Beyond Being Green: Simple Living Families and ICT

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ABSTRACT

Motivated by a need in sustainable HCI for studies of everyday practices, and a belief that a *holistic view on sustainability* is crucial to deeper understanding of how to design ICT to support sustainability, we here present a qualitative study of 11 *simple living families* in the US. Simple living refers to a lifestyle which is voluntarily simple out of concern for both the environment and quality of life. Our goal was to learn about a holistic view on sustainability and the role of ICT in helping and hindering families to live simply. The study contributes new insights about how holistic sustainability could be a valuable lens for HCI, revealing that sustainability is important to a wider range of areas in HCI than previously discussed. We conclude with implications for HCI for how to support sustainable practices beyond being "about" being green.

Author Keywords

Sustainability; sustainable HCI; simple living; families; qualitative studies; holistic sustainability

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION

There has recently been an explosion of work related to sustainability and HCI, much of which focuses on addressing well-defined aspects of environmental sustainability, such as energy consumption in the home [e.g., 4, 12, 14]. There have been calls to complement and extend this work, through empirical studies of the everyday life and practices in which Information and Communication Technology (ICT) should fit and help people live more sustainably [e.g., 5, 28, 29]. Studies such as Woodruff et al.'s analysis of "bright green" US households that have made conscious choices towards sustainable lifestyles and housing [29] are helping us understand how people feel about and act around environmental sustainability in everyday life, and implications for ICT design, although these until now have formed a relatively small part of sustainable HCI [e.g., 7, 8, 9, 22].

Here, we build on recent concerns about the relatively narrow focus of much sustainable HCI research [e.g., 5, 10, 11, 17] to expand our view of what "sustainability" means, and what it might mean for HCI to pursue sustainability as a comprehensive research and design agenda. We report on a qualitative study of families in the US who have voluntarily chosen to "live simply" out of concern for the environment and for their own quality of life. These families not only focus on limiting their environmental footprint, but also reflect on and develop practices oriented towards sustaining the environment, their families' quality of life, and their communities. The study had two key aims: to learn what a holistic view on sustainability could mean in everyday family life, and to understand the role of ICT in their lives and its consequences and potential for supporting a more holistic notion of sustainability. Through this study, we analyze current limitations of and substantial opportunities for HCI to address sustainability in a holistic fashion.

What is "holistic" about our study, and why does it matter? As Dourish has argued [11], sustainable HCI's current focus on shaping individual choices to reduce consumption can inadvertently rely on guilt around consumption as a (de-)motivating factor. Instead, in our study, families are positively motivated, seeing being *more sustainable* as tied to a *higher quality of life*. Opening up an alternative, more multi-faceted view on what living sustainably could mean might help provide guidance for more effective ways to motivate users. Furthermore, by looking specifically at families and how they interact with their communities, we expand on sustainable HCI's typical focus on individuals and their choices. As we will show below (building on previous studies such as [9] and [28]), individuals' environmental practices are strongly shaped by the choices, priorities, and actions of people and organizations around them. By analyzing how practices are shaped on the ground, we have a better chance of finding effective levers of intervention.

This work presents new insights about what it means to take a holistic view on sustainability, and how this relates to current and potential work in HCI. We demonstrate, for example, the need to balance sustainability concerns with other priorities in families' lives, the interdependence of family members' environmental choices, and the "double-edged" role ICT plays in both supporting sustainable action and presenting challenges to maintaining an environmental lifestyle. We present design implications for HCI, such as the opportunity to take having "enough" as a central design

theme for applications that support communication and information access. Most importantly, we show that taking a holistic view of sustainability is not limited to obviously "sustainable" applications but reveals sustainability issues across research domains in HCI. We demonstrate research opportunities in a variety of areas that have the potential to support sustainability without being "about" being green.

Voluntary Simplicity

The idea of voluntarily living simply is not new, with origins in both Western and Eastern culture. Here, we particularly focus on the *voluntary simplicity movement* in the US, as analyzed by Grigsby [13], who describes the movement's origins and relates an ethnographic study of voluntary simplifiers (a similar lifestyle is described in Schor's work on downshifting [27]). Grigsby calls the voluntary simplicity movement a "*loosely bounded*" cultural movement, in that followers are not tightly organized but nevertheless culturally homogenous, in terms of both demographics and motivations to live simply. Simple livers tend to be Caucasian, middle-class, well educated, and, in her study, singles or couples without children. Together they are *"concerned about environmental degradation, critical of conspicuous consumption and 'careerism,' and dissatisfied with the quality of life afforded by full participation in mass consumer society"* [13: p. 1]. Further, they express concerns that *"there is no built-in or culturally established concept of 'enough' in the dominant culture"* [13: p. 1]. Instead, simple livers try to determine for themselves what is enough, and only work and consume as much as they need to. Importantly, this is based on experiences of *having had enough*, which distances this group of middle-class people from less-affluent groups in society, who struggle merely to have enough. All in all, voluntary simplifiers believe that living simply raises their and their community's quality of life and creates less environmental damage. Our study differs from Grigsby's work by looking at *families* living simply, and by particularly exploring the role and potential of ICT in their lives.

