did you use here?”, or “how did you clean that mess?” should be asked.

Cultural probes development is an important part of the tangible section of the protocol: “[t]hey give us a feel for people, mingling observable facts with emotional reactions” [6]. The Probe allows the investigative team to collect real-time data

Protocol Phase	Protocol Content	Result
Introduction	Talk about interview process and logistics.	Easy participant and set tone.
Framework building	Talk about tangibles. Problems, benefits, etc.	Data recording: actionable
Storytelling	Talk about intangibles. Desires, hopes.	Story recording: inspiration

Figure 8.1: Interview Protocol Structure

without dedicating time to ethnography. It should record the tangibles and even the mood of the participant, but it should not try to capture the experience. Rather, the probe is a launching pad for the interviewer to explore the intangibles. The probe needs to be a short exercise that the participant can accomplish easily all at once, or in parts over time.

The intangible section is where the interviewer pulls stories out of the participant about their experience with the offering. The goal of the intangibles section is to gather information that can lead to a better understanding of the cognitive interaction with an offering. The intangible section cannot be as planned out as the tangible section because the tangible topics can be predicted to a degree, whereas the experiences cannot. The intangible section's questions should be follow-ups to statements the participants made during the tangible section. For example, "how did you feel about cleaning that mess?"

8.2 Stage Two: Recruiting

The Recruiting strategy is important to the study because getting the most out of limited resources is often what small businesses are about. For a local business the recruitment strategy is to pick the most extreme users. Some participants will come from current clients, but also, it is important to find some people who might refuse to use the offering. The nice thing about the local business is that the prospective clients are geographically nearby and easy to access without large expenditures of time or money.

For businesses that are more geographically spread out, recruiting does not change much unless the offering is tailored specifically to different regions. If the offering is region independent than the recruitment can happen just as described above; the business can utilize one region and investigate core rationales then extrapolate to other regions. Obviously it would be more accurate to remove location bias by recruiting in multiple regions but as long as the offering is not region specified the core rationales will be universal. If the offering is customized to different regions it is necessary to recruit in each region. For example, a company who makes ski jackets for sale in Sweden and the United States would need to investigate in both regions.

8.3 Stage Three: Interviews

After the protocol has been developed and participants have been recruited, the probes can be distributed. Having the probes completed within twenty-four hours of the interview is important because it prevents the participants from forgetting information. If the interviews can be conducted with two interviewers that is the ideal situation. If only one interviewer is available the interview should be videotaped for future analysis. Making the participant feel comfortable in paramount because it

is the only way to get them to talk candidly about the experiences they have with the offering. Conducting the interviews can be an on going process, but at least five need to be completed before analysis can start.

Talking to people in this semi-structured way is not unique to this approach. Klaus Krippendorff talks about “unstructured interviews” in The Semantic Turn, “[h]ere, interviewers engage interviewees in a focused but otherwise natural conversation” [10]. The benefit of this approach lies in the protocol development and the tangible/intangible arrangement for the semi-structured interview.

8.4 Stage Four: Reasoning

The reasoning stage is where all the collected data are sorted and the core rationales or core benefits are identified. There are four parts to this stage:

1. *Parse* the data for pertinent or interesting bits of information. This process has two parts. The first is to note down initial thoughts immediately following the interview, and secondly, review videotapes twenty-four hours later and note down everything that seems important or interesting. Be sure to note developing themes.
2. *Cluster* the parsed information into identifiable themes that appear across participants. Post the parsed information on a large wall and color code ideas that align across participants. Connect ideas by generalizing or broadening them. The goal at the end of clustering is to have three to five major themes coalesce.
3. Use the themes identified through clustering to *model* the information to a format that is relevant to the data (e.g. if four themes arise, a two-by-two matrix would be an appropriate model). Use the nature of the themes arrange them appropriately.

4. Use the model to generalize *Archetypes* of people. The archetypes represent the core rationales of the people who interact with the offering or the core benefits of the offering itself depending on the scope of the project. Develop mission statements that describe each archetype's thoughts on the subject, that way when the strategy is defined it can be checked against the mission statements.

Once the core rationales or core benefits have been deciphered, the strategy can be defined as their overlap (Figure 8.2). Chances are the core rationales and core benefits will not be in the same language; however, figuring out how they can interact concludes this stage.

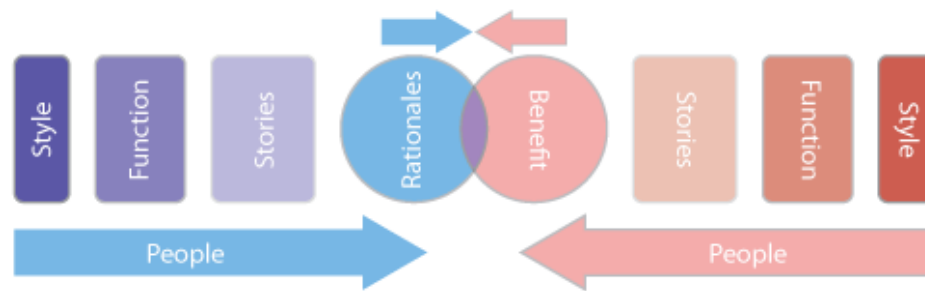


Figure 8.2: Route to Core Benefits or Core Rationales

8.5 Stage Five: Offering Development

Now that the new product strategy has been developed based on the overlap of the core rationales and the core benefits, the strategy can be exploited to develop new offerings that will resonate with people on the level of their core rationales. The investigative team should have developed a deep understanding through the previous

stages that allows them to creatively approach the issue of developing an offering from the new insight. The new strategy may represent the function of the new offering in a very broad sense. The investigative team can use the strategy in conjunction with the archetypes to drive the embodiment of the new offering. Using the archetypes to drive the design ensures that the offering will resonate with people on a deeper level than designs driven by statistical market research.

The new offering development should mirror the protocol structure in that first designers should develop the experience or stories that people want to have when interacting with the offering. Then, the design should focus on developing the function to achieve those experiences, and finally, designers should apply a style or form to the concept that enhances the experience people wish to have with the offering. A graphical outline of the approach is shown in Figure 8.3.

8.6 Method Conclusions

This approach was developed to maximize the three qualities this study is focused on: core rationales, developing unprecedented offerings, and the scalability of the approach. Short of hypnosis, talking to people long enough to develop a relationship where they feel comfortable sharing thoughts and stories seems the best way to understand the underlying reasons for why they interact with products and services. The transformation of the data to rich information through clustering lends itself nicely to the generalization of themes and ideas leading to core rationales. Clustering fits jigsaw puzzle pieces together, and the understanding pulled from that process can be unprecedented, leading to new innovations, and new offerings. Lastly, the process is quite scalable. The entire process can work with a very small core team of one or two people. However, when more perspectives are needed on the problem the team

