Co-Creating "Smart" Sustainable Food Futures with Urban Food Growers

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ABSTRACT

The futuristic visions, infrastructures, and developments of smart cities continue to gather pace, with municipal authorities and businesses in the UK investing increasing amounts of resources into their manifestation. At the same time local communities continue to be hard hit by austerity, with more local services being affected by government cuts, with the North-East of England being particularly affected. In this paper we report on a case study that aimed to explore how the top-down, technocentric, and corporate visions of smart cities stand in contrast to the reality of grassroots communities who are dealing with the consequences of austerity. Our case study focuses on a community of urban food growers. We describe our speculative and participatory approach that we devised for co-designing "smart" urban food-growing futures from the bottom-up with local residents in a deprived neighbourhood of Newcastle upon Tyne, and reflect on how they elicited realities and future visions that stand as a counterpoint to the corporate visions of future cities.

CCS CONCEPTS

• Human-centered computing • Human computer interaction (HCI) • **HCI design and evaluation methods**

KEYWORDS

Smart Cities, Urban Agriculture, Food, Futures, Sustainability, Speculative Participatory Design

1 INTRODUCTION

The top-down neoliberal visions of smart cities from corporate and government often employ embedded networked sensing, cloud computing, and automation to optimise urban processes. In such imaginaries citizens are presented as subaltern [14], or non-existent. The problem of sustainability is approached as a simple matter of increasing efficiency and productivity, leaving little room for citizen participation. Furthermore, while there are increasing efforts to involve citizens in the design of smart cities' services, there remain significant questions over who controls, owns, and has access to the data, and how legislation is addressing these challenges. Civic-minded researchers working with technology have started to challenge such visions and work with urban communities to co-create alternative imaginaries of what a smart city could be from the bottom-up [2,8,10].

We build on this work by reporting on a case study exploring citizen perspectives on 'smartness' in relation to urban food growing. We do so in the context of a northern UK inner-city neighbourhood navigating complex and diverse growing histories and futures. We could have taken a general "smart city" focus for our case study but we chose to focus instead on the specific angle of food growing in urban spaces for the following reasons. Firstly, to challenge top-down, broad-brush perspectives, through a citizen perspective on the future that was rooted in, and reflected, the lived experience and practices of those citizens. The future is already an abstract concept that can be difficult to creatively imagine in concrete ways, so by constraining it to a particular community practice, we hoped to elicit "futures" that were grounded in experiences of everyday life. Secondly, we thought that the material nature of food growing (as opposed to with e.g., energy, transport, or connectivity) and the tangible relationship between the physical landscape, citizen practices, and the sustenance of life, would be beneficial to this aim. Thirdly, food, like urban life, is highly social, cultural, and political in nature. The topic of food therefore provides a good opportunity to give these concerns due consideration in understanding and negotiating citizen perspectives on the future sustainable "smart city". This is particularly relevant against a backdrop of growing concerns around food security, the squeeze of austerity on city services, and a looming Brexit. In this paper, we report on early insights of how effective our approach was in fulfilling these aims.

We developed an approach, called speculative participatory design, which brought together speculative and participatory approaches (and which we had started to develop in [6,10]) to facilitate dialogues between citizens and a small business (SME) stakeholder. Our aims were to think expansively about future smart cities beyond corporate visions, find ways of introducing new technologies to citizens that may not be very tech-savvy, gain capacity, share knowledge and skills, build community, and engage with complex sustainability issues in future imaginings. Building on growing bodies of work within PD and HCI that seek to involve people in speculative design, grounded in life experiences and local imaginings [3,6,9,11], our aim was not to push particular sustainability or technology agendas. Rather our aim was to stimulate critical exploration in participant-led discussions by introducing technological possibilities and consequences of alternative practices for environmental sustainability. We were also interested to see how ideas from our approach could gain traction with the community, as well as with the small business partner. We offer initial insights into how our approach surfaced both new design imaginaries and everyday

concerns that contrast sharply with the dominant top-down smart city visions of increased efficiency and productivity. We highlight the practical challenges of negotiating between the tangible real and the intangible speculative, and we propose that the tensions between these can offer a useful space for ideation on food growing.

2 THE CONTEXT: COMMUNITY GROWING

The geographical area we worked with sits on the outskirts of Newcastle upon Tyne city centre in the north of England. Residents experience a number of challenges associated with social and economic deprivation, poor health, also transitory student and migrant populations. Alongside this there is a rich history of diverse cultural and food heritage, accompanied by high density living, poor waste management facilities, a limited growing season due to its northerly location attracting Baltic weather systems, and limited food growing spaces. For instance, certain members of the neighbourhood were still involved in ongoing action contesting the recent removal of allotments by the local council and land-owners. Many other members of the community were also involved in regular co-ordinated volunteering activities to remove litter, tidy local green spaces, and tend community orchards in response to local government funding cuts associated with austerity measures.

We were initially invited to scope ideas with a local small enterprise (SME), Vertical Veg, on ways of engaging the wider community in the future of food growing. We then also approached a community interest company (CIC) Greening Wingrove to further develop research ideas and align areas of interests and concerns. The Greening Wingrove CIC had emerged from a 5-year funded programme of community capacity building on sustainability action within the local area. When our research team became involved in January 2018, the funding was coming to an end. Vertical Veg had been a successful part of the Greening Wingrove initiative running regular 'street meets', growing sessions on pedestrianised streets of terraced houses, to share seeds, ideas, food growing resources and advice. The scheme had introduced over 500 people to food growing in small concrete urban spaces, and now engaged a wider online community with regular social media discussion and information exchange. With funding diminishing, Vertical Veg was seeking ways to sustain and extend its activities in the near future.

As researchers we held different positions and relationships to people within the neighbourhood and in relation to the research inquiry. Collectively we had prior research experience and interests in community agriculture, smart cities, sustainable HCI, sustainability, interