Sustainability Begins in the Street:

A Story of Transition Town Totnes

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Abstract—*Recent scholarship in sustainable HCI has called for research beyond change at the individual level. This paper aims to contribute to research on community-level sustainable practices. We report an ethnographic study of the Transition movement, a global social movement encouraging sustainability. We discuss how Transition movement participants in Totnes, UK mobilized community resources, developing a shared moral sense about sustainability, and undertaking positive, collective, community actions. We discuss how sustainable HCI can engage community-level practices.*

Keywords—sustainable HCI; sustainability; community; Information and Communication technology; Transition Town movement; Transition Town Totnes; moral capital

I. INTRODUCTION

Much research in sustainable HCI has considered how to effect behavior change at the individual level [1]–[4] . Recent studies stress sustainability at larger scales [2]–[7], although Pierce et al. observe that "prospects for intervening at other levels [are] unclear, given that the primary disciplinary literature sustainable HCI has drawn on is largely limited to analyzing individual or social behavior" [8]. Our study points to how we as members of the HCI community can engage the community level. We report an ethnographic study of the Transition Town movement, a global social movement in which sustainability is firmly anchored at the community level. As Transition participants say, sustainability "begins in the street." Rob Hopkins, the founder of the movement explains:

> Between the things we can do as individuals and the things that governments and business can do to respond to the challenges of our times, lies a great untapped potential…It's about what you can create with the help of the people who live in your street, your neighbourhood, your town. [What we do] can lead to real impact, to real jobs, and to real transformation of the places we live and beyond. [9]

In the summer of 2013, we traveled to Totnes, UK to study the original Transition Town, one of many in a global network of 1200 Towns. The "Transition Streets" project enabled "street-by-street behavior change" [10], urging participants to "get out on your street, knock on doors, and get six to ten of your neighbours to agree to meet seven times, in each other's houses" [9].

The Transition movement's goal is not, of course, just to get out in the streets, but to address global problems at the community level. Transition Town is concerned with the massive problems of the "highly vulnerable, non-resilient, oil-dependent state in which we live" [11]. The movement espouses bottom-up community strategies to tackle those problems. Hopkins argues that, "If we wait for governments, it'll be too little, too late. If we act as individuals, it'll too little. But if we act as communities, it might be just enough, just in time" [9].

Transition towns are not eco-villages or cooperatives. Residents prefer to stay in their homes in urban or suburban communities, participating in community-led, voluntary activities. Transition members maintain community gardens, learn techniques such as water catchment, work with local governments, find new ways to reduce energy usage, promote activities such as riding bikes and bicycle repair, and build and repair housing for low income families.

Transition Towns promote collective, non-market mechanisms for change. The approach is different from market mechanisms such as financial incentives from utility companies to reduce energy. We use Stokols et al.'s notions of "moral capital," "human capital" and "social capital" to draw attention to how such non-market mechanisms can operate. Moral capital denotes "investment of personal and collective resources toward justice/virtue" [12]. Human capital refers to "capacities of persons, including skills and information." Social capital is "relationships among people that facilitate action" [12]. A community contains various forms of capital. Achieving long-term sustainability depends on effective and strategic mobilization of different types of capital [12]. This framework focuses on the *unity* of the community, rather than seeing community as an entity comprised of subsystems represented by stakeholders with different interests such as a local government, residents, and businesses. The framework emphasizes a common moral sensibility that asserts and defends the common good for all within the community. It assumes that everyone can rely on and contribute to the shared projects that moral imperatives, such as sustainability, promote.

Moral capital is a crucial stimulus to action, yet is often overlooked in research in favor of a focus on human capital and social capital [12]. Moral capital is based on ethical considerations, not membership in a particular social unit that

may exclude non-members. Moral capital speaks to collective norms that have the capacity to "transcend intra-group social ties and inter-group differences" [12]. While all forms of capital are important, the power of a shared vision and imperatives for action enable developments such as "widely shared, consensual guidelines for mobilizing and distributing community resources," and faith in social institutions and processes [12].