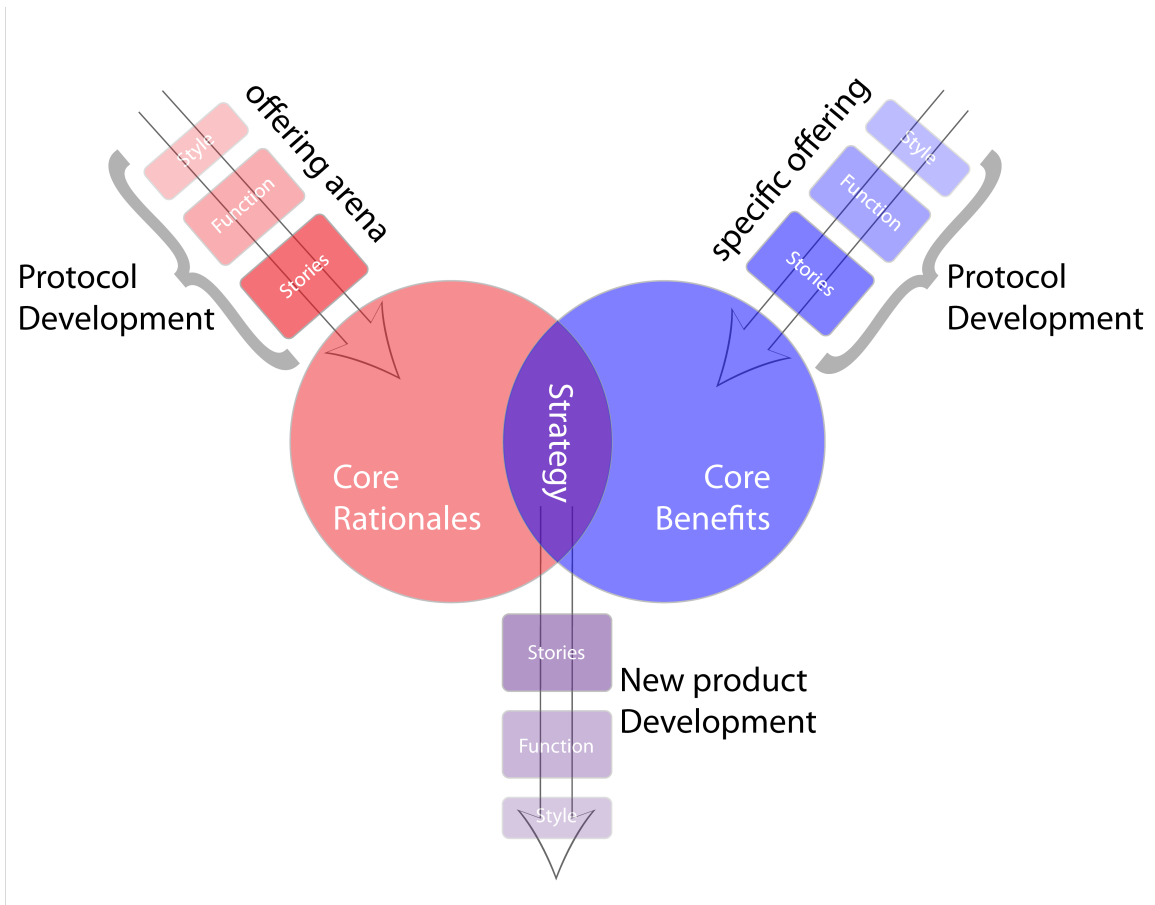


Figure 8.3: Overall Approach

can either grow by tapping into an auxiliary team member or, if an auxiliary team is not possible, by tapping into participants as in the case of TimeQuake’s Envisioning phase. An application of this theory follows in the next three chapters about Full-Duplex.

This approach pools some methods of research (i.e. semi-structured interviews) from different methods and fills in gaps in the approach with the protocol development, parse, and clustering with the goal of identifying core rationales. The protocol development section evolved from the research in the TimeQuake project. Recruiting “outliers”, or extreme users, and using “archetypes” can be seen as two sides of the same coin and have been used as market research techniques in quantitative ways [12].

CHAPTER 9
FULL-DUPLEX:
INTRODUCTION AND UNDERSTANDING

9.1 Introduction

The second project in this study is an evaluation of the process formalized in the previous chapters. The project tests the scalability of the process as well as its ability to adapt to vastly different projects. This project—Full-Duplex—has a shortened timeline of four weeks, a one-man team, and no budget. The goal is to apply the process to a completely different project and see how it can work.

CoachComm is a comparatively small company with an interesting problem. They are the leading producers of headset communications systems for Division I A college football programs. 98 percent of the football programs in that division use CoachComm’s equipment, Tempest, on the sidelines of every game. High schools also use a stripped down version of Tempest, Connex, for football games. Now that they have saturated the college football market they are looking for new avenues to expand their business.

Full-Duplex is fundamentally different from TimeQuake. CoachComm intuitively identified an opportunity that coaches need to communicate faster, more effectively, and with more people than they had in the past, especially as football becomes increasingly specialized and complex. They created an offering to address those core needs of coaches and have been wildly successful at satisfying those needs. That core need is at the heart of CoachComm’s business, but now that nearly every team uses

their technology they need to figure out how that offering can be applied to other sectors. The first phase of Full-Duplex is to understand and distill CoachComm’s offering down to its core—to strip away the football jargon. Once the core benefits and needs are understood other sectors with similar needs are identified through brainstorming and discussions. The new sectors will be pared down to one or two areas. The author will investigate those areas using the approach outlined in the previous chapter. The goal is to understand how communication in the new sectors happens and to determine whether or not CoachComm’s Core Benefits line up with the core rationales of people in the new sectors.

9.2 Understanding the CoachComm Core benefits

Understanding the CoachComm offering was a two-fold process. Firstly, the author used the equipment, testing its range and abilities. Secondly, the team interviewed coaches who used the equipment during games. The coaches are “extreme users” of the equipment. The interview protocol was designed based on Figure 4.4 with an introduction, tangible, and intangible sections. An umbrella theme of “Mission Critical” emerged quickly; the coaches mentioned repeatedly how the lack of this system would “cost us the game.” It was hard for the coaches to even imagine a time when they did not have these headsets. CoachComm was founded in 1991 and the wireless system for high schools was only released in 2004. Clearly CoachComm got their strategy right early on—they understood coaches’ needs and addressed them. Finding out what factors made this equipment so “Mission Critical” is the challenge.

9.2.1 Communication Quality

The most straightforward benefit to Connex is its audio quality. It surpasses the quality of cellular phones and walkie-talkies, the offering's competitors. Peter Amos, the president of CoachComm, explained it this way:

This is called dynamic range—it's the level of the lowest sound that passes as a ratio to the loudest. The higher the dynamic range, the more natural it sounds and the better it handles the background noises. This is THE major core difference in the [CoachComm] technology versus cell phones and 2-way radios.....huge. [1]

This is one of the most striking attributes that struck the team during testing around a building. Everyone on the team is used to cellular phone quality and most had used other two-way communications devices, but with the CoachComm headsets talking anywhere within an approximate 900 foot line-of-sight is like talking face-to-face in a quiet room.

9.2.2 Extreme Volumes

CoachComm touts their ability to communicate in extremely loud environments, but after talking to the coaches it became clear that communicating in a loud environment was not the primary benefit. The real benefit was the ability to communicate between extreme volume environments (e.g. from a quiet environment like a press box to a loud environment like the sidelines of a game and vice versa). Other communications systems that typically work in a loud environment would disrupt a quiet environment the way a two-way radio would interject noise into a quiet environment. Similarly, a system that works well in quiet environments cannot be heard in loud environments, or voices may not be distinguishable from background noise the way

cellular phones work in rock concerts. CoachComm's offering allows for communication between any two extreme volume situations.