PARTICIPANTS AND METHOD

During Dec 2011-June 2012 we interviewed 11 *simple living* families with children. In total, the study included 19 adults (9 men and 10 women) and 16 children ranging from 14 months-14 yrs. The study was located in a small liberal college town with a strong sustainability-oriented ethos in the northeast United States. We relied on snowball sampling to recruit the families, who guided us to neighbors, friends, fellow church members, and fellow homeschooling families. As far as we know, they did not all belong to the same group or all know each other. Since we wanted to work with an open understanding of voluntary simplicity and learn how the families themselves defined simple living, we did not recruit our families through the voluntary simplicity movement, nor did we use a description of simple living when recruiting. Instead we asked potential participants if they try to live simply out of concern for the

environment and for their own quality of life. We looked for participants who are *voluntarily* living simply, rather than from hardship, to give insight about reasons to and strategies for *positively* choosing a simple life. As discussed below, there is a large overlap in demographics and cultural references between these families and voluntary simplifiers as defined by Grigsby [13]. Still, none of the families explicitly identified themselves as part of a voluntary simplicity movement. They all see themselves as living more simply in the context of mainstream America and have practiced simple living for years, although internal motivations to do so and resulting everyday practices differ somewhat within the group. They all continuously reflect on their lifestyle choices, particularly in relation to changing needs and challenges as their children grow up. None of the families belong to a traditional religious simple-living community such as the Amish. They are all regular participants in modern society through work, education, social life, and technology use.

Each home visit lasted for 1.5-3 hours, with the aim to interview the family together to the extent possible. In 3 families with small children, we split the visit across two meetings because this worked better for the children. In all but 3 interviews, all family members were present. The visits consisted of a semi-structured interview, primarily intended for adults, with an integrated "technology tour" [3] for the children. We asked about living simply, living simply as a family, and the role of ICT in simple living. The technology tour involved inviting the children to show us what technologies they have and use, if any. It worked as a way to engage children to participate on their own terms. Parents were present during the tour, leading discussion to include the parents' use of technologies as well. Children participated depending on age and interest in the tour and interview, where the youngest did not reply directly to questions, but still made valuable indirect contributions. By interacting with technologies and other items in the home, they triggered discussions, helped us by asking more questions or wanting clarifications from the parents, or reminded the parents of e.g., events. All interviews were audio recorded; during the tours we took photographs of objects. Each person received a $10 gift card as compensation. All interviews were transcribed for analysis and then open-coded to identify common concepts and reoccurring themes in the data. The photos served as memory aids.

THE SIMPLE LIVING FAMILIES

We start by describing the simple living families (referred to as *F1-F11* below) in more detail, because their particular context frames the rest of the findings. Our participants all happened to be Caucasian and middle-class, which reflects voluntary simplifiers as a group [13]. Middle-class here does not refer to income level, which is a misleading indicator for this group who voluntarily work less outside the home. For the purpose of this study, we understand middle-class as a cultural category with values tied to having a col-

lege education, and, importantly, having social and cultural capital. Having such capital would allow them to live more affluently if they wished to, which differentiates them from the working class. Furthermore, as this study is situated in the white middle-class in the US, we are aware of and stress that these findings by no means represent the only or even a preferred way to approach holistic sustainability across cultures. While our families reported practices that likely were more sustainable than the cultural norms in the US, our study did not measure the actual sustainability of these families; instead, our study results highlight the complexity and perhaps unmeasurability of what counts as "sustainability."

The adult participants' occupations range from professor (*F1, F2, F6*), lecturer/lab manager (*F3, F4, F10*), homemaker (both female (*F1-4, F9-11*) and male (*F5*)), homeschooling teacher (*F1, F3, F5, F7, F9, F11*), midwife (*F10*), yoga teacher (*F6*), volunteer worker (*F2, F4*), "green tech" start-up company manager (*F4, F5, F8*), web designer (*F8*), shop assistant (*F3*), developer (*F9*), carpenter (*F11*), to "green tech" engineer (*F5*). Four toddlers are looked after at home (*F2, F4(2), F10*), two children go to a private Waldorf school (*F6, F10*), two children go to public school (*F5, F8*), and the remaining eight children are homeschooled by one or both parents (*F1(2), F3, F5, F7, F9(2), F11*). All but one homeschooling family (*F9*) belong to a local homeschooling cooperative, where they regularly interact with other families. Six families live centrally located in town (*F1-5, F8*), while the remaining five live up to 10 miles (ca. 16 km) away. Three of these homes use environmentally-oriented materials and techniques (*F6, F9, F10*); one is producing power to the grid (*F9*) and one is off the power grid (*F10*). Several of the houses are relatively small compared to US standards, as a deliberate way to limit possessions, and equipped largely with second-hand items.