II. BACKGROUND

Totnes is a town in Devon, UK with about 8500 residents [13]. Transition Town Totnes ("TT Totnes") serves Totnes, and residents in surrounding parishes. Participants organize projects around a set of themes: Arts, Food, Building, Housing and Energy, Reconomy, Inner Transition, Skillshares, Transportation, Transition Streets, Play, and Education [14] (see Fig.1). For example, TT Totnes's Transition Home project provides sustainable housing for low-income families. An Open Eco-Homes event in 2013 allowed participants to visit households working toward reducing environmental impact. TT Totnes initiated the Independent Coffee Festival, celebrating "the thriving café culture of Totnes" to support independent cafés and restaurants [15].

Fig. 1.   Transition projects shown on bulletin board in TT Totnes office

Although TT Totnes emphasizes community and operates at the local community level, it seeks impact beyond the immediate community, aiming to demonstrate "the culture of a place…best prepared for times of great uncertainty and change" [9]. A project coordinator we interviewed told us:

One of things about the Transition Town Totnes is that it's never just about changing the local community. It's always about trying to provide an example so that other people can use it as well and learn from the example….If we got 20,000 people in this area to reduce their carbon footprint to zero, what difference would it make to climate change? None. But as an example to other people, if other people start copying that, it makes a huge difference. So Transition projects are about taking a look at what is happening, what works, and what other people look at… and that makes much, much bigger differences.

III. METHODS

The first author visited Totnes in July and August 2013. As a participant-observer, she worked as a volunteer, participating in skillshares, fundraisers, project meetings, and Transition Walks. She audio-taped in-depth, semi-structured face to face interviews with 20 TT Totnes participants between the ages of 25 and 74. She observed local practices, and stayed in the home of one of the most active TT Totnes members, Chris Bird (real name used with permission). Bird was the facilitator of the Building, Housing and Energy group. He is the author of the influential book *Local Sustainable Homes: How to Make Them Happen in Your Community* [16]. Study participants included the manager of TT Totnes, project coordinators, and rank-and-file participants. We asked how long they had been participating in the Transition movement, why they chose to participate, and how their activities affected their lives. We collected official handouts and workbooks and took photos of community projects. When we report quotes from documents and interviews, we retain original orthography and punctuation.

IV. FINDINGS

In this section, we describe how TT Totnes participants engaged sustainability at the community level. We report their efforts in mobilizing the community's social, human, and moral capital, allowing them to take action in the face of monumental global change.

A. Community is prior to sustainability

Our first finding is that Transition members felt that sustainability was not even possible without community. "We want to stand together; we don't want to feel alone," said one participant, expressing a sentiment we heard often in the interviews. A strong, cohesive community was inseparable from efforts to achieve sustainability. Transition activities brought neighbors together in close proximity. For example, the Transition Streets project, winner of the UK's Ashden Award for Behaviour Change in 2011, engaged about 500 households. Small groups of neighbors studied and carried out energy-saving actions together, guided by a TT Totnes workbook containing energy-saving suggestions [17]. Neighbors took turns hosting meetings in their homes to learn about, plan, and discuss how to save energy. This intensive activity brought neighbors together for an extended time as each group had at least seven meetings. Although the Transition Streets project awarded grants for installing solar PV to save energy and reduce carbon, in participants' eyes,

getting the grant, saving energy, and reducing carbon turned out to be secondary to the neighborliness the activity generated. One participant told us that he and his friends valued getting to know neighbors the most. Frequent meetings at neighbors' homes had never happened before in his life. Participants talked about energy-saving actions, as well as personal issues such as their families and other life experiences.

One participant explained that neighbors were more reliable and valuable sources of opinions and information than experts or companies:

The really important things for us, and the things we talked about, were things like good neighbors, community, and friends. It wasn't about renewable energy, climate change, peak oil. You know, these things, we mentioned, and we've done these things in the project, but one of the reasons we got involved was to get to know our neighbors and to become a part of our community. These are the most important benefits...We value neighbors' views, opinions, and information...more than we value information from experts, government advisors, or companies who want to sell us their product. We feel that neighbors are more trustworthy.

When the project ended, TT Totnes conducted a survey. "Building good relationships with my neighbors" was the most important benefit of participating in Transition Streets (Fig. 2) [18].

