Using Sketching to Support Design Research in New Ways: A Case Study Investigating Design and Charismatic Pentecostalism in São Paulo, Brazil

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ABSTRACT
In this paper we contribute to the community's understanding about the relationship between religion and technology use. Simultaneously, we demonstrate how sketching supports the creative design process in novel ways. We describe how we used sketching to translate findings from our fieldwork examining Charismatic Pentecostals and technology use in São Paulo, Brazil, into conceptual design concepts. We then presented these sketches to the participants who motivated and inspired the ideas depicted in the drawings. Findings from these interviews suggest that sketching can be used to uncover value differences between users and designers, highlight promising design ideas, and validate qualitative research findings. We conclude with a discussion describing how our use of sketching illustrates the intellectual rigor involved in design research.

Categories and Subject Descriptors
H.5.m **[Information Systems]**: Miscellaneous.

General Terms
Design.

Keywords
Religion, Design Research, Sketching, Brazil.

1. INTRODUCTION
Our work contributes to two established areas of interest in the iSchool community: Human-Computer Interaction (HCI) and Design Research. Within these areas we examined topics receiving increased research attention: "Understanding Sketching" and "Religion and Design." Sketching is widely considered the "archetypal" design activity [4,9]. Despite the central role of sketching in creative design it is often "concealed" or overlooked in HCI research [9]. Like other scholars, we contend that sketching is a widely applied way of thinking in HCI, but is habitually neglected and only rarely discussed in relation to user studies and system development [9,25]. In this paper we demonstrate how sketching is used in a familiar way—to translate empirical findings into material forms—and in a less explored way—to illustrate the intellectual rigor involved in design research.

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In the process of illustrating how we used sketching to support our research, we contribute to the community's understanding about the relationship between religion and technology use. To do this we examined a unique and understudied user group—Charismatic Pentecostals in São Paulo, Brazil. These individuals routinely have ecstatic experiences such as speaking in tongues, healing, and prophesying. Pentecostals' encounters with the supernatural affect their interactions with technology and this made them an interesting user group to investigate from a design perspective. Studying their interactions with technology forced us to imagine products that supported practices unrelated to productivity, efficiency and rationality. Instead, we imagined products that accounted for users' encounters with divine and demonic forces in their everyday lives.

We provide empirical findings and novel design ideas inspired by our fieldwork in Brazil and contribute to the community's understanding about how sketching supports design research. Our findings demonstrate how sketching is useful for translating empirical data into design concepts. We then describe presenting these sketches to the participants who motivated and inspired the ideas depicted in the drawings. Findings from these interviews suggest that sketching can use used to uncover value differences between users and designers, highlight promising design concepts, and validate qualitative research findings. We conclude by elaborating on how our use of sketching illustrates the intellectual rigor involved in design research.

2. RELATED WORK AND MOTIVATION

2.1 Religion and Design
Religion has recently become a topic designers no longer avoid, but now consider when developing new products [14]. Designers recognize that religion affects how individuals interact with artifacts and that studying religious uses of technology is an effective way to uncover non-utilitarian uses of technology [12,14]. Although, design-oriented research examining religion is growing, only a handful of the world's major faiths have been studied. We developed an alternative mobile phone interface to support Muslims' prayer practices [26]; Sterling and Zimmerman imagined novel applications for Buddhists [23]; and Gaver and his colleagues created the "Prayer Companion" to inform Catholic nuns about people in need of prayer [13].

We explored a growing, yet understudied, denomination within Christianity. Two reasons made Charismatic Pentecostalism

interesting to examine from a design perspective. First, the Charismatic Pentecostal movement is one of the most popular and fastest growing religious movements in the world. It is estimated that there are over five hundred million Charismatic adherents worldwide and this number is growing [1]. Although the movement traces it roots to the US, nearly two thirds of the Charismatic Pentecostal movement's 523 million adherents live outside the West in "emerging markets" such as Kenya, Nigeria, and Brazil [15]. Over the past two decades, Brazil—a historically Catholic country—has experienced a dramatic rise in Protestant Christianity, with many in the country now identifying as Pentecostal [6,15]. Pentecostals make up the majority of evangelicals and have steadily increased from 3.2 million in 1980 to 18 million in 2000 [15]. The sheer size and expected growth of this user group make them worthwhile to study. Further, given the ways that religious practices are intimately woven into the fabric of daily life in Brazil and other emerging markets, it is hardly far fetched to imagine that new products might support existing religious and spiritual activities, and help to create new ones. Our work is a first step in imagining these new products for a growing demographic.