Echoing Grigsby's study [13], the families' reported motivations to live simply include wanting to do something about the environmental crisis, wanting to focus on people rather than material things, personal health, spirituality, frugality, and rejecting conspicuous consumption. In 3 families environmental concerns were not the primary reasons for leading a simpler life, and "green" practices like eating locally were a byproduct of other values. Health and leading a less stressful life motivate *F6* to live more simply. *F8*'s "*deliberate*" lifestyle is guided by their faith as Quakers (simplicity is a key principle in Quakerism), and they try to make conscious choices about e.g., transportation, food, and consumption, instead of "uncritically" following mainstream trends. *F11* prefer to live with few belongings and modern technologies because this makes them feel closer to people and nature. Fewer expenses also mean being able to work less and having more time for music (their hobby), gardening, and homeschooling.

To avoid confusion, we will continue to use the term "simple living". However, some participants preferred to talk about their lifestyle choices as "*deliberate*", "*authentic*",

and "*wholesome*." They felt that "simple" could be misleading, as it could give the impression that this lifestyle is "*easy*" when in everyday life it is the opposite: it requires reflection, time, and work. The families engage in a range of practices like growing their own produce (*F1, F3, F5, F7, F10-11*); deliberately using the car less (all); doing volunteer work (*F2-4, F7-8*); when possible, buying locally (all); limiting consumption of new goods (most); or limiting resource consumption in the home (most). They all report having made changes over a long period of time, and constantly exploring, reflecting, and re-learning how to live sustainably in a holistic way.

We also wanted to understand the role of ICT in their lives. Each family owns at least one computer, and all adults use Internet and e-mail. In half of the families, the computers were bought second hand or came for free e.g., through work. All families have at least one cell phone, where most phones we observed were cheap pre-paid ones used for coordination between parents and for safety when traveling. Six families also have more "recent" digital technologies such as tablets and/or smartphones (*F2, F4, F6, F8, F9-10*), on which a few adults and children occasionally play games. None of the families have cable TV, but at least three access an online media streaming service like Netflix (*F8-F10*). Overall, this group of families did not report watching much screen-based media, and when they do, it is mostly carefully chosen movies or shows for educational purposes or family fun. In about half of the families, we observed few digital technologies overall, and very little child use (*F1, F3, F5, F7, F11*). During technology tours we saw objects including remote-controlled toys, CD players, basic digital cameras, a digital piano, two electric train sets, and VHS and DVD players. We were also shown other toys and items, including "*nature collections*" with e.g., stones and feathers, Lego, drawings, and crafts.

BEYOND BEING GREEN

In this paper, our primary aim is to move beyond simply "being green" to understand the implications of a more holistic view of sustainability for HCI design and research practices. We do not claim that this group of simple living families has the final or only answers to solving the extremely complex challenges of sustainability. Simple living is one culturally specific way to address this challenge. However, we *do* argue that these participants provide a valuable lens on sustainability that has new lessons for HCI. In this sense, this study is similar to [20] and [29] in studying a particular group to gain insights that could be valuable for more general groups.

To do so, in this section we describe in more detail what it means for the participating families to live sustainably in a holistic way. We organize our findings around themes salient to developing new insights from seeing sustainability holistically. We discuss each theme in relation to how sustainability has been dealt with so far in HCI and what we can learn from looking at sustainability holistically. In the

discussion section, we step back from the individual themes to discuss broader implications for HCI as a whole.

Sustainability cannot be compartmentalized
Much current work in HCI approaches sustainability primarily as an environmental problem [but see also 6, 8, 17]. Holistic sustainability goes beyond "being green". The majority of these families report that it does not make sense to live sustainably in one aspect of life and not in others. What they do for the environment is related to and interlinked with personal and social sustainability, and vice versa.

"[I]n terms of sustainability as a more comprehensive concept than just environmental consciousness […] we do all we can to support social justice as an important principle. […] We're trying really hard to model our life, doing everything you can to make the community healthier – environmentally, socially, economically." – Dad/F1

One example of how this is manifested in their lives is that living centrally in town, or outside of town but close to a bus route, allows nine of the families to walk, bike, or ride the bus to work, school, social activities, and to do errands. It is a deliberate environmental choice for them to be as "*car-light*" (*F1*) as possible, but they also explicitly bring up the health benefits that such a multi-modal approach to transportation offers. Another recurring pattern in their reports is how their choice of food and diet is influenced by what they believe is sustainable for the environment, personal health, and the local community. Six families grow their own produce fully or to some degree, all try to buy local food to the extent possible, and most families try to cook food from scratch where *F4*, *F5* and *F9* talk specifically about making "*wholesome*" food.

Where HCI focuses primarily on environmental sustainability, we sought families interested in both environmental and personal sustainability. Unsurprisingly, then, all the families stressed the importance of a high quality of life for oneself, one's family, and the local community. They report that finding a balance between work and family, spending time together, slowing things down, focusing on people, having time to reflect, spending time in nature, helping the community, and having time for practices such as gardening and cooking is equally important as environmental sustainability. One way to achieve this is to work less outside of the home, which frees up more time for other things. In all families *at least* one parent is home and/or working part-time. Tied to working less is a strong aspiration to consume less or at least more carefully. Five families mentioned excessive consumption as damaging to the environment, and all expressed a profound desire to look beyond the material world and focus on more important matters such as people.