Fig. 2.   Wordle from survey asking participants about the most significant benefit(s) from Transition Streets [18]

Participants told us many stories about the neighborliness that grew from participating in TT Totnes. One said, "We're more inclined to knock on each others' doors and ask for favors now." Another decided to rent a garden with two neighboring households after joining TT Totnes. They worked in the garden together and shared the harvested produce. The first author joined them in picking apples.

Our study participants considered neighborliness a powerful resource for coping with possible future events such as natural disasters and environmental threats. One compared his past life in London and his life in Totnes:

In London, on my street, for 20 years, I didn't know anybody on the street. I knew the man at the corner store, the barber, and the people at the food store, that was it... So

for example, if things [were ever to] get very very bad in London, I would expect, if you don't know your neighbors, and you've got food and they don't, they are gonna come and beat you up and take your food, right? Because you are not friends with them, [there is] no relationship. But here, I think if things get really really bad with climate change, I know everybody on my street. We've all been together in groups. We've all had dinner together. We are all friends. So if something goes wrong, we're not gonna fight. We are gonna say: "How can we work together? What can we do? How can we share our food? I have a little bit of bread, I have some croissants, I have a bag of flour, we are gonna share everything, and work together to make it work." So, social cohesion is very important.

This imagined scenario indicates how serious people were about community, and the way participation in Transition projects enhanced confidence about facing potential challenges. Another participant spoke of "social sustainability" and noted that "social cohesion" was critical to all efforts to attain sustainability. "Creating bonds is very important," she said. "It's about social sustainability."

When we asked what changes the Transition movement had brought, many pointed to improvements in the community's social capital. One participant said that Transition events had fostered an atmosphere of gathering, sharing, and celebrating that helped "build a strong sense of community." This sense of community was a positive achievement she valued a great deal:

I think it's all very positive. I think the whole Transition Town, it provides an outlet, it provides a way for people to really get together and talk to one another...They host different community events. People might have read a book and they hold a book lunch, or things like [that]. So I think that is really important for community life, to have ways for people to come together to talk, to share, and to celebrate... So the fact that they can share what they love, the work they have done, it really helps to build a strong sense of community, of the place you live in, and the people that live there, so I think it's all positive.

Another participant compared Transition Town to other environmental movements she had participated in:

I really feel like Transition Town Totnes is kind of a way for people to come together and meet each other, as a community, really, because they really focus on the entire community. So I have been in communities where they have had environmental groups, but nothing is as inclusive and as far-reaching as Transition Town Totnes. It is a really big thing.

Some researchers have argued that the Transition movement is exclusive, noting that the "core group" in some Towns is composed of mostly white, educated, middle-class people [19], [20]. We observed that project coordinators were primarily white, middle-class people, but that projects did not exclude others' concerns. In fact, our study participants felt TT Totnes served the whole community. For example, TT Totnes' Gardenshare project was aimed at those who lived in public housing projects with no backyards. Local garden

owners shared their gardens with those without gardens. Transition Home's goal was to provide low-cost, low-impact housing for families who could not afford housing on the open market. Many local citizens joined the fundraising activities of the Transition Home project and expressed their intent to apply for the housing. We feel that allegations of exclusivity do not apply in Totnes. We observed many inclusive activities, and an inclusive community spirit everywhere in TT Totnes.

TT Totnes's projects and events helped newcomers fit into the community and develop a sense of community. One participant who had moved from the US to Totnes told us she felt needed by the local community, and that the community was encouraging and welcoming to her:

> Actually I moved to Totnes only two years ago…But having a Transition Town has given me a place to go to as a new person. It really makes me feel like I've got something to give to the community. So it has empowered me to feel like I'm here, I've got something to share, and I can be part of this whole community. I think that's very empowering... Since I've been here, I have made so many friends. It's very nice. Because I go to so many events, I meet people. I have so many friends that I never had before.

B. It's about face to face communication

All of our study participants preferred face-to-face communication to reach out to others in the community. They were skeptical about relying on technology to build and maintain social relationships. The manager of TT Totnes told us that an online discussion forum saw little traffic. Nonetheless, members used technology such as email and the TT Totnes website.