Second, we were attracted to this form of Christianity, because it involved studying a user group who engaged in practices that were unfamiliar to us. Charismatic Pentecostals place great importance on the gifts of the Holy Spirit, especially speaking in tongues (the gift of speaking in unknown languages when the Holy Spirit manifests itself to the faithful in collective trances), the gift of divine healing (a belief that faith alone can cure health problems) and participating in exorcisms (the ritual expulsion of demons) [20].

The authors are affiliated with technical universities and work in an academic discipline—computer science—that prizes rationality and observable phenomenon. Thus, studying individuals who regularly experienced the supernatural—or difficult to quantify phenomenon—in their daily lives, prompted us to "make strange" or defamiliarize our assumptions about technology use [3]. For example, during our fieldwork, participants described how televisions, radios, and computers, acted as "points of contact" between themselves, the divine, and the demonic, rather than how they were used to solve problems or to complete tasks. Studying Pentecostals prompted us to imagine products that were used to support activities not necessarily related to efficiency or productivity and to account for human experiences that have largely been overlooked in prior user studies. We believed investigating users who differed from us in terms of their values and beliefs would prompt more creative ideas than if we studied individuals with values and beliefs similar to our own.

2.2 Sketching in Design Research

Our work also engages the use of sketching in design research. By "sketch" we mean the early forms of graphical representations of a design, including rough freehand and conceptual drawings. Buxton argues sketching is the prototypical design method and central to the developing novel devices and interactive systems [4]. Drawings can be used to document design solutions, highlight conflicts and possibilities as well as form the basis for revising and refining ideas. Not only is it a useful tool for exploring ideas, but drawing also assists designers and researchers in their thinking by eliciting reflective feedback from collaborators and users [10,24]. Engaging in this dialogue is essential in the discovery and fine-tuning of design ideas [4,24]. We used sketches to document ideas inspired by our fieldwork and to spur conversations with users. This allowed us to gain a more sophisticated understanding of the phenomenon being studied than we could have developed through interviews alone.

We are not suggesting there is anything novel about using sketching in design research. Indeed, many sketching methods aimed at support idea generation exist [4,10,24]. However, case studies documenting how to implement these methods remain scarce and questions about how to translate empirical findings into material forms remain [9,25]. Further, design literature in HCI tends to gloss over the steps describing how to use sketches as transitional elements that help designers and researchers move from contextual analysis to design [9]. Similarly, researchers may describe their method for contextual analysis and provide design implications, but not describe how these implications directly affected the design decisions involved in developing an eventual product [9,25]. Our drawings illustrate how design implications uncovered in fieldwork shape new product development.

Further, using sketches to engage users in the design process can help researchers/designers more deeply understand topics under study. Like prior research, we describe how we used sketching to translate our empirical finings into material forms [10,24]. Then we extend these prior efforts by telling what we learned when presenting our sketches to the people who inspired the ideas depicted in them. Unlike Forlizzi and DiSalvo's work we used sketches to allow for active involvement of users throughout the early stages of the design process. In contrast to Tohidi et al.'s research, we did not use sketching to explore or fine-tune interface designs. Instead, we developed sketches that are more inline with industrial (or product) designers rather than interaction designers' practices. Our sketches depict hybrid software/hardware appliances rather than two-dimensional interfaces. As the lines between physical and digital products continue to blur, designers must become equally comfortable visualizing innovative hardware in addition to software applications.

3. OUR PROCESS

The research presented here is part of a larger project examining Charismatic Pentecostalism, technology use, and design [27]. Findings in this previously published work draw from data collected during a first round of interviews with participants, whereas the work reported in this paper draws from a second round of interviews conducted with the same participants. In the prior paper we argue that if computing is to truly be ubiquitous, technology researchers and developers must look beyond the western, normative assumptions embedded in their work [27]. In this paper we focus on the sketched design concepts that emerged following these initial interviews and how we used these drawings in another study—a second round of interviews conducted with participants from our first study.