This group of families tries to model an alternative, simpler lifestyle for others, without preaching. Importantly, they want to be role models for their children by not just talking, but living according to their sustainability-oriented values.

"[W]e try to walk and bike with the kids, to teach them that that's a perfectly normal sort of transportation, which for many Americans it's not. So these guys [sons] grow up walk miles around town, doing errands" – Mom/F1

While HCI tends to approach sustainability primarily as getting people to be more "green", our study suggests how living sustainably affects *all* aspects of life. Environmentally sustainable practices are only practical if they are also socially and personally sustainable. For example, if we build technologies that encourage people to take time to reflect on their practices, and/or to engage in sustainable practices that take more time, we need to consider where that time will come from and to what extent this is practical in their broader lifestyles. This can mean, for example, that issues around busyness and having time to reflect on one's values [19] may be as important for a sustainable HCI to address as issues directly around consumption.

From "more" to "enough"
Many modern technologies, including in HCI, are designed to bring us *more*. For instance, social networks thrive on users constantly adding more content, becoming friends with more people, and commenting on and consuming more content. Digital artifacts are constantly being improved to be faster, better, "smarter". This approach embodies a modern cultural orientation that "more" is probably "better."

Based on a desire to shift focus from the material world to what matters more according to them – people, relationships, health, rituals, food, and nature – these families seem to understand their lives not in terms of striving for *more*, but in terms of being satisfied with having *enough*, what the mother in *F3* termed "*being satiable*". In a Western world of abundance, seven families feel it is crucial to be conscious about the differences between "needs" and "wants". Shifting focus from the material world to a core set of values and being satiable, guides them in living simply.

Dad: "I think it [living simply] makes you happier."

Mom: "Yeah, just wanting to focus on the importance of people rather than things. It's so easy to get caught up in the material culture in modernity […]"

Dad: "Getting it, protecting it, worrying about it, I mean, it puts material things […] So if you reduce your needs and your wants to a…minimum- as minimal as you can…those are minimized too…those kinds of worries." – F1

This focus on having *enough* to meet one's needs provides a different lens from the focus in sustainable HCI on *less*, i.e., limiting consumption, which can unintentionally lead to guilt as a motivator ("bad" people use "more") and does not provide guidelines as to how much "less" is enough. Our families do not focus merely on reducing consumption, but on determining a reasonable amount and kind of consumption that supports quality of life, and on being happy with what they have rather than guilty for what they use.

At the same time, six of the families struggle with how to deal with or avoid distractions from their core set of values. As one mother (*F5*) confesses: *"I have a hard time living in America. A lot of it because of pressure…to consume more, buy more, be more."* They related difficulties avoiding unspoken expectations on what to wear, how to look, and how to live, internal and external expectations on what to strive for in life (career, success, money, possessions), and, especially with children, a strong American consumer culture. Distraction comes from the digital world as well. Even though they rely on and appreciate ICT, five families described difficulties that ICT and digital technologies posed in being satisfied with enough, for example through contributing to raising standards:

"It [technology] raises the bar [of standards and expectations]. […] You know, part of living simply, I suppose, is being satisfied with just being satisfied! Actually, being satiable. And I think that the ever-increasing bar makes that a really difficult place to be." – Mom/*F3*

ICT has fundamentally changed how we as a society work, communicate, socialize, search, and are informed. The families described feeling that with digital technologies come new possibilities and thereby new expectations to do and participate more: call, text, send e-mails, share media, update social networks, and be accessible. The vast amount of information online makes it hard to *"say enough"* (Mom/*F2*).

"For me, it makes it more complicated because there is ALWAYS MORE information at my fingertips, I can ALWAYS be answering one more e-mail, I can always be learning one more thing about how to do something better for the environment. […] [I]t's REALLY hard to draw the line and say enough." – Mom/*F2*

Wanting to focus on people and relationships, six families are concerned with how the widespread use of digital technologies can be disruptive in social contexts.

"[ICT use] has very much changed how […] our extended family interact at gatherings. A lot of times now, people would be sitting on the couch with their laptops on their lap doing something, or you know, pulling out a phone every five minutes and checking it, and it makes me feel like they don't want to be spending time with me" – Mom/*F1*

HCI design is frequently focused on more, better, and always connected. Our study builds on alternative approaches like "undesigning" [24], discussing when HCI should *not* design technology [1], and "slow" technology [15] to suggest that specifically focusing around "enough" rather than "more" may help us to design things that truly improve quality of life, rather than proliferate consumption. Within sustainable HCI specifically, we note that it may be helpful to expand focus from merely *limiting* consumption, to discussing and supporting reflection on what is *enough* and how to be satisfied with having enough. This refers not only to consumption of resources and goods, but also to how we value personal resources such as time and attention, and thinking about enough in terms of how accessible we are to others and when. While HCI supports an ever more mediated and networked world, these families stress the need for a balance between the mediated and unmediated, online and offline.