One participant said he did not use technology, except email to organize meetings:

> I use email to organize meetings, and sometimes people send information by email... Physical meetings are the most important, email is just there to support it. Once you meet and spend several hours in someone's house, you feel more free to come to the door and meet people. There is a physical sense.

Another explained why she preferred face to face communication to Facebook:

> I'm really a big big believer in face to face. I don't really use Facebook. I just find Facebook is more about you kind of projecting yourself. When you are face to face, you have a conversation, things really come up. Talking with your neighbors, you end up talking to people you might not necessarily chat to on Facebook or somewhere online, who'll be completely different from you. I think that's really valuable to really interact with people and keep your own perspective broadened.

Most of our study participants said that social media did help their local campaigns have impact beyond the local community. They acknowledged that social media were useful for connections among different Transition towns and some national campaigns. However, overall, they expressed a preference for face to face communication serving local community engagement.

One participant expressed concerns about relying on technology too much. Face to face interactions were more important in bringing people together as a community. He explained that:

> I'm not so sure about relying on technology so much. And the traditional idea of sitting around in the evening and telling stories is very good…It's about being together socially, other than relying on these technologies, on which people are spending a ridiculous amount of time... I see people have social networks online... but people need to actually physically meet and interact… It's clear that there are national campaigns where social media is very useful, has had a positive impact...However, I would caution getting people thinking all the answers lie in technology, or IT, because technology, IT, is great, but it's not physical interactions.

Another participant who actively reached out to other community members asserted the power of physical proximity:

> Trying to persuade people through messages and through the media, that was very useful very early on, but actually, more people get involved by watching you doing things.

The persuasion occurred within the community, such that participants' actions influenced other community members.

C. Feeling supported

A cohesive community supports its members in taking sustainable actions and staying strong emotionally in the face of frightening change. People in the Transition movement are genuinely concerned about climate change and resource depletion. Such prospects are more than a little scary, and having others to turn to for support is critical. A key reason community precedes sustainability is that it is not feasible for most people to continually confront the magnitude of possible futures marked by climate change and resource shortage if they feel alone. One participant told us:

> It can be quite disheartening when you look at what's happening in the world, and little is happening to put things right. But when you are working with other people and doing things that are positive, that stops you from getting depressed. It would be quite easy to just be worried and thinking about negative things…The psychological support you get from being part of a group of people is very important.

Being surrounded by like-minded people brings emotional courage. One participant explained that:

> Climate change is getting worse. We're using more and more fossil oil rather than less. The distribution of wealth is getting worse. The economic situation is declining all the time. If you are just sitting around receiving all these things, that can be quite depressing. If you try to do something about it on your own, it can seem like an impossible task, and never to be. I think also you will not achieve very much. But if you are able to do some positive things, even decide to make a quite small change, you can

both start to tackle the problem and feel that you are surrounded by and working with people of like minds. Instead of being depressed, you will feel happy and inspired.

As we contemplate why it seems so difficult for the ordinary person to take appropriate action in the face of the global realities science has documented for decades, perhaps the words of these TT Totnes participants can help us make sense of our own fears. As traditional communities have given way in modernity to increasingly atomized individuals ("dividuals" as Deleuze called them [21]), staring down ruinous futures requires the aid and comfort of a community. Social and moral capital come together in relations of mutual reinforcement—the moral imperative of acting responsibly in our current conditions is made possible by connections forged through social bonds. A supportive environment within a community can facilitate positive change. One of our participants told us how the sustainable actions of people in his community encouraged him to change his own lifestyle:

I used to just jump in the car to go somewhere. I was used to being able to just turn the lights on or turn the heating on. When you think no one [else] is changing, it's psychologically very challenging [to change]. If you feel a lot of people are also making changes, it's much easier... It's really nice to be in a community where lots of other people [are making changes] as well.

The futility of acting alone is countered by collective, shared commitments to sustainable action. Again, community is prior to sustainability, providing a necessary condition for sustainability. The moral choice to not "jump in the car" is sustained by knowing the action makes a difference in a context in which others are making similar choices.