9.2.3 Visceral Communication

Another feature CoachComm is trading on is the idea of "Hands-free Communication" compared to cellular phones or two-way radios, both of which require use of hands. But after talking to coaches it became clear that CoachComm was hinting at a larger idea: Thinking-free Communication. The idea is that people need to be so engaged and focused on the task at hand that communicating should be as easy as talking. Hands are just one aspect of it, eyes are another. People should not have to stop looking at what they are focused on to communicate with someone else. At the times when it can cost a game or save a life, communicating should only involve your brain, ears, and mouth.

9.2.4 Different Perspectives

The culmination of these attributes is the idea of gaining multiple perspectives on the same problem. On the football field it is demonstrated by offensive and defensive coordinators being in the press box as well as on the field. The coaches in the press box can see patterns and plays more wholly than the coaches on the field, a tool that would be useless without the ability to communicate it to the coaches on the field. This is very core to a short-distance communication system because if people are communicating in the ten to one-thousand feet range they are probably talking about the same problem.

CHAPTER 10
FULL-DUPLEX:
ALIGNING CORE BENEFITS WITH CORE RATIONALES

10.1 Identifying Opportunities

Once CoachComm's offering was distilled into the four core benefits the next task is identify other industries whose core rationales or needs would mesh with CoachComm's technology. One of the talking points of the interview with coaches was what do they do with their old sets when they upgrade, and does anyone else ever use their headset equipment. One of the coaches mentioned that they passed down their old set down to the theater department of their school. Hence, theater or stage production became top of the new possible uses for CoachComm's technology. When theater was presented to CoachComm as a possible new direction, they said that they have a production equipment product coming to market within the year. This represented a minor setback for the project, but also a validation of the approach.

Other than the aforementioned example the interviews did not directly reveal any areas worth pursuing; typically the equipment is only used by the football departments at the schools. At this point it is time to expand the team to bring in as many points of view as possible as to increase the likelihood of identifying a new arena for CoachComm to compete in. A senior studio of Auburn University Industrial Design students was tapped as a resource. After explaining the process to seventeen students the four core benefits were laid out and we discussed possible industries where these benefits would match needs; Figure 10.1 is the result. Four themes emerged: Med-

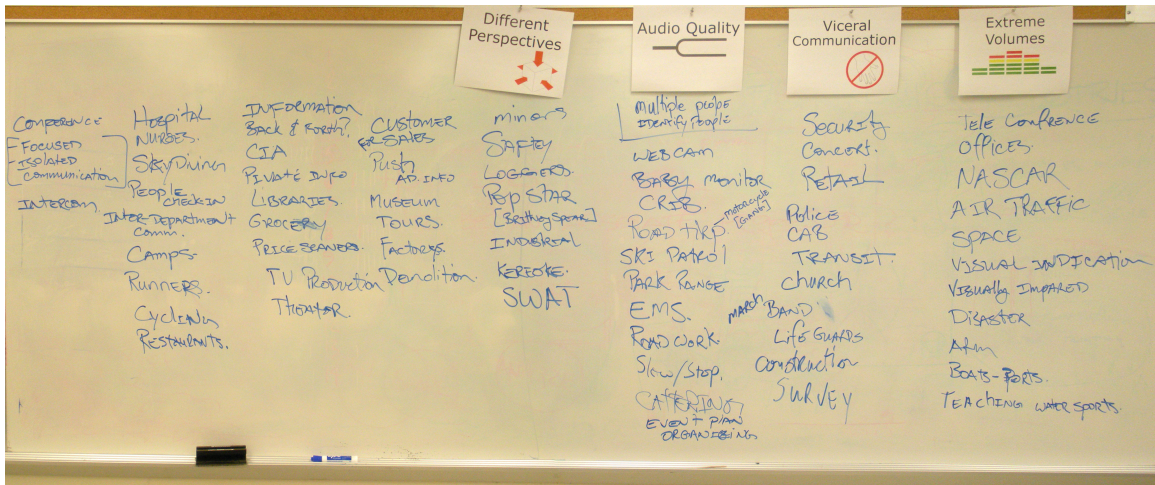


Figure 10.1: Whiteboard Capture: Discussion of Core Benefits

ical, Emergency, Extreme Sports, and Tours. Tours stood out as the most feasible in a short time because it most closely fit with Connex, CoachComm’s current embodiment of their technology. The other three areas would take considerably more research and engineering to determine if Connex would work for them. Furthermore, this is an iterative process. If tours do not prove to be a lucrative avenue then the company can continue on to the next possibility. However, tour applications are worthy of some research and development.

10.2 Understanding the Core Rationales

Now that tours have been identified as a possible opportunity, research can begin: firstly, going on tours; and secondly, holding semi-structured interviews with tour guides to understand if and how Connex can help them. The tours will be focused around Auburn University and the Georgia Aquarium. Both destinations were chosen because of the limited time allotted in the project and the diversity they represented.

Investigating tours at a major university in the springtime has a major advantage. Auburn University runs tours for prospective students four times a day in the spring because prospective students and their parents use the tours to make decisions. A division 1A school like Auburn University is a good starting point for this research because CoachComm already has a relationship with the school through athletics that could be extended to admissions if research validates the use of Connex during tours. The author attended two tours with two different guides on the same day. The author kept with the extremities of the group of people to get a hold on the worst possible communication situation. Auburn University has several roads that cut through its campus and a transit system of buses that frequent the roads (Figure 10.2). The tour follows close to several of the roads making it impossible to hear the guide even in close proximity. The obvious implication is that the information on the tour could be disseminated easier with Connex.



Figure 10.2: Loud Distractions on University Tour

The guides usually walk backwards throughout the tour so that they can converse with the tour participants. One guide navigated several obstacles backwards, even up and down stairs. The first tour guide tripped going backwards on a curb. She was not injured but clearly this is dangerous. The second guide blindly backed into streets with the tour group (Figure 10.3). The urge to engage with the tour's participants forces the guides to walk backwards. CoachComm's Connex could provide a conversational level of engagement with the safety of walking forwards.



Figure 10.3: Backwards on University Tour

The tour guides for university tours are typically outgoing, talkative, personable, and engaging, making them perfect participants in semi-structured interviews. One guide was interviewed immediately after a tour and the other was interviewed two days after a tour. Both guides talked extensively about how important it is to make a tour personal and engaging; from the guide perspective these are the most important aspects of a tour. They are why they walk backwards for example. Connex could aid

the guides in engaging with people on the tours by eliminating distractions and allowing them to absorb information from the guide and not have to crowd uncomfortably close together.

Aquariums offer a different tour altogether. University tours present information in order to convince prospective students to attend that university; museum tours offer information because people are interested in the information enough to pay for a tour or at least the admission fee. The tour at the Georgia Aquarium costs fifty dollars and typically the groups are seven to ten people. The tour environment of the aquarium is more uniformly loud compared to the university tour. The aquarium tour took its participants through the industrial areas of the building, showing a behind-the-scenes look at the aquarium's workings. With all of the equipment and people working around where the tour was given it was often quite difficult to hear the guide. One example is a tank where thousands of gallons of water are dumped every two minutes (Figure 10.4).