Living sustainably is not an optimization problem

A common approach to supporting sustainable lifestyles in sustainable HCI has been to use digital technologies to measure environmental factors such as energy consumption and report them back to users so that they will lower them. We found that detailed eco-feedback was tangential to our families' lifestyles; they are not driven by details about CO_2 emissions or how much water or energy they consume in everyday life. This is not to say that they are not aware of such information or do not care about it, but it does not seem to dictate every part, or even a large part, of their daily lives. Such knowledge is one piece in a bigger overarching approach to life where the challenge is to find a way of living that is *simply sustainable*, i.e. that you can maintainably enjoy while not demanding more resources than you need.

In terms of approaching sustainability in everyday life, living sustainably for them does not appear to be about perfectionistically optimizing their environmental impact. Four families stressed the importance of experimenting with new ways of doing things, and giving *"yourself permission to not be perfect, eco-model person"* and not feel like a *"failure"* (Mom/*F7*) if circumstances require you to do something that is considered less sustainable. They do not see simple living as an extreme lifestyle, arguing that you can reduce your footprints considerably and *still* live comfortably.

"We turn the lights on. We run the dishwasher. We use lots of electric... you know, we don't use lots of electricity. We use probably less than half of what the average American household uses. I know this because I've looked up such things. But we use plenty of electricity. […] When we want tea, we slap the teapot on the stove and we turn it on. I feel like in general, in some ways our lifestyles are just American. […] There might be people who think, 'Oh my goodness, how can you live with only one car?' We hang our laundry to dry. We don't have a dryer. It seems extreme, but it's not extreme." – Mom/*F7*

In sustainable HCI, few empirical studies have involved families with children [except see 28]. We found that children lead to significant compromises about sustainability, since children demand more time and material resources. As one mother (*F1*) explains, *"when the kids are very small it's hard to take them in the bike in the wintertime […] If I were by myself I would exclusively bike almost. But with two other people, [I] can't really do that as much."* For this otherwise very *"car-light"* family, the car also provides a

way to socialize with the children's friends who are living outside of town, which they value despite requiring the car. For the families with young children (*F2, F4, F10-11*), child rearing often overlaps with simple living practices like cooking food from scratch, which limits how much the parents can achieve and forces them to compromise. As children grow up, their interests also change with respect to their peer group, which can lead to new compromises, as the mother in *F9* explains: "*We try to keep chemicals out of our homes and food, and our teen brings in conventional hairstyling products and nail polish…*"

These families are strongly motivated to live simply and with a small environmental footprint. The very real compromises that they nevertheless feel they need to make in order to have a balanced lifestyle suggests limits to a focus in sustainable HCI on approaching sustainability as a problem of optimizing one's environmental impact. Focusing on limited factors risks losing track of the overall picture, and misses acknowledging that there are other priorities (e.g., taking care of children) that we also need to attend to. And these families stress other values as part of a sustainable lifestyle. To them, it is important to *enjoy* practices like biking to work; otherwise there is a large risk that one will not continue doing them. The idea is not to optimize temporarily, but to explore strategies that gradually become permanent parts of a sustainable lifestyle overall. A sustainable way of doing so is not to aim for optimization and perfection – which is hard to live up to, especially in a social context – but to be satisfied with being "good enough". Holistic sustainability thus tells us that it is not only about being satisfied with *having* enough, but also about *being* good enough.

Being on the same page
Further, a holistic approach to sustainability means taking into account how individual choices and decisions about sustainability take place in a social and cultural context. People around us influence what we can do about sustainability, and vice versa. As stressed by others [e.g., 5, 8, 9, 11, 17, 28], individuals have limited power to change, which in turn limits individual-based approaches to sustainability. This study clearly illustrates how important it is to be on the same page in a family with regards to prioritizing sustainability and making fundamental decisions about e.g., housing, investments, diet, and transportation.

These families all seemed to be well aligned in wanting the same overall lifestyle. Still, nine families gave examples of how making decisions around sustainability can be a lengthy process, and that family members often need to compromise, rather than individually optimizing their behavior. In some cases, the family's financial situation prevent them from making costly investments in "green" technology like solar panels, even though everyone in the family wants to. As one father (*F8*) explains, his strong desire to live without owning a car and instead relying on bikes has

met strong resistance from his wife who does not want that imposed on her.