D. Community is a treasury of sustainable knowledge and skills

TT Totnes participants emphasized the importance of enhancing human capital by increasing sustainability-related knowledge and skills. They planned and carried out a variety of activities in which they could learn from each other.

In the Skillshares project, participants focused on the Transition concept of "reskilling," i.e., helping people learn practical skills that everyone used to know such as growing food and repairing clothing. One participant said:

It's useful... for everybody to have some practical skills: growing food, looking after the soil, composting, reusing waste and recognizing how we can reduce waste. It's good to have some practical skills around building and repairing things so that we don't throw something away when it stops working. We can repair it.

Skillshares were free sessions offered as "a gift to increase the community's resilience" (Fig. 3). Skills included keeping chickens, upgrading old computers, repairing bicycles, baking bread, and foraging for wild food such as rose hips and birch sap. People even shared "skills" such as "laughing for no reason"—a way to enhance wellbeing!

People shared knowledge about the process of upcycling, a form of recycling that converts waste materials into new products [22]. Figure 4 shows materials a Totnes artist collected which she recycled into her artwork. Upcycling is the opposite of downcycling, a process that "converts materials and products into new materials of lesser quality" [23].

People acknowledged the need for learning and sharing skills. They realized that without basic skills, individuals and communities would be vulnerable if conditions worsened. One participant said:

In the First World, we are so far away from our basic skills. If things go wrong, we'll really have difficulties. I mean, we don't know how to grow food, we don't know how to do pastry. I think compared to Cuba or the Third World, although they are much poorer, when things get difficult, they'll be actually in a better position... If things go wrong, they haven't got so far to fall. They are actually used to kind of surviving. We don't know how to survive any more. We gotta relearn those skills. Skillshares is about that...Let's not say survival, let's say sustainability.

Fig. 3. The Skillshares schedule poster from April to June, 2013

Fig. 4. A Totnes artist collected discarded materials, upcyling them to artworks

Our study participants acknowledged the importance of local knowledge and skills. One said:

One of the principles of Transition is to honor the elders, because it's a recognition that older people have knowledge and skills that younger people want...Very often they would be local in this area. So people who have been growing tomatoes in Devon for fifty years or sixty years, will have some knowledge that other people can learn from that's relevant to this area. So honoring the elders is one important principle.

Members of TT Totnes enjoyed participating in Skillshares. One said:

I have had gardens before, and allotments, so I had some knowledge of growing things, but I've learnt a lot more since I've been living here, since there are a lot of Skillshares activities. You know, Skillshares run hundreds of sessions for people, so there are lots of opportunities.

Another noted that Skillshares made learning easier than with books:

By providing people to do training for Skillshares, it makes it that much easier to have someone help you rather than learning to do it from a book.

Another participant agreed, and emphasized the importance of observing someone performing a skill:

I think many skills used to be very very common, for example, fermenting vegetables and doing sourdough. Actually, they are very easy. I think it just helps to have someone just show you how to do it. It's much easier... than trying to read a book and learn how to do it by yourself.

The treasury of skills supporting human capital flowed from the social capital of sharing and learning collectively. We observed excitement, inspiration, and empowerment in Skillshares sessions. One participant used Skillshares skills for DIY projects and energy-saving home alterations. In a follow-up interview in October, she told us:

Transition Town Totnes hosted an eco-home weekend. We opened our house. You've been in our house. Most of the houses here [have] ground source heat pumps, or fancy windows. You know our house doesn't have much of that, but we have kind of tried to do things that we can do ourselves. We lifted the floor boards and put insulation down. Actually I went to a sewing Skillshares and got help on how to make curtains. I also went to another draft-proofing Skillshares to put little strips around windows to stop drafts from coming in. So even though [that] was the smallest little thing you can do to make your house eco, people still came and were really really kind and supportive about the types of things we have done. It's nice to see what one can do oneself. So yeah, I felt very supported. And of course I have been in many types of Skillshares, and people are very very positive and happy. This makes me want to go, do things, make things happen.