Another possible advantage Connex has in gaining traction in a tour market is that at the aquarium the guides already carry communications equipment around, and they are already trained on the equipment. One guide carried around a "chatter box", a headset with a loudspeaker hanging around the neck of the guide (Figure 10.5). Every guide carries around a two-way radio, and after the tour, during the interview, the guide talked about a one-way headset system that they use for gallery tours.

Throughout each tour participants would ask questions and while guides are trained to project information out to a group, participants cannot be heard unless they are a very short distance away. Extreme volume environments is the easiest core attribute to link back to but audio quality and visceral communication can be linked to how personal and engaging a tour can be while also getting information to everyone



Figure 10.4: Wavepool in the Georgia Aquarium



Figure 10.5: Chatterbox

at once. The guide for the aquarium tour talked about making tours personal and engaging while getting information to everyone.

10.3 Full-Duplex Offering Embodiment

Now that the strategy of entering tour communications has been defined the form for such an offering can be explored. The team worked up some initial computer models to show CoachComm how Connex's form might have to be reworked to fit into a museum setting. The team highlighted several differences between the tour application and the typical coaching application:

1. The embodiment needs to be universal. For example the "belt pack" is not useful because not everyone in a museum setting would have something to clip a belt pack onto.
2. Technically, the unit needs to be very intuitive. The coaches use these week after week, whereas the person who attends a tour will have never seen anything like this before.
3. The embodiment does not need to be as "all-weather" as Connex because the tour offering will be used in a museum. It will, however, need to be rugged enough to withstand dropping and abuse from children.
4. The embodiment needs to be visually less intrusive than the Connex headset. The large headsets that Connex utilizes would be comically out of place in a museum setting.

With the above basic criteria in mind the team developed two forms that might fit the tour communications offering. Both forms are smaller and lighter than Connex because the battery life does not need to extend to ten hours when tours only last

one to one and a half hours. Also, both forms utilize built in earbud style ear pieces with a microphone built into the earbud wire. And finally both forms are meant to be hung around the neck of the tour attendee. The two forms are shown in Figures 10.6 and 10.7

Full-Duplex concluded with a presentation to CoachComm's president and new-business manager. The core benefits were of particular interest to them because they are currently determining the best way to talk about their technology outside of the coaching arena. The possible new areas were outlined and the preliminary research specific to the viability of a tour application was discussed. The presentation ended with a series of informed questions that CoachComm would have to investigate with regards to a tour application of Connex. A tour application is an excellent way to expand CoachComm's offering. However, the following points need to be addressed:

- The tour participants' point of view has not been addressed. CoachComm needs to talk to people who frequent tours. Find the "extreme users" of tours and understand what is important to them.
- Some testing needs to be done with actual tours to understand the real impact of headsets on the mentality of guides as well as participants. Can a headset system like Connex escalate how personal or engaging a tour can be?
- The technical issues posed by a mobile tour might be significantly different from those of coaching football. An example of this is that Connex uses a base station that needs line-of-sight access to the belt packs, but in a museum a mobile "base station" might be the only way to gain line-of-sight to the belt packs.

Peter Amos was excited about the new opportunity. Tour communication is not something CoachComm had explored as a possibility of expansion, and that it was something that they were going to pursue.