In the remainder of this section we describe our study. First, we describe why we chose São Paulo as the site for our fieldwork and provide details about our methods and participants. Second, we explain how we created the sketched designs, by providing an illustrative example (Figure 1). Finally, we describe how we used our sketches during the second round of interviews. We then present findings uncovered during these sessions and discuss how they demonstrate rigor in design research.

3.1 Site Selection: São Paulo, Brazil

Brazil was an excellent site for our fieldwork exploring how Charismatic Pentecostals use technology to support their religious practices. The country is home to some of the largest Pentecostal communities in the world [6, 15]. Within Brazil, São Paulo is the birthplace of the country's Pentecostal movement, home to the region's most vibrant Pentecostal community, and headquarters to the country's largest churches [15]. Further, Brazil's emerging middle class, or individuals with a relatively high degree of technology ownership, are concentrated in São Paulo [7]. Charismatic Pentecostalism used to primarily appeal to the poorest segments of Brazilian society, but as the movement has become more popular it has attracted members from other classes. Thus, we chose to conduct our research in São Paulo because it provided us with the most opportunities to observe phenomenon central to our research—Charismatic Pentecostals who had access to and frequently interacted with technology (e.g., televisions, mobile phones, computers and the Internet).

3.2 Methods and Participants

3.2.1 Design Ethnography

Design ethnography, an approach that draws heavily from anthropological research methods guided our study [21]. Like many researchers working in corporate and in some academic settings, we were constrained by time, thus making this approach well suited for our six-weeks in Brazil. Whereas traditional ethnographers spend months, sometimes years in the field working to develop a holistic understanding of their participants' lives, our research focused on uncovering information relevant to the development of new products.

As Salvador, Bell and Anderson, make clear this compressed time frame means that researchers must "draw on a wider tool kit of ethnographic methods," than researchers who spend long periods of time in the field. These methods include interviewing, photography, documentary filmmaking, and archival research [21]. Although, presenting sketched design concepts to users is not mentioned as one of these methods, we demonstrate how it can be equally effective in shaping researchers' sensibilities, knowledge and understanding of the topics they study.

3.2.2 Participants

During our six-weeks in São Paulo we interviewed 21 individuals who identified as Charismatic Pentecostal (6 men and 15 women—we interviewed both husbands and wives in 4 homes, sisters in one home, and a mother and daughter in one home). Twelve of these participants were interviewed a second time. We present findings from this second round of interviews in this paper. During these interviews, we asked participants to critique the sketched design concepts that were inspired by findings from our initial interviews with them.

When conducting interviews it is common to develop better rapport with some participants than with others [22]. During our initial interviews it became clear that some people were more interested than others in continuing to participate in our project. These participants expressed interest in seeing the outcomes of our research, while others did not. We asked those who were most enthusiastic about our work to be interviewed a second time, and they all agreed. Like the first round of interviews, these took place in participants' homes, apartments, or workplace, and were conducted in Portuguese.

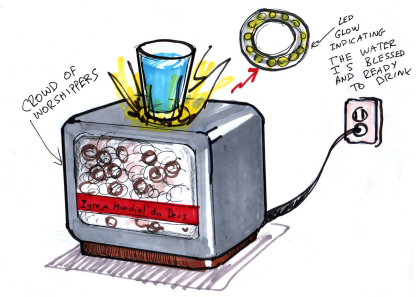

Figure 1. Design concept inspired by research

Participants ranged in age from early 20's to 65 years old. They had a various occupations including a student, church minister, shop owner, seamstress, house cleaner, and English teacher. All were affiliated with Brazil's largest and most prominent Pentecostal churches including God is Love Pentecostal Church (Igreja Pentecostal Deus é Amor); Universal Church of the Kingdom of God (Igreja Universal do Reino de Deus); and Assemblies of God (Assembléias de Deus). Ten of the 12 people we asked to critique our sketches owned televisions, personal computers, had domestic Internet access, and regularly used these technologies in ways tied to their religious faith.

In addition to interviews, we supplemented this data with other occasions to consider religion and technology in São Paulo, Brazil. For example, we attended 27 church services. We also visited Christian bookstores to see what types of materials they had—particularly those that spoke to the presence of technology in Christian life such as software and DVD's.

3.3 Developing and Presenting Sketches

In this section we describe how we translated our empirical findings into sketched design concepts. Our initial interviews allowed us to learn how Charismatic Pentecostals used technology to support their faith and they were also a source of "inspirational data." In other words, in addition to generating empirical findings about how Charismatic Pentecostals' faith affects their technology use [27], the interviews stimulated our creative imaginations and we used sketching to document this process.