It was remarkable how many times we heard the word "happy" in connection with TT Totnes activities. Participants drew energy and excitement from one another. The experience of working toward sustainability developed into much more than sustainability—it became a blissful experience of what Durkheim called "collective effervescence" when people feel joyously connected to one another [24]. Although motivated by grim projections of future decline, the empowerment of learning how to "make things happen," and the strong feelings of social and moral connection left people feeling "positive" and "happy."

E. A community-based moral sense

TT Totnes participants recognized that commitment to sustainable action originates from shared morality. One of our participants said, "All Transition is trying to do is try to get people think more."

Another told us:

I would say I have ethical, moral values. I'm not sure whether they are beliefs or not...Many humans are suffering because of environmental problems and because of greed. I think greed is a very big part of the problem. There are people who have so much money, they can never spend it in their life time, but they are still fighting to get more, and other people, they have nothing, and they are fighting to survive. We can afford the poor people. We can afford them a roof; we can afford them food, water, no problem. For me, I think we can't afford the rich people, because the rich people are greedy, they want too much. So in my life, I'm doing whatever I can to make sure I'm using resources that are local as possible...so that there are some left for other people. So when I go shopping, I never take plastic bags, I take bags with me, I reuse them…But we have this crazy, greedy society, where money has become the ultimate value. And money is imaginary. It's not even real.

Such moral perspectives spurred action. Participants distributed handouts, stickers, sloganed T-shirts, and maps of

local independent stores to share their ideas on the importance of sustainability. Some food markets used product labels to indicate that food was local-sourced. Some used stickers to show that they accepted Totnes Pounds, the local currency issued by TT Totnes to encourage local shopping (Fig. 5). Some members produced the *Transition Free Press*, a newspaper with stories about various neighborhoods (not just Totnes) that were engaged in collective sustainable actions. Some collected historical photos of Totnes, and invited older people to talk about what Totnes was like in the past, and how the older generation managed to be self-reliant. These stories wove together past and future through vivid accounts of community members' own remembrances.

Fig. 5. A local store's stickers on the window

People discussed the deeper meanings of Skillshares activities, expressing an underlying moral sense about sustainability. One told us:

It's about relationships with people and with environment. I think it's very important. A lot of Skillshares, you know, if you look at them, they tend to be about food, health, or...a lot of gardening, very much about environment. There's a kind of trinity of people, place, and environment.

This participant invoked a "trinity" of the fundamental unity of "people, place, and environment." While Skillshares was ostensibly about practical everyday skills, this participant felt that the activity carried deeper existential meanings, and strengthened the values of caring for the community and the environment.

Fig. 6. Map of independent local cafés, restaurants, and pubs; handouts for a campaign to convert an old dairy; and the *Transition Free Press*

Another explained how a beekeeper's skill sharing on the bees' behalf shifted her thinking about the relationship between people, other creatures, and the environment:

A [beekeeper] who lives locally... is really teaching people about beekeeping. His focus is much more on bees rather than the beekeeper getting the honey. The beekeeper, in this case, is keeping the bees for what the bees are able to do for the environment. If you are lucky, there may be some honey left over. But really, it's more about doing for the bees. It's really shifting the way we interact with other creatures and with our environment.

All of our study participants believed that a community-based moral sense of sustainability should start from a positive perspective, instead of blaming or criticizing non-sustainable thoughts and behaviors. One gave the "NotoCosta" campaign as an example. In 2012, the campaign forced Costa Coffee to withdraw plans to open a store in Totnes. One person told us:

When we did the campaign against Costa, it was important to not start with, "We don't want Costa here, Costa is a bad thing." It was, "We got a lot independent cafe shops here, let's have a café festival, let's vote for which ones we think are the best ones. Let's have a competition"... It would be a shame if some of these places closed down because Costa opened...So you start with some positive things...You can enclose things within positive messages.

Although often cost savings are often offered as an incentive to sustainable behaviors, our study participants had concerns about such incentives, which they thought might eventually end in unsustainable actions. They thought caring for the community should be emphasized as a way to ensure long-term engagement in and commitment to sustainability. For example, one participant who had worked on many Transition projects explained:

If you want to incentivize people, using money to give people incentives to get renewable energy, you are increasing the value they have around money, and being thrifty, which means they may then say: "I'm a thrifty person who saves money, I would not take a train to France. I would fly, because it's cheaper." You have to be careful which value you incentivize. So it's very important to incentivize people around issues such as caring for the environment, doing good things for their community. Because it's easier to see your community than it is to see global warming or climate change. For instance, people are investing in shares from local a renewable energy company, TRESOC, which is a community owned company. That can increase the benefits to our community.