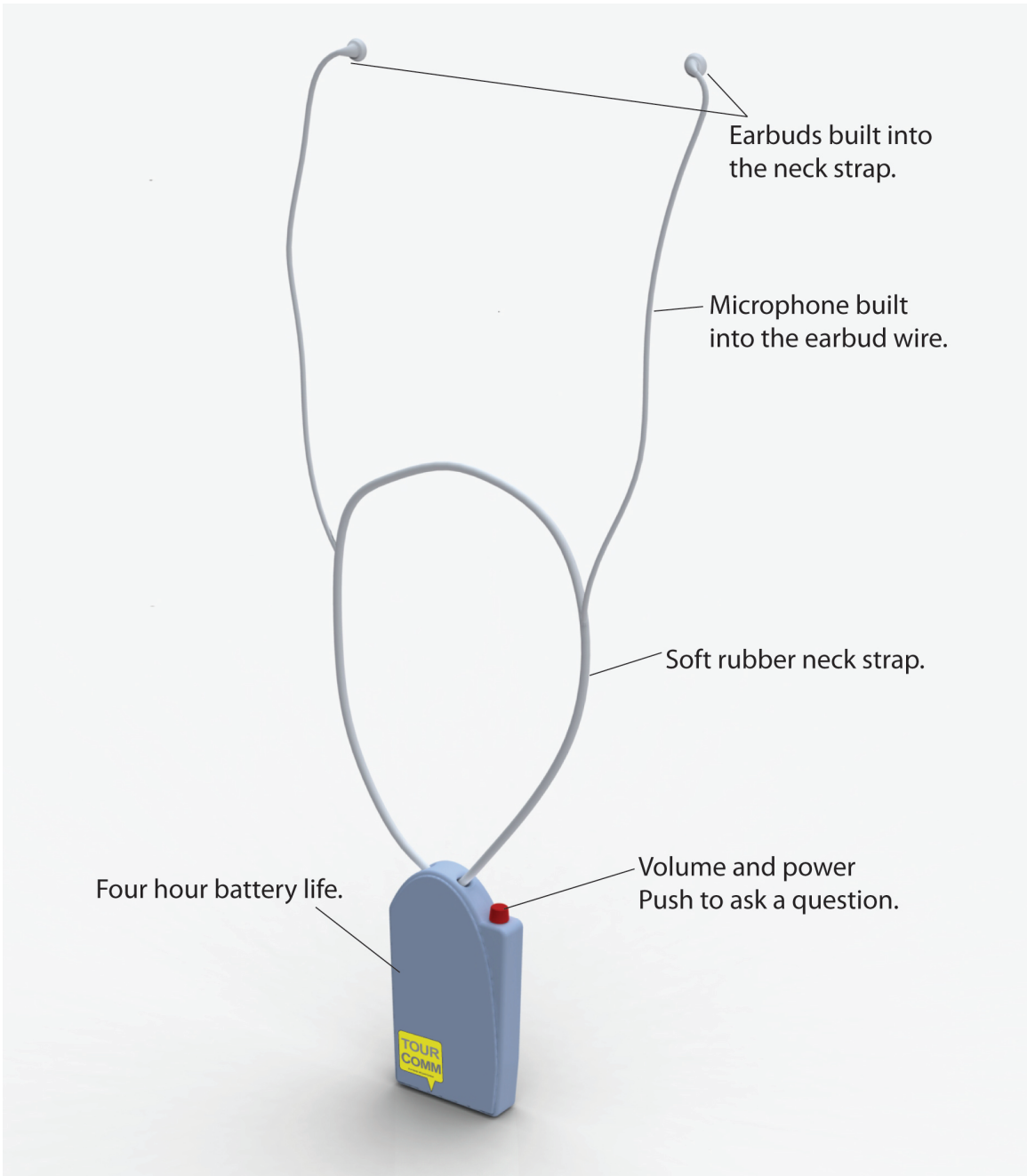


Figure 10.6: CoachComm Tour Offering Form A

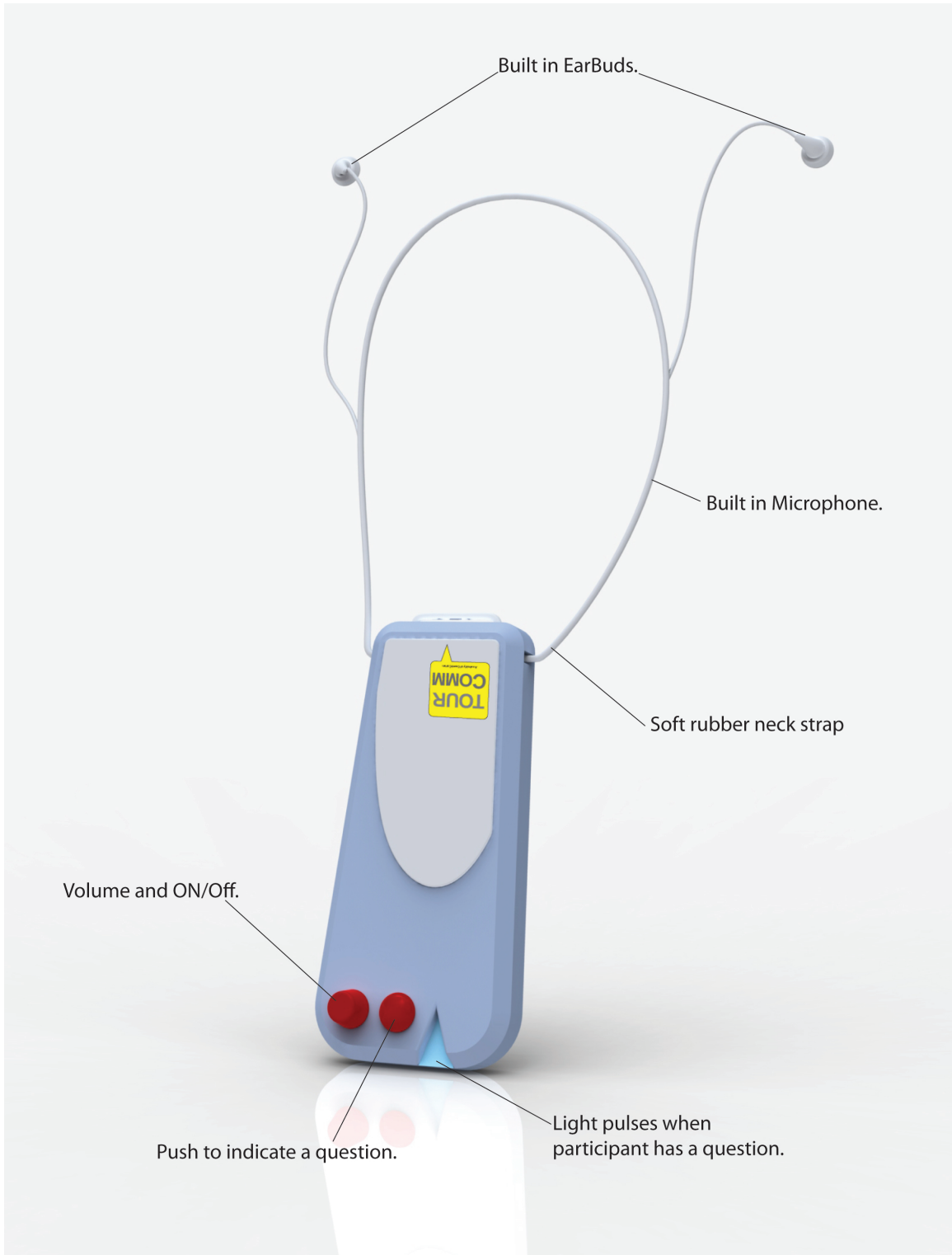


Figure 10.7: CoachComm Tour Offering Form B

CHAPTER 11

FULL-DUPLEX: CONCLUSIONS

Full-Duplex was an application of the approach developed through TimeQuake only it was applied in a reverse order. Ordinarily, the process would start with a generalized topic which was born from a problem, as with TimeQuake. From there the team would investigate the topic by talking to people, and would eventually reach a new offering through analysis of the collected data. CoachComm's offering is so specific and different from current forms of communication that the team started with the offering and decided to look for new opportunities for their offering. The scope of the project was to identify and do preliminary research on new opportunities; it would be up to CoachComm to decide which, if any, proposed opportunities they would pursue with in-depth research. At the conclusion to Full-Duplex CoachComm was presented with the three possible new opportunities. This chapter focuses on the process and how it worked and did not work with the Full-Duplex project. For all that is reported in this chapter about the process of identifying new opportunities for CoachComm's offering it should be noted that the process's ability to identify profitable new opportunities cannot be reported here. If CoachComm decides to pursue any of the outlined opportunities only time will tell if they are successful.

11.1 Scalability

Full-Duplex demonstrated the flexibility and scalability of this process. CoachComm is a small, privately held company and one person accomplished all of the work

by tapping into other people at key times like during brainstorming and discussing the offering and its core value. It seems that the only way for an individual to do this type of work is to have a support group of people who can help when it is needed. Figure 7.1 shows how this may work, but the limiting factor is the size of a company. It must have several employees, all with time allocated to help the project. The author was able to tap into the owner of CoachComm and its new-business manager, three professors at Auburn University, a multitude of design students, and a design professional in the Boston area as the extended team. This worked well because of the different perspectives and ideas from each external source. The core team parsed and interpreted the ideas and opinions of the external team while adding ones from the authors own throughout the development of Full-Duplex's new opportunities.

11.2 Core Benefits

Unstructured interviews proved to be a great source for unforeseen information and inspiration. The interviews and information gathered suffered from the pace of Full-Duplex. Given three months, instead of only one month, the team could have prepared probes and longer interviews with the coaches. A probe would also have been a good source of information from which to develop the interview protocols. The interviews were almost impromptu, making them too short and typically too shallow. Regardless the team identified four key benefits essential to the CoachComm offering based on the interviews with high school coaches and the analysis of the interviews. The lesson may be that the timeline of this process should not be truncated, but the team should allow ample time to work through each piece of the process. Ideally, the timeline could stretch into a rolling, ongoing process that is constant instead of just a project that begins and ends.

11.3 New Opportunities

The ability for this process to make the leap from core benefits or rationales to new opportunities or offerings is the most unpredictable part of the process. The leap relies so heavily on two things:

1. the quality and thoroughness of the Discovery work, and
2. the group of people associated with the leap.

The quality and thoroughness is addressed partly in the previous section. Not rushing the process is a big part of the quality. Furthermore, the core team needs to be completely supportive of the initiative, not merely following the orders of superiors. Both of these aspects are easy enough to control and obtain good results from. However, if the data collected does not yield an obvious path to a new opportunity or offering, and the data have to be interpreted and assimilated with the help of the extended team members, problems could arise. If the team cannot remove themselves from the current business, then they might only use the data to reinforce the current direction. The other extreme example is that if the team interprets the data incorrectly a wrong direction could be pursued at great cost to the business. Both of these problems may be minimized by developing the Discovery and Analysis phases exhaustively.

CHAPTER 12

CONCLUSIONS

From the onset of this study the goal was to develop a scalable approach to allow businesses of any size to understand the people who interact with their products better and use that understanding to make the best possible strategic decisions. Through the two case studies, TimeQuake and Full-Duplex, the process has been shown to be scalable and to yield information that helps make strategic decisions. The extent to which decision makers should rely on this process to dictate strategic moves is unclear, but this approach certainly gives a different perspective on the problems that companies face with strategic decisions. This is a approach to add to a businesses toolkit, a way to get more information and make decisions more easily.