"*I do have to balance, I think, my responsibility as a parent to transport my kids places versus my own goals in not driving so much. That's been a real tension for me. If [Wife] weren't in the picture, I would sell our car the next day because I don't feel like we need it, and I don't like having it.*" – Dad/F8

The compromise *F8* has reached is to own a small car, but also rely on bikes, public transport, walking, and sometimes a car-sharing service to address shifting transportation needs in everyday life. Here is another example of how doing something that is considered sustainable is not merely about "doing", but requires everyone on board first:

"*I'm intrigued by the possibility of wood heat, but it would be […] a big upfront expense to get the kind of wood heat that would make most sense for us […] and my husband is not comfortable with that kind of big cash outlay just for the purpose of earth care […] and so that project is on hold until we can figure out a way to do it in a way that makes sense to everybody.*" – Mom/F2

Big life-changing events, such as having a baby, also require making new decisions together. As children grow older, they want to decide, too, which is a natural part of growing up but can create tensions in a family related to living simply. In fact, children's use of ICT caused tension in two of the interviews (*F1* and *F9*), where the parents had set up rules that the children did not agree with. For example, in *F1*, the 4-year-old declared that he plays computer games every day, which turned out to be a lie and led us to discuss the family's deliberate choice of strictly limiting computer-based media in the home. While the preteens/teenagers in *F5* and *F9* wish to have the same mobile devices and consume media as their friends, their parents try to encourage them to resist consumer culture and social pressure. One way to do so is to engage in dialogue with the children about these issues, as well as "*slow things down emotionally, and be a break on getting wrapped up in peer pressure to be, act or behave older*" (Dad/*F5*). However, these parents feel that online media both speed up and increase the amount of influences directed toward children and teenagers, which makes it challenging for them to have such a dialogue.

Research in sustainable HCI has so far largely been focused on individually based approaches, although some recent work [e.g., 5, 11] stresses the need to think about and design for sustainability in a larger social context. This study supports the latter direction by illustrating how making decisions about sustainability and acting sustainably depends on family members, communities, institutions, etc., around us, which is not free from tensions or conflicts. It also shows how living sustainably is not stable – as life changes and we have children, change jobs, move, etc., the external conditions and our needs and priorities change, which re-

quire us to re-think, re-value, and change our practices again with the people around us.

Going against the grain of society

One aspect of sustainability in a broader social context which is particularly challenging for our families – and, by extension, sustainable HCI – is the way in which, just by living simply, these families go against the grain of mainstream American society. Although they strongly believe that their choice of lifestyle makes them happier, raises their quality of life, and is better for the environment, they sometimes struggle with motivating this for others, and sometimes even for themselves. It can be stressful and time-consuming for them to live simply in middle-class America:

"I struggle with [pressure from society], I go back and forth through it ALL THE TIME. Struggling through like… especially now, owning a start-up company and being involved in business, do I look right? Am I wearing the right clothes and you know, that whole- that whole game that gets played, the pressure of it – for me – is the most difficult part [of living simply] and when you have a family, then… you have that pressure times four." – Mom/F5

The quote above illustrates some of the pressures that arise from wanting to stand for simpler, alternative values while living in a society with different social and cultural norms for work, consumption, and how to look. Another mom (*F6*), who is a professor and wants to spend more time at home, explained how her competitive work culture makes it difficult to go against the norm by working part-time. Furthermore, in our society where ICTs are now pervasive, *not* using ICT is also going against the grain. Six families say they would prefer not to use e.g., cell phones, social media like Facebook, or e-mail extensively, but find the cost of not participating high. *F1* and *F3* mentioned they have stopped hearing from friends and extended family because they prefer not to use these technologies for communicating. For children, the cost of not having what their peers have could be even higher.

"It frustrates some of our family, some of our friends, you know, why are you not going on Facebook, why are you not going to do this, so I think that's definitely a cost to relationships when you choose not to participate in the social media or having a cellphone on all the time." – Mom/F1

Living simply in the US requires these families to invest a lot of time, work, and reflection into figuring out almost from scratch how to live simply when infrastructures and support are lacking. In *F4*, for example, the parents manage a start-up biodiesel cooperative on top of having another job and young children. They have been producing biodiesel for their own car for years, and are now trying to build up the infrastructure and legal requirements so that the cooperative can provide the local area with biodiesel. Needless to say, this requires much effort.

Returning to sustainable HCI, there is a risk that by focusing primarily on environmental aspects, we might fail to understand how socio-cultural factors related to going against the grain influence our attempts to live sustainably. For instance, the mother in *F5* buys her clothes at second-hand stores, but worries that this might not give the "right" impression of her as a businesswoman. Taking a more holistic perspective would acknowledge such issues and take seriously how they might impact people's attempts to live sustainably. More broadly, we may ask how and to what degree HCI as a user-centered research field can or should work against the grain of broad segments of our users to support alternative or niche values. This issue is important in, but by no means limited to, sustainable HCI. As reflected in these families' experiences, sustainability issues cross borders to other areas in HCI, such as social media, which so far have not been conceptualized with respect to sustainability.

Consumerism everywhere

A strong underlying theme in this study is the pervasiveness of consumerism in the US. For nine families, being conscious about consumerism and avoiding consuming new goods to the extent possible is a fundamental part of living simply. They believe that excessive consumption does not make them happier and is damaging for the environment. This theme suggests that to see sustainability in a holistic way, HCI also has a responsibility to think about *our* role in consumerism, and what role we *could* have. This is important because as researchers and designers of new digital technologies, we contribute to the continuous change of technologies.