We listened to believers describe how they sought "healings" when experiencing envy, worry, hate, and physical health problems. "Faith healing" is the belief that religious faith can bring about healing—either through prayers or rituals that evoke a divine presence and power towards correcting one's problems [6,15]. Belief in divine intervention in illness or healing is a central part of Charismatic Pentecostal's faith. Participants often went to church to physically receive healings; this often took the form of a church leader laying hands on a believer. Those we interviewed also received healings via their televisions at home. To do this, believers placed a glass of tap water on top of their televisions during religious programming and told us how the minister's healing energy could be "channeled into water." This 40-year-old seamstress described this process, as did others we interviewed:

> I put the water on the television because it transforms the water, it blesses the water, it changes the water and makes it sacred water. This can be done through television.

This finding inspired the design concept in Figure 1; we present this as an example of the process used to develop the other sketches described in the paper. We imagined a television with a ring of light-emitting diodes (LED) and a sensor embedded in its top. Believers would place a glass of tap water onto the rings when watching religious programming and when the water was sufficiently blessed the lights would alert users. The seamstress, like others we interviewed, told us the water "transformed," thus we speculated a sensor could monitor this change, inform believers when it was complete, in turn letting them know the water was ready to drink.

This concept may seem peculiar to individuals unaccustomed to encountering supernatural forces in their daily lives. However, our participants repeatedly told us there was "scientific evidence" to prove this blessing process happened via the television. This design concept—like others presented in the paper—reveals how studying Charismatic Pentecostals prompted us to reconsider our personal assumptions about technology use and influenced our ideation process.

Like this example, all 14 of our design concepts were inspired by themes that consistently appeared in data collected during our first round of interviews. The actual ideas emerged following brainstorming sessions between the first and second author. We elaborate on more of these concepts later in the paper.

3.3.1 Creating the Sketches

There are a variety of ways designers express their ideas, these include creating collages, storyboards, physical prototypes and using computers to support sketching [4]. We chose hand sketching with markers and colored pencils to translate our empirical findings into conceptual ideas for the following reasons. First, while in the field, we did not have a computer with graphics editing software (e.g., Adobe Photoshop and Illustrator) or have access to a printer. Sketching was an immediate and low cost way for us to translate findings from our first round of interviews into design concepts. Colored pencils, markers, and sketchbooks can travel anywhere, whereas it can be more cumbersome to take a color printer and desktop computer into the field. Second, the rough, almost cartoonish nature of the drawings was well suited for our project. We used the sketches as a starting point for further speculation about novel product ideas and to deepen our knowledge about an understudied topic.

When creating the drawings we were careful to distinguish our sketches from storyboards. Storyboards present usage scenarios that suggest an idealized way to for users to interact with a concept [4]. We felt that creating storyboards might limit the rich feedback we wanted to elicit from participants. In others words we wanted them to tell us how they imagined using our concepts, rather than the other way around.

3.3.2 Presenting the Sketches to Participants and Analysis

Once we had enough drawings to engage participants with the key themes emerging in our data, we scheduled to meet with 12 participants interviewed earlier in our study. Over a one-week period we created 14 sketches that were presented to individuals during a second round of interviews. We told these individuals the purpose of the second interview was to get feedback on design concepts our previous interviews with them inspired. We encouraged them to share positive and negative responses to the drawings.

Figure 2. Presenting sketches to participants for feedback.

These sessions that we began to refer to as "user critiques" took place in participants' homes, apartments, or in their workplaces. Like our prior interviews, these lasted approximately an hour and were conducted in Portuguese. Drawings were arranged on a table or in some places on the floor and participants were asked to choose a drawing and discuss it (Figure 2). Once they selected a concept, we provided them with a brief description of the idea and asked them to comment on the drawing. Then we would ask them to elaborate on their initial comments. For example, "Tell me what you like about this idea?" or "Why is this a bad ideas?" Each of the interviews resulted in a rich body of responses from which we were able to determine surprising interactions with technology. Like the drawings, our intention was to generate as rich a dialogue with users as possible, thus it was important that our descriptions of the sketches suggest potential design directions rather than a final design solution. We continued this process until we had discussed each drawing.