TRESOC is the acronym for the Totnes Renewable Energy Society. TRESOC's purpose is to ensure the profitable development of renewable energy for the benefit of the local community [13]. It raised over £230,000 for hydro and solar projects in 2014 [25].

Our study participants believed that everyone possesses some values about sustainability in some degree and some way. One explained:

Everyone has values, and it's about strengthening the values good for us all, and weakening the values harmful for us. You know, even someone who is very concerned with power, money, wealth, and status, we all have some values around the environment in some way: animals, biodiversity, fairness for people. We all have them, but they may be very weak. So how can you strengthen these values? It's not that you have to put them there. They are already there.

Such optimistic attitudes were characteristic of TT Totnes participants, encouraging them to continue to reach out to the wider community, and to persist in their own sustainable actions.

V. DISCUSSION

Stokols et al.'s framework of social, human, and moral capitals provides a holistic perspective useful for sustainable HCI. Mobilization of material resources has been a common theme in sustainable HCI [1]. For example, typical projects are eco-feedback systems that encourage individual behavior change by providing energy consumption information [26]– [28], and systems that help individuals manage electronic waste [29]–[31]. Our study suggests that we go beyond urging people to adjust simple material practices, to engaging sustainability at the community level where a powerful fusion of social, human, and moral capitals can be deployed to drive sustainability. As one study participant said:

It's all about relying on one another within the community, on skills we have, and resources we can share, so that we don't have to do everything and create everything for ourselves, and rely only on material resources, but have social resources or the ability to share material resources with other people. It's really important to sustainability.

Physical proximity and face to face interaction were important means of mobilizing local social capital in Totnes. The continuing significance of physical proximity and face to face interactions raises a question for social media and other ICTs: How do we go beyond conventional social media and other ICTs to shape media and ICT systems that will be truly civic? One answer is to consider the particular activities of importance in a social movement such as Transition Town, and design for those activities, such as the various Skillshares, or the collection of the knowledge of residents (which could be used to create mixed media "scrapbooks" rather than just simple blogs or databases), and support for rich face to face encounters and social gatherings. For example, TT Totnes's Food-hub project mobilizes local food resources and create opportunities for community members to have face to face interactions. As the coordinator said, "It [is] bigger than just a food hub…[The project] fosters a community sphere." The project had a successful trial, combining an online local food ordering platform and a physical collection point where community members obtain their orders. They join social gatherings where they talk and cook together. The ICT platform and the physical place *together* foster opportunities for the social interactions that promote sustainability.

There will be no sustainability without greater potential for citizens to take control of their own lives and environment. But local citizen-based knowledge and understanding are often excluded from sustainable HCI design. Brynjarsdóttir et al. [3], [32] argued that most sustainable HCI research adopts a modernist approach that places trust and agency in top-down, expert knowledge. Designers are given responsibility to decide what constitutes desirable behavior, and how to accomplish behavior change. Brynjarsdóttir et al. warned that this approach tends to "abstract away from the details on the ground" and "deal poorly with socio-cultural particularities" [3]. Our study shows that an alternative approach rooted in local conditions—taking account of local farming practices and species of wild plants, for example—can be productive and generative at community scale.

TT Totnes participants were an active force, both as designers and owners of their community. They came together to envision and explore their community's sustainable future. They were not passive recipients of aid from experts. They utilized their skills and knowledge to contribute to community sustainability. The mobilization of social capital facilitated peer learning and personal growth. Scaffolded by a supportive community, TT Totnes participants trusted one another's knowledge and wisdom, valued their collective competence, and learned from each other. Their knowledge sharing practices are consistent with Baumer and Silberman's argument [33] that knowledge sharing "may have the additional benefit of creating a community of those involved" and may lead to "civic action toward environmental ends." There is a need to reconstruct our research practices to acknowledge the richness of local knowledge, practice, and understanding.