12.1 Scalability of Process

Both case studies, TimeQuake and Full-Duplex, were completed with a small team. TimeQuake was initiated with a five-hundred dollar budget and the resources of a design firm. The author could tap into the expertise and experience of the design team when they were not busy on other projects. This is where the idea of an expandable project team came from and seemed to work well with the only drawback being mild fragmentation. The remedy to that is to keep everyone on the peripheral team updated early on and throughout the entirety of the project. The goal with Full-Dulpex was to determine if one person could work through this process alone. The result is, quite simply, no, one person cannot work through this process

without the input of other people. Adding people to the team allows the problem to be viewed through different perspectives thus increasing the validity of the results. The scalable team model needs to be explored in greater depth. Is it a realistic model of how a process like this could work inside of a small organization where strategic research is not a mainstay? A study that works within the bounds of a company, where the employees are educated on how to do this process, would get to the root of this problem.

12.2 Identifying Core Rationales

Scientists have long struggled with trying to understand what is going on inside people's heads. As designers, we are able to constrain that problem to a specific product or service arena making it much easier to talk about. Those constraints help people talk about what is happening internally because the products and services act as talking points—ways to explain complex ideas through physical descriptions. People must be nudged into talking about these ideas, though. Quantitative methods, as in surveying, get at the surface reasons people do things, whereas this process forces people to become more introspective about their product and service interactions. In a semi-structured interview a participant may describe a situation where they acted in a way that contradicts how they say they would act. That story becomes more relevant to the researcher because it can be dissected to understand how the person thinks regardless of what they say they think. It would be interesting to see a study where a psychologist and designer team up to test this idea of core rationales.

12.3 Creating New Offerings

Perhaps the biggest question remaining is that of the validity of the outcomes of TimeQuake and Full-Duplex. The strategic benefit of the results of both case studies cannot be known at the time of this publication because of the length of this study. This study's timeline has been so short—eight months—with regards to business strategic movements that the results have yet to be proven as the sole approach to develop strategic decisions. A long-term case study needs to be done with a process like this to determine how heavily this process should affect strategic decisions. Clearly, the results of this study have yielded new perspectives on the people who use products and services. Clearly, the validity of generating new perspectives or new information about people cannot be argued against because decision makers can always benefit from the addition of more information. As mentioned above, this process is meant not to replace any part of strategic development but to add another layer of information. The most promising result of this study is the potential it has for improving small business strategic decisions. A small business can implement this process without disrupting day-to-day operations of this business.

BIBLIOGRAPHY

- [1] Amos, Peter. "Fwd: Core Benefits." E-mail to the author. 9 Feb. 2009.
- [2] Babbie, Earl. *The Practice of Social Research*. 10th ed. Belmont, CA: Wadsworth, 2004.
- [3] Baxter, Mike. *Product Design : A Practical Guide to Systematic Methods of New Product Development*. New York: CRC P, 1995.
- [4] Cross, Nigel. *Designerly Ways of Knowing*. New York: Springer, 2006.
- [5] "Design Drives Successful Innovation." Centre for Design Innovation. 3 Apr. 2007. Centre for Design Innovation. 5 Nov. 2008 (http://designinnovation.ie/why_business_sec1.html).
- [6] Gaver, William W., Andrew Boucher, Sarah Pennington, and Brendan Walker. *Cultural Probes and the Value of Uncertainty*. PublicationNo. Interaction Design, Royal College of Art. 1-7.
- [7] Gorb, Peter, ed. *Design Management*. New York: Phaidon P, 1990.
- [8] Jamieson, Bob. "In the iPod and Cell Phone Age, Who Needs a Watch?" ABC News. 18 Jan. 2006. ABC News. 8 Dec. 2008 (<http://abcnews.go.com/technology/story?id=1518077>).
- [9] Knecht, Justin. *Innovation by Design: Irish Companies Creating Competitive Advantage*. Sligo, Ireland: Centre for Design Innovation, 2008.
- [10] Krippendorff, Klaus. *The Semantic Turn*. New York: C R C P LLC, 2006.
- [11] Kumar, Vijay, and Patrick Whitney. "Daily life, not markets: customer-centered design." *Journal of Business Strategy* 28 (2007): 46-58. Suri, Jane F. "Informing Our Intuition Design Research for Radical Innovation." *Rotman Magazine* Winter 2008: 52-57.
- [12] Riedesel, Paul. "Archetypal Analysis in Marketing Research: A New Way of Understanding Consumer Heterogeneity." *Archetypal Analysis in Marketing Research: A New Way of Understanding Consumer Heterogeneity*. Action Marketing Research. 31 Mar. 2009 (<http://www.action-research.com/>).

- [13] Siddall, James. Design participation: proceedings of the Design Research Society's conference, Manchester, September 1971. London: Academy Editions, 1972.
- [14] Suri, Jane F. "Informing Our Intuition Design Research for Radical Innovation." Rotman Magazine Winter 2008: 52-57.
- [15] Vaishnav, Anand. "School lunches are no picnic Longer student breaks advocated." Boston.com. 6 Aug. 2005. The Boston Globe. 3 Nov. 2008 (http://www.boston.com/news/local/massachusetts/articles/2005/08/06/school_lunches_are_no_picnic).