In fact, five families feel that ICTs are challenging for them because consumerism is integrated into how ICTs are designed, the business models they build on, the material status of digital devices, and their short lifecycle. For example, advertisements and commercials are everywhere online, which can be frustrating for adults and problematic when you want to teach children other values. *F1*, *F7* and *F9* explicitly told us how homeschooling helps them to avoid some of the consumerism that children are otherwise exposed to: *"You know, a lot of not having the TV and not having the computer is about not having the commercials, not having them [the two sons] exposed to all that consumerism." – Mom/F1*

So far in sustainable HCI, consumption has mostly been discussed in terms of reducing resource consumption and in terms of re-use, e.g., how ICT designs and artifacts could be designed to have a longer life [e.g., 2, 18, 23] or support second-hand acquisition [25]. However, consuming *goods* is just one concern for our families. They also struggle with how many ICTs are themselves designed based on the idea of the *user as a consumer*, e.g., consuming online content often means being exposed to commercials, while using a web e-mail service might mean giving up privacy for the sake of marketing. This suggests that having a *wider* dis-

cussion about HCI and consumerism beyond specific "non-consumer" applications is crucial to better understand how to design for holistic sustainability.

ICT as a double-edged sword

In this final section of the findings, we summarize the role of ICTs in these families' lives with regards to the previous themes. With the exception of *F8*, who has a positive attitude to ICT, the families overall feel that ICT is a "*double-edged sword*" (Mom/*F7*). By acknowledging that *ICT both hinders and helps* them in living simply, they offer a different perspective on ICT than "bright green" individuals who embrace technologies with optimism [29].

"I definitely am hesitant about some of these ideas that the Internet will save the world. I personally think it's a more fragile technology than it seems like a lot of people think it is because it depends on electricity. You know? Which depends on fuel." – Mom/F7

By definition, ICT should be seen as a part of holistic sustainability. However, the families point out that ICT is just *one* tool among many others in striving for sustainability. Other technologies are equally if not more important to them: chest freezers for storing food; bikes as transportation; rototillers for gardening; library books; and green energy technologies like solar panels. *F1* and *F5* are also concerned about how electronic devices are produced, the mining for minerals that is involved, and what it means for the earth and for the people involved in assembling and recycling these technologies.

Except for *F8*, our families see ICTs as making simple living harder by offering few limits or support for saying "*enough*." They see them as constantly raising standards and expectations, e.g., for how we communicate and work and as distracting from what is more valuable. However, these families do not exclude ICTs completely from their personal and family life, but wish to find a balance in line with their values. Six families feel that ICTs like cellphones, e-mail, and social media are so tightly integrated in society that it is hard to opt out without paying a price in terms of lost friends or opportunities to participate in society. In trying to avoid excessive consumption and teaching their children to resist it, they are also concerned about how ICTs are influencing and influenced by consumerism.

However, while ICTs add complexity, they are also useful for living simply. Valuing strong relationships, these families appreciate how ICTs like voice-over-Internet services enable communication with remote family and friends. *F5-F7* also mentioned bonding over technology within the family, e.g., playing a game together, reading, or learning together online. The families gave several concrete examples of how the Internet has made it easier to gather people locally and globally around sustainability to act together on causes they believe in. Two of the mothers (*F2*, *F4*) who are doing volunteer work in the local community described how they depend on the Internet to reach out to people and

organize e.g., local "*swap meetings*" (*F4*) where people can exchange objects and services. A couple of parents said that even though they do not like Facebook, they use it as a way to spread the word, e.g., about petitions. *F1-3* and *F5* mentioned using Craigslist and other online resources to find second-hand objects locally. Finally, they experience the Internet as an irreplaceable resource for information about things related to sustainability; all the families relied on the Internet to find recipes, DIY projects, gardening advice, etc. The Internet is also invaluable because it offers chances to get social support from likeminded communities – both locally through for instance "*neighborhood listservs*" (*F2-F6*) and globally.

IMPLICATIONS FOR HCI

Each of the themes above describes specific new insights about taking a holistic view on sustainability. Next we step back to review larger implications for HCI. Again, we neither claim that these families have the final answers to solving sustainability, nor that everyone should or could live simply. Instead, we believe that this group, who has thought consciously and at length about what it means to live sustainably holistically, provides a valuable lens to illuminate issues in HCI research and design.

Expanding the lens on what counts as "green"

We have seen how living sustainably for families in this study means being concerned not only about the environment, but also about people's quality of life. While trying to live sustainably, we also need to take care of children, sustain friendships, do our jobs, and participate in society. At its simplest, this underscores again that we need to move beyond individual consumption to understand what it means to live sustainably in families, communities, and organizations [5, 8, 9, 11, 17, 28]. More deeply, we need to recognize that sustainable practices, to be practical, need to fit to individuals', families' and communities' life as a whole. This suggests, for example, that we might broaden evaluation criteria for eco-feedback systems to not only measure how much resource consumption is reduced, but also how sustainable this change is in the wider perspective of a family's life and other practices.