Baumer and Silberman argued that sustainable HCI does not always have to come up with innovative technological solutions or novel computational devices [33]. It can help people regain old but useful skills and knowledge. Håkansson

and Sengers showed that organic farm families re-adopted old technologies from the early 1900s. They suggested that sustainable HCI design "may also be about rekindling interest in past technologies" [34]. In Totnes, "the old" was primarily skills and knowledge rather than technological artifacts. TT Totnes participants resurrected skills and knowledge that most people had in the past, such as repairing bicycles and keeping chickens.

Monetary incentives such as reducing energy bills are often used in sustainable HCI design to encourage sustainable behaviors [7]. However, Massung et al. [35] suggested that while monetary incentives may motivate users in the short term, they are not likely to ensure participants' willingness to engage in sustainable actions in the long run. Our participants were concerned that monetary incentives were likely to backfire, reinforcing pecuniary values, and neglecting robust, long-term moral values.

A typical strategy is to use competition and social comparison to motivate sustainable behaviors. For example, some systems rank users' energy consumption [36]. The competition and social comparison mechanism "satisfies an individual's need for social status through competition, motivates through peer pressure, and taps the unconscious human striving to comply with the actions of like-minded individuals" [36]. Many studies have shown that competition and comparison are effective at the individual level [37]–[42]. However, they do not draw on the spirit of everyone working together in a community, instead pitting one individual against another. Engaging community-level sustainable practices requires sustainable HCI to encourage strategic collaboration between community members.

Sustainable HCI has largely focused on a theme of *less*: less energy consumption, less waste, less obsolescence. TT Totnes shows that we can also focus on a generative, positive theme of *more*: more community, more shared activity, more moral capital, more neighborliness, more empowerment, and more happiness. Indeed, we believe that these "mores" may be imperative to real changes in sustainable behavior. Change is difficult at the best of times, and confronting global change can be daunting. Studies show that people who feel helpless, who feel that their behavior will not make a difference, are less likely to engage in sustainable actions, even if issues of sustainability are of concern to them [43]. TT Totnes offered celebration, excitement, joyfulness, and mutual empowerment. A moral sense of sustainability, a sense that ordinary people can indeed make a difference, was grounded in positive, collective, community interactions—with an emphasis on more social good and more well-being for all. How to design technology to foster the "mores" is a genuine challenge we should address in sustainable HCI. One possible way to foster the "mores," is to "enclose things within positive messages," as one of our study participants said. For instance, as the "NotoCosta" campaign showed, TT Totnes participants did not frame shopping locally as a sacrifice imposing limits on merchandise selection, but emphasized the many benefits of local shopping. Such messages, and their associated community level activities, can portray bright sustainable futures, and the benefits of sustainability for all. There are rich opportunities for sustainable HCI to foster the "mores." Some

researchers have already addressed possibilities such as local food bartering and time banking [44]–[46]. Pierce and Paulos envisioned that, "In the future, individuals and groups may not simply acquire and use energy, but additionally may be actively involved in distributing and sharing energy." Homes equipped with solar or wind generators can sell power back to the electrical grid when they generate surplus [47]. Totnes's ongoing TRESOC project aims to empower the local community to develop and democratically control renewable energy supplies. It encourages Totnes residents to invest in the project and buy shares of profits.

VI. CONCLUSION

We reported an ethnographic study of Transition Town Totnes, showing how community level sustainable actions began "in the streets." Participants formulated moral values at global scale regarding protecting our planet and protecting future generations, but they emphasized that caring for the local community is essential to ensuring lasting commitments to sustainability. Community was the core concept of sustainability in Totnes, and provided the groundwork for action. We showed how participants mobilized social, human, and moral capitals, and how these capitals mutually reinforced one another in empowering participants to address the monumental tasks of global change. We proposed implications for sustainable HCI to support community-level sustainable practices. Sustainability can begin "in the street," originating from people's interactions with one another, from feelings of communal happiness, and a shared moral sense of caring for the local community. Sustainable HCI can support such sustainable practices by directing more attention to the specific ways communities work together toward sustainability.

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