During interviews we were careful not to tell participants the first author created the drawings. This protocol was an important part of our process because we wanted a level of autonomy with the images. In other words we did not want participants to feel as if they were hurting our feelings if they did not like an idea.

Like the initial interviews, all of these were digitally recorded, which resulted in approximately 12 hours of recordings. We listened to recordings, transcribed and translated (Portuguese to English) relevant segments that were organized into themes presented in our findings. Following each interview we also generated field notes detailing participants' responses to the sketches. These notes were comprised of translated segments of interviews we identified as important and most relevant to helping us answer broader questions about religion, technology use and design.

4. FINDINGS

In this section we present findings based on participants' feedback organized into three themes: 1) Supporting "Value Discovery" 2) Getting to the "right" design 3) and using sketches to support "member checking" in design research. Collectively, our findings demonstrate how sketching allowed us to gain a more sophisticated understanding of the phenomenon being studied and broaden the community's appreciation of how sketching can support design research. Given the short and focused nature of our

fieldwork it would have been difficult to gain this understanding—particularly its relevance to design—through interviews and observations alone.

4.1 Supporting "Value Discovery" in Design

Accounting for human values, or the ways designers and developers' beliefs shape the computer systems and products they build remains a central topic of interest in HCI and related fields [11]. Yet, recently Le Dantec and his colleagues, argued that existing design approaches—the most notable being "value-sensitive design"—offer little guidance on how to prompt discovery and reflection of values differences between researchers and the people they create for during the design process [16]. The authors suggest "photo elicitation techniques" provide a useful way to uncover these differences in early stages of the design process. During our study we found that asking interviewees to comment on conceptual design ideas is an equally effective way to discover value differences early in the design process. We present two examples of this event.

Misinterpreting the meaning in symbols: Two sketches elicited strong emotional reactions from some participants. Though the drawings presented very different ideas they shared depictions of common Christian symbols: the cross and the ichthys (or what is colloquially known as the "Jesus fish"). An understanding that some Charismatic Pentecostals blessed newly purchased objects (e.g., groceries, home appliance, and clothes) before they came into their homes inspired the first drawing (Figure 3, left). Participants told us they were concerned that individuals who did not share their spiritual beliefs may have come into contact with the object prior to them owning it [27]. Blessing the object before bringing it into their homes was a common strategy for diffusing the negative influence that may be embedded in the artifact.

In response to this finding we imagined branding objects with a symbol indicating who manufactured them, specifically the symbol would suggest that other Christians made the artifact. There are similarities between this concept and some mobile phone manufacturers' efforts to mark phones with a rabbinical seal indicating they are "kosher" (see [5]).

The second drawing (Figure 3, right) was inspired by an activity we repeatedly observed at church services. Individuals, including those we interviewed, routinely brought paper photographs of friends and family members in need of blessings, or healings to church services. These artifacts were left on a stage, typically at the front of a church's sanctuary and eventually blessed by a minister. It was common to see hundreds of artifacts on these stages and we wondered how individuals could locate their personal photographs after leaving them in the crowded piles of stuff waiting to be blessed. We learned that participants often lost photos after leaving them on the stages. Potentially losing their photos was a risk participants took when asking ministers to bless them.

Inspired by this finding, we imagined automating the photo-blessing process with mobile phones, digital photography, and an interactive display. Participants would use their mobile phones to electronically send photographs that needed to be blessed to a large, digital screen at the front of a churches' sanctuary. Then ministers could physically touch the images—indicating they had been blessed—and believers would then receive a text message (sent to their mobile phone) notifying them this process occurred.

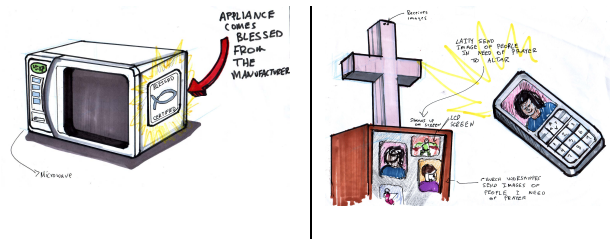

Figure 3. Sketches depicting ichthys and cross symbols

When we presented these drawings to users, more than half commented on the symbols illustrated in the drawings, rather than the technology concepts. Participants were immediately drawn to the Christian symbols depicted in the sketches and expressed concern upon seeing them. For example:

> My church does not have any crosses, this is an image [referring to the cross] made by man, not by God—it would be better to not have any symbols.