Additionally, we have seen sustainability impacting multiple dimensions of people's lives – e.g., work, family life, education, consumption, health, relations, communication – suggesting that sustainability may be important to consider across many different application areas of HCI. This suggests it would be a missed opportunity to take sustainability as only relevant to the subfield of sustainable HCI. In the long run, we need to make sustainability a priority across HCI. This could mean everything from caring about the conditions under which electronic devices are being produced and taken care of [2,18] to how a wide variety of ICT applications may be hindering and helping us to live more sustainably, perhaps in unexpected ways.

Having enough, being "good enough"

For example, a fundamental aspect of living sustainably in a holistic way is the concept of enough, i.e. being satisfied with enough in terms of *having* (e.g., resources, possessions) and in terms of *being* good enough. The latter captures the need to understand and design for people not as needing to constantly optimize their behavior, but as human beings who try the best they can in their circumstances. In contrast, the digital world has few limitations. The focus in HCI has so far been mostly on removing barriers, seeing benefit as lying in having access everywhere, anytime. There is also an underlying idea that "more is better", with many technologies designed to encourage users to participate, share, and consume more. This makes it harder to say enough, whether it is about searching for information about how to live sustainably, setting limits for availability to others via e.g., e-mail or cellphones, setting limits in participating online in social networks, or consuming electronic devices. One implication is therefore to consider more deeply the concept of *enough* as a design dimension in HCI. Pierce's work on "undesigning" has begun to explore ways that ICT can be designed to limit or completely remove use, behavior, functionality, etc. [24]. How could we consume online media and participate online without relying on the premise that "more is better"? How would an emphasis on determining what is "enough" influence the design of CMC, crowdsourcing, search engines, or online entertainment? We believe that considering this largely unexplored challenge will reveal many opportunities to support sustainability without design being "about" being green.

Supporting people, changing society

Our participants felt that living sustainably in a holistic way means going against US society. In doing so, social support from immediate family and a local like-minded community becomes crucial. This suggests opportunities for HCI to support people in *going against the grain of society together*. For example, this could mean designing ICT that, like Hirsch's digital game for communities to explore stakeholders' interests in a local resource like water [16], creates openings for communities to discuss and explore together what it means to live sustainably in a particular context. It could also mean designing ICT for practical support so that families and communities do not have to start from scratch in terms of *how* to live sustainably. More broadly, it suggests needs for HCI to think carefully about what norms we are designing for, and whether these are, or should be, *for* or *against* the grain of a consumer-oriented society. Should, and if so how could, ICT be designed based on and promoting alternative sustainability-oriented norms?

We also learned how not participating in ICTs because of sustainability could be seen as going against the grain. Several families talked about the costs of not participating or the mixed feelings they have about digital communication technologies such as e-mail, cellphones, and online social networks. How could HCI better support people opting out,

or participating partially? [26] How could networks work without relying on frequent participation? How could an online network foster and allow for both online and offline interactions? Again, such questions push implications of sustainability beyond "being green" towards broader research issues for other areas of HCI.

Seeing the user as a non-consumer

Drawing upon our participants' concerns with ICTs being heavily influenced by and influencing consumer culture, the final implication is to be conscious about how our work in HCI incorporates consumerism, and design systems that do not see the user as a consumer. This is important not only in terms of the direct design of systems, but also our assumptions within the design about the likely market ecosystem in which our applications or ideas will be deployed. In the US, this is largely an advertising-paid model which positions user attention as a product to be sold to advertisers; refocusing design on users as non-consumers therefore requires us to develop new business, policy, or deployment models as part of technology design. Following our participants' concerns when teaching their children to resist consumption, awareness of consumerism as a part of the inherited mindset of HCI would be particularly important in ICT designs targeted at children and in online media. In their "ecocritical" study of virtual games designed explicitly for children to support ecological intelligence and knowledge, Meyers and Bittner [21] found that despite these intentions, the analyzed games relied on a "consumerist logic" and reward system that "*reinforces the link between commerce, acquisition, and social status*". How could we design systems that reward in alternative, sustainable ways, e.g., through learning or by helping others?

CONCLUSION

Our goal in this study of simple living families is to consider the implications of expanding sustainability beyond being "green" to also include considerations of personal quality of life. While simple living as an ecologically oriented lifestyle is neither universal nor universally desirable, considerations raised by simple living *do* provide a valuable lens for reconsidering commitments and opportunities for HCI to support sustainability more holistically. The study suggests opportunities for sustainable HCI specifically, e.g., to expand design and evaluation of sustainable systems to consider their practicality when families juggle many priorities besides being "green." More deeply, the study shows how considerations of holistic sustainability lead to design opportunities for other areas of research in HCI which have systemic implications for sustainability. Design to disseminate on-line media, for example, may be enriched by design considerations that focus around a sense of having "enough," while social networks may derive practical benefit from explicitly designing to support non-participation. Our key take-home message, then, is that HCI researchers concerned about sustainability can, and should, go beyond being "about" being green.

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