APPENDICES

APPENDIX A
TIMEQUAKE:
TESTING STORYBOARDS

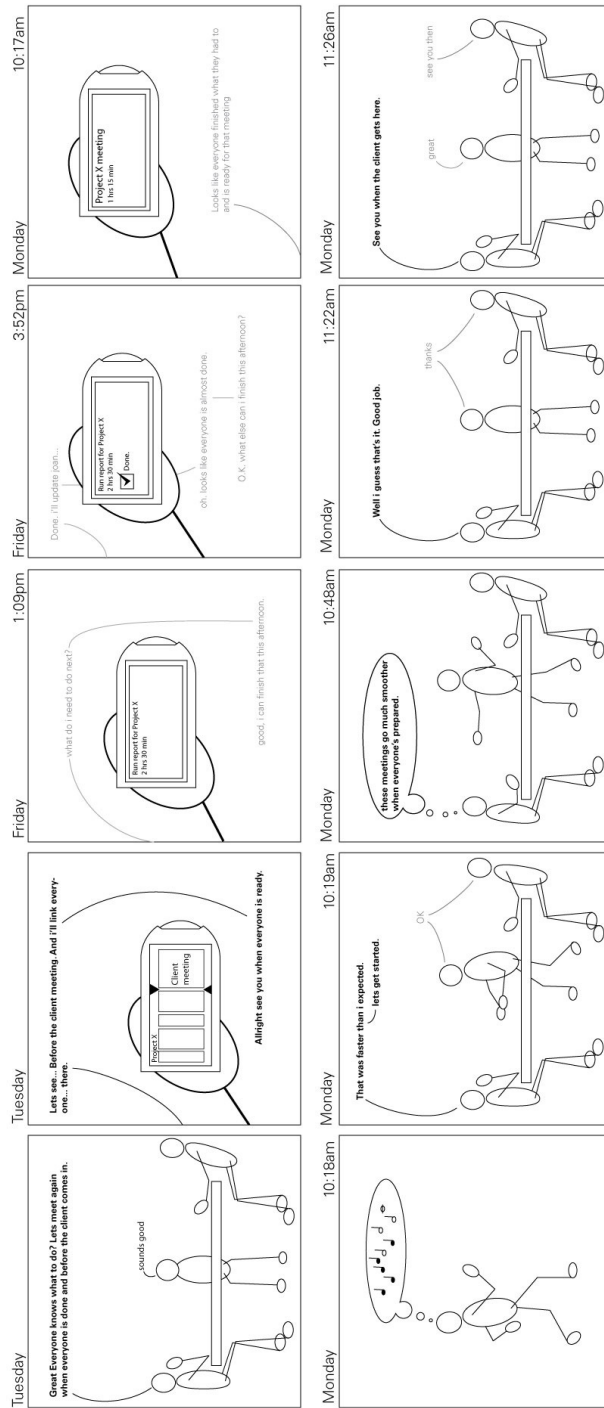


Figure A.1: Enlarged Joan Storyboard

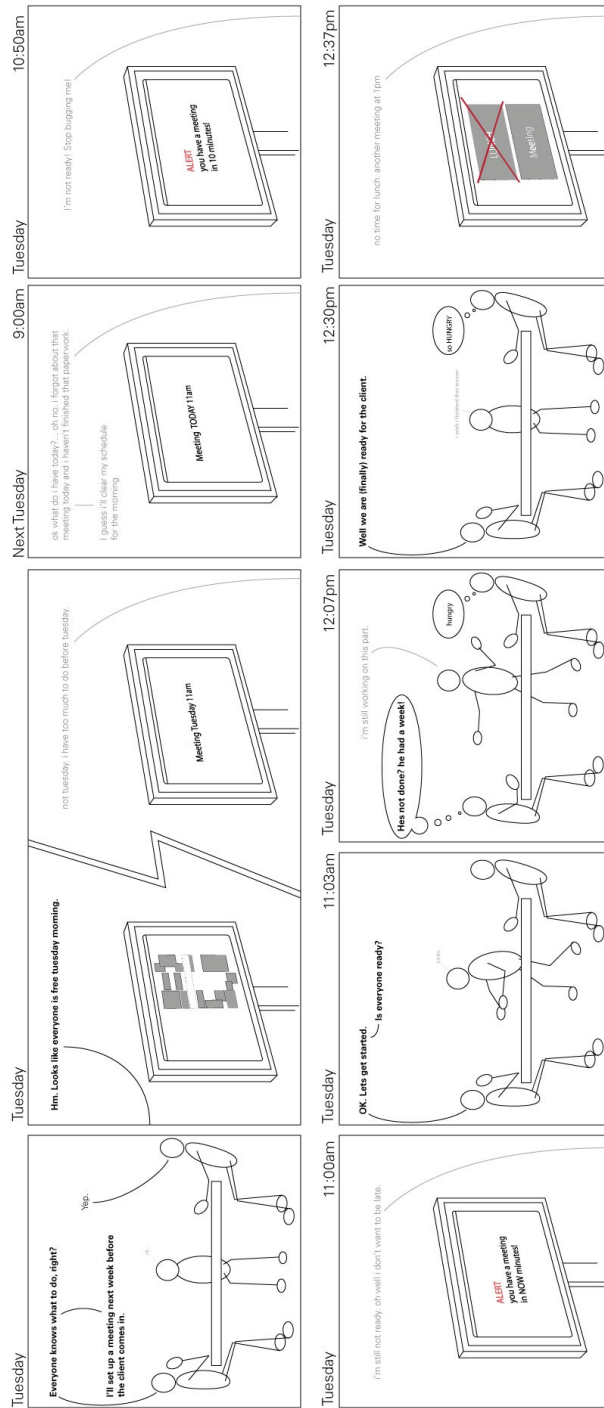


Figure A.2: Enlarged Computer Storyboard

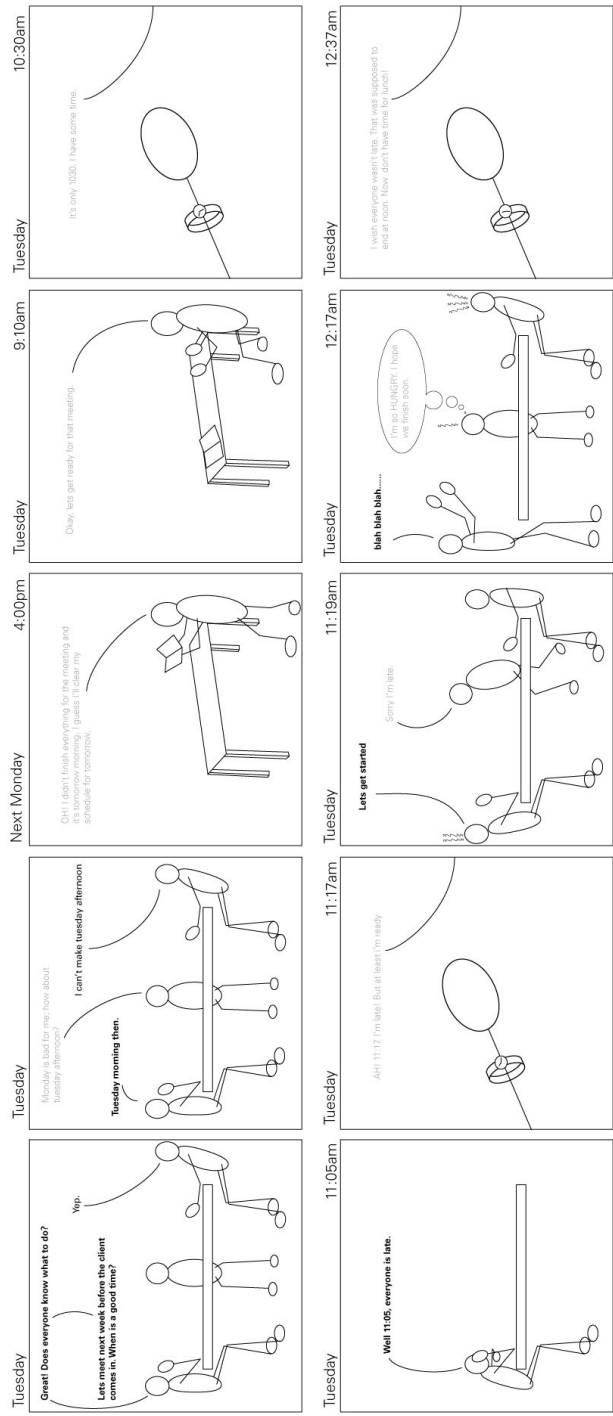


Figure A.3: Enlarged Watch Storyboard

APPENDIX B
TIMEQUAKE:
FINAL MODEL IMAGES



Figure B.1: Joan Final Design



Figure B.2: Joan Final Design: Mouse for Scale



Figure B.3: Joan Final Design: In Context