While others suggested alternative symbols we should consider in our designs:

> You should change this cross from an eagle or maybe to the Holy Spirit symbol, be careful these can be controversial.

Following these discussions, we learned the symbols we chose were visceral markers of a "dead Jesus." It became clear that participants did not want to be reminded of death because of their intense belief in developing a relationship with a "living Christ" [6, 15]. Our participants believed Christ interacted with them and if he was dead, this could not happen. The cross and fish were symbols of Christ's death, rather than his ongoing life.

These interactions demonstrate how creating the sketches, then presenting them to participants helped us discover differences between our values and our participants' beliefs. The first author created the sketches and is familiar with Protestant Christianity because she regularly attended church services in the US. When conceiving of and sketching the concepts the symbols were an afterthought. They were meant to be contextual clues—communicating the design concepts were developed for Christian users—rather than details that detracted from the larger themes we wanted to explore using our drawings.

Thus, we gained an understanding of the topic under study that we failed to develop during out initial round of interviews. It became clear that we should refrain from using symbols associated with Christ's death in future design concepts. This instance also highlights a challenge other designers will likely encounter when imagining new technologies for unfamiliar users, or those who value systems differ from their own. The challenge is seeing beyond one's own experiences and cultural roots. As noted elsewhere, separating one's own experiences from those of their users is difficult [3]. Using sketching to engage users in every stage of the design process is one way to overcome this difficulty. Finally, this experience taught us to be very thoughtful about every piece of information included in our sketches. Indeed, what we thought of us as a simple contextual clue had a very different meaning for our participants.

Inappropriate Technology: There were other instances where the sketches helped us uncover value differences between participants and ourselves and to understand how these differences could shape design. Nearly all of those we initially interviewed told us

that demonic powers are transmitted through the airwaves. Our participants viewed televisions and computers as transmitters of invisible good and (often times) evil powers. They worked to combat the evil influences that came in the form of violent or hypersexual television programs. For example, when we asked participants to describe the "evil things" that some technologies emitted they responded with stories about *telenovelas,* or soap operas. Religious scholars refer to Charismatic Pentecostals battle with evil in their daily lives as "spiritual warfare" [15]. Participants typically relied on prayer or spoke a significant Bible verse when confronted with evil while watching television or looking at the Internet.

This insight inspired the sketch in Figure 4. We imagined a television remote control participants could use when subject matter that contradicted their Christian values appeared on television. Users could press a button on the device and a Bible verse or short prayer would appear on the television screen. In turn, this would help participants combat the evil forces trying to enter their homes.

This explanation and the sketch were presented to our participants. Their responses to this concept were similar and most agreed we should not develop this concept. For example:

> Evil will try and get to you through any possible, having a device will not stop it. This is not something that has nothing to do with technology because it is about yourself. You have to judge if you are going to watch something or not, you don't need technology for this.

The phrase "you have to judge" was one we repeatedly heard when presenting this concept to participants. Rather than relying on technology to help them eschew evil, they wanted to rely on their personal knowledge. For example, participants devoted a significant amount of time to studying the Bible and memorizing verses because this was an effective way to fight evil. Vigilance was important if they were to successfully combat evil and they feared this alertness would be lost if they simply pushed a button on a remote control to fight it.

As designers we often look for situations that are amenable to technology interventions. This drive to imagine new ways products and device can support everyday life is valued within HCI. However, less attention is given to thinking about when technology interventions may be inappropriate [2]. The discussions spurred by the drawing prompted us to reflect on how our desire to "innovate" contradicted with our participants' desires to not want technology to intervene into some aspects of their lives. Like Baumer and Silberman we believe value should be given to research that uncovers instances "not to design" [2]. Using sketches to engage users in the design process is one way to identify these instances.

Uncovering value differences is a topic of growing interest in HCI and related communities but researchers put forward few concrete ways for designers to uncover these differences in their work [16]. Sketching is understood part of the design process and prized because it helps designers externalize ideas. We extend and further elevate the role of sketching in the design process because of its potential in uncovering value differences between designers and users.

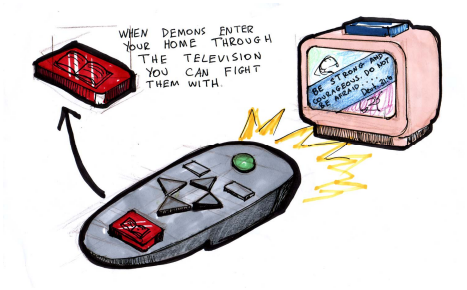

Figure 4. "Spiritual Warfare" Television Controller

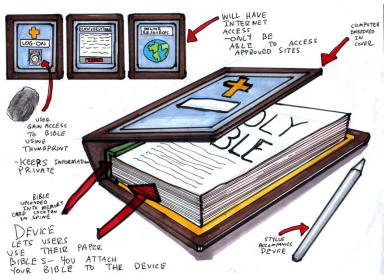

Figure 5. Digitally Enhanced Bible

4.2 Getting to a "Right" Design

Asking users to review our sketches was instrumental in shaping our understanding of a complicated topic, particularly how it related to the design of new products. Although, many concepts generated negative responses because they contradicted participants' beliefs and religious practices, some promising ideas emerged from our work. In this section, we focus on one of those ideas and discuss how our process helped us get to a "right" design that we plan to prototype and evaluate.

During the first round of interviews we consistently listened to participants describe the significance of the Bible in their spiritual lives. Those we interviewed in Brazil were attached to their Bibles for two reasons. First, it is the Christian faith's central text. Second, their copies were often hand-annotated with meaningful and personal notes. At the same time, participants showed us and discussed the importance of other religious texts and the Internet when talking about their relationships with their Bibles. They relied on these books and some websites to help them gain a deeper understanding of the Bible, or to point them passages that were relevant to certain issues in their lives. This finding inspired the concept in Figure 5.

Digital Bibles have existed for decades and the Bible is one of the most popular texts downloaded onto eBooks [19]. However, given the intense relationships our participants formed with their paper Bibles, we questioned if they would want to replace them with digital versions. People commonly mediate between materials artifacts and digital technologies, yet there are few example of a middle ground between these artifacts. In other words, there are few instances of integrating or augmenting traditional artifacts with digital technologies. Thus we imagined incorporating a thin computer screen (similar to an iPad) into the leather jacket covering users' Bibles. This would let them keep their paper Bibles, the notes written in margins of its pages and also allow them to quickly access online information. Specifically, they could use the computer screen embedded in the Bible's cover to search for information that would answer questions they had about biblical stories or passages.

Nearly all of those who critiqued our concepts enthusiastically liked this idea. With many describing it as our "best" idea. For example:

> This is the best of them all! There are websites and programs that help you search the Bible, but everyone likes having their own Bible, you create intimacy with it over many years, so if you have a program that helps you find what you store in your Bible that is the best option.

Many participants imagined using the device as we thought they would, as a tool that could assist them with studying the Bible. Others we interviewed imagined using the device in ways we did not anticipate. For example, an older woman wanted to use our concept to help her improve her reading abilities. The youngest person we interviewed envisioned using it to store and easily access relevant Bible verses. He also wanted to use the digitally augmented Bible to participate in online discussions about sermons at his church.

While responses for this concept were mostly positive, the sketches helped us uncover concerns that we did anticipate when imagining the concept. For example, an older man who worked in the construction industry told us the concept "looked expensive," and he feared it might get stolen. While others worried that adding a digital component to their Bible might decrease the serendipitous interactions they had with it. For example:

> To help you understand biblical passages, it would be interesting, but the search engine is not a good thing because, it may make you pass by some important things, sometimes God wants you to read another Biblical passage and he makes you see this passage in your way of finding another one . . . you may lose that.

We welcomed these comments from participants and were pleased the drawings generated such lively discussions among them. This example demonstrates another benefit of presenting users with speculative design concepts instead of storyboards. Participants generated their own use scenarios, instead of us speculating about how they use the device. In turn, this helped us uncover additional information that will be useful as we move forward with this design concept. We learned about features to include in the device and were prompted to consider unexpected use scenarios. These features included, supporting serendipitous interactions with Biblical texts and to imagine ways the device could be designed so to discourage potential theft. We did not uncover this information during our initial interviews.