Figure B.4: Joan Final Design: Form Definition



Figure B.5: Joan Final Design: Evolution

APPENDIX C
TIMEQUAKE:
JOAN INTERFACE BASICS

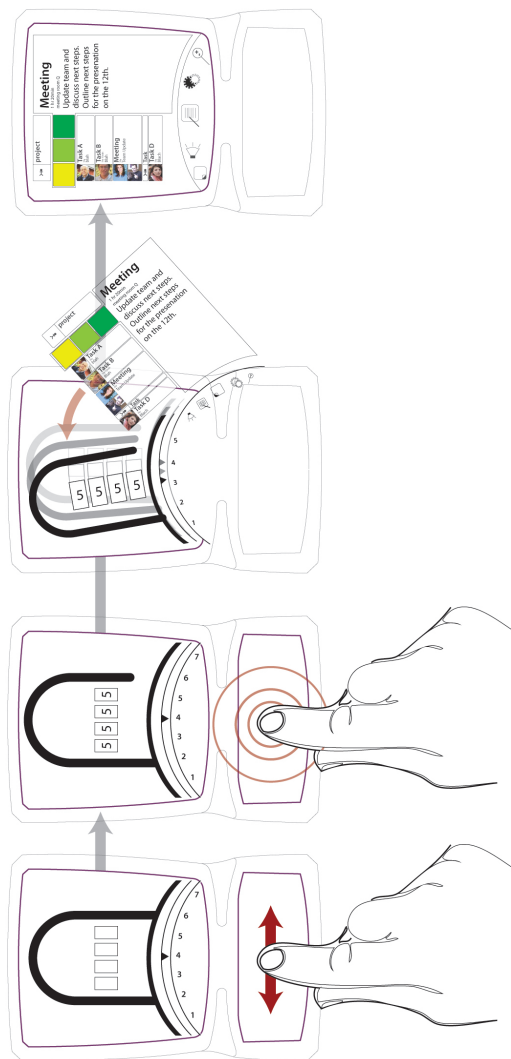


Figure C.1: Unlocking Joan

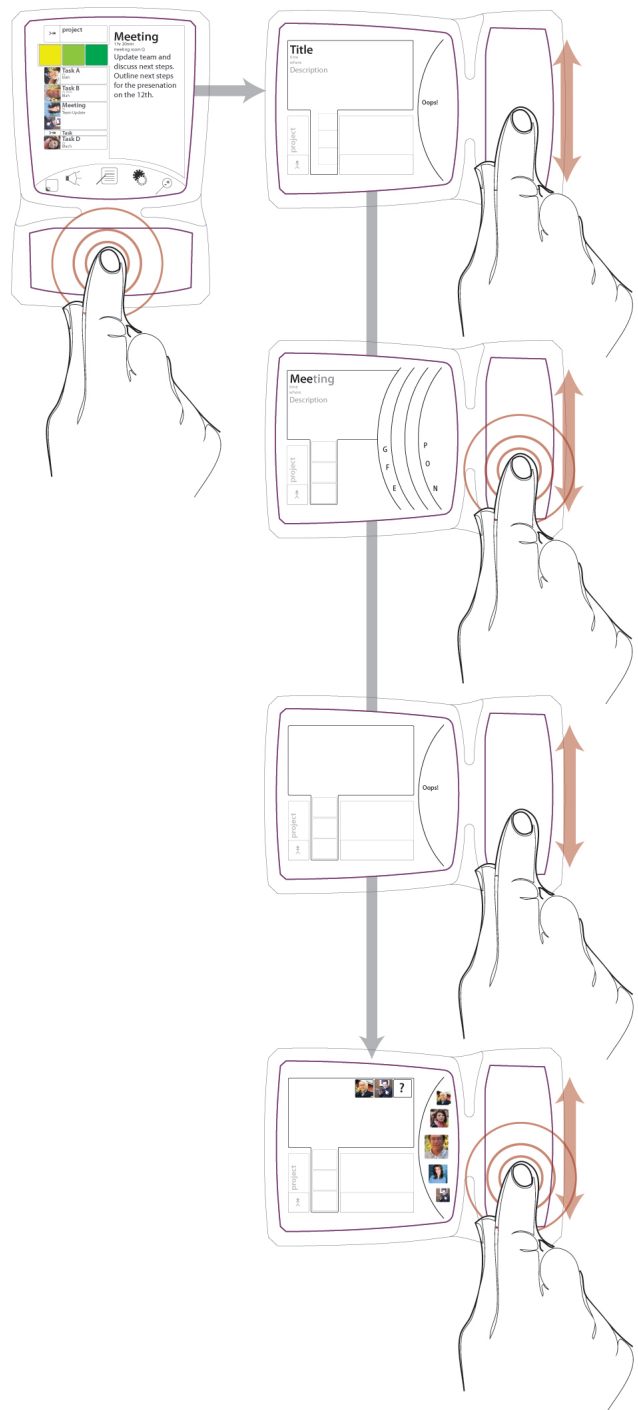


Figure C.2: Basic Data Inputting for Joan

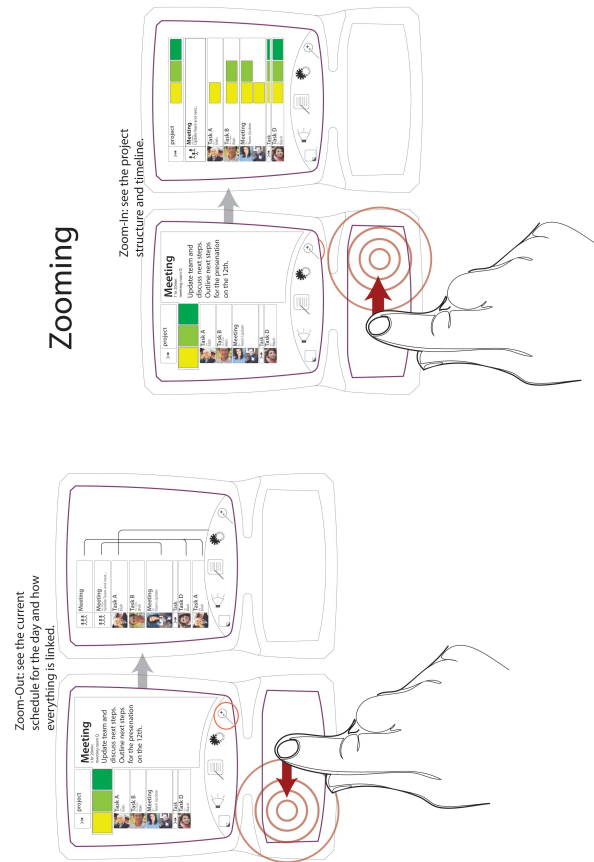


Figure C.3: Zooming with Joan

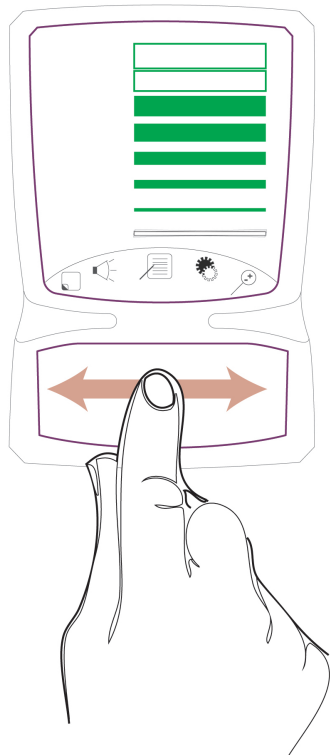


Figure C.4: Volume Adjusting for Joan