4.3 Supporting "member checking"

One of the most complicated problems researchers committed to interpretive practices in fields such as anthropology and design, is deciding whether an interpretation of their data is credible and truthful [18]. Though some researchers who conduct ethnographic research go to great lengths to understand how well their interpretations of a phenomenon correspond with their participants' beliefs less attention is given to "member checking" in HCI and design research communities. It is critical to use member checking in qualitative research studies because these types of studies often involve interpretation. For example, when writing about their fieldwork an anthropologist might present their work to informants to check the validity of their findings [17]. During the second round of interviews we found that presenting our sketches to users for feedback was a useful way to support this practice.

Many of our concepts were grounded in an understanding that our participants' regularly used and relied on digital technology to support their faith practices. For example, participants often showed us messages (e.g., "God is love") they placed on their mobile phones. Those who were not as attached to their paper Bibles described the benefits of using a digital bible and we saw these devices for sale at shops we visited. Participants told us they often watched religious services online or used their computers to listen to Christian music. These are examples of the ways we witnessed participants integrating new technologies into their spiritual lives. Given that a goal of our project was to imagine how future technology could be used to support these practices, imagining ways new technology could support users' religious practices seemed logical. However, after presenting the drawings to users, we realized their desire to appropriate new technology was more nuanced. Specifically, we found that it was okay to use technology in some ways but not in others ways connected to participants' faith. Our initial interpretation of our data was incomplete and presenting the drawings to participants allowed us to refine our interpretations of it.

We present examples illustrating how we used sketches to support member checking in our research. With Figure 5 (digital Bible) we learned that it was okay to use technology to support participants' studying/learning practices. When presenting Figure 4 (remote control) to people, we uncovered that they wanted to rely on personal judgment rather than technology to combat evil in their lives. Following our initial interviews, we did not learn about this subtle—yet powerful—distinction in how our participants wanted to (and did not want to) use technology in ways connected to their faith. Thus, this process of presenting users with the design concepts that were inspired after our initial interviews with them allowed us to assess our preliminary results and refute particular aspects of the data. This process increases the credibility of our interpretations of the data collected during our initial interviews (see [27]).

Finally, member checking is often cited in discussions regarding the ethical nature of qualitative research [17]. Returning to interviewees with the analyzed data for member checking provides them with a deeper understanding of what they consented to participant in. For example, we found that some individuals did not understand how their religious faith could affect future technology design when recruiting for our study. Pairing our initial interviews with another round where we presented participants drawings helped them become more aware of how the information they shared with us might be used. For example, during our second visit participants appeared to understand the commercial nature of our research:

> Tell Intel to put this on the market very fast!

Thus, the process of presenting our sketches to participants helped us obtain a level of full disclosure about the nature of our work that was difficult to articulate without the sketches.

5. DISCUSSION

In this discussion we elaborate on a theme running throughout our paper and this is the meshing of anthropologist and designers' practices. Specifically, many ethnographers have emphasized the central place of writing in their craft [8]. We agree that writing has a central role in ethnography. However, we also contend that sketching has an equally significant role in ethnography, especially in design research. We suggest that design researchers

treat sketching as anthropologists treat generating field notes because doing so illustrates the rigor in design research.

Wolf, et al. note that design has been considered part of HCI since its early days, but that typical HCI usage of design is at best limiting and at worst flawed [25]. This sense that design research is misunderstood or lacks the rigor more quantitative forms of research are perceived to have is echoed by other scholars (e.g., [9]). Sketching, like generating field notes is a form of iteration that allows designers to prove, or at least account for the evolution of their design in a manner acceptable for research communities that tend to be oriented towards the quantitative. In this way designers reduce the need to justify design decisions, because they have empirical evidence that their decisions are "correct" [25]. As noted earlier, questions about how to translate empirical findings into material forms remain [9,25], thus overlooking the role of sketching in this process arguably contributes to the idea that design is a mystery or "black art." Using sketching to obsessively document every stage of the research process, like anthropologist used field notes, demonstrates the rigor involved in design research.

6. CONCLUSION

The act of bringing forth a prototype—the design process—seems often obliterated from descriptions of research projects; research prototypes just seem to "happen" [9]. Our research presents a case study documenting this process, specifically moving from empirical findings to conceptual sketched prototype. At the same time we present empirical findings suggesting ways to design (or not to design) for an understudied, yet growing user group—Charismatic Pentecostals. We also demonstrate the added value that comes from presenting these sketches to the people who inspired them and comment on how our work contributes to the communities' understand of finding creative inspiration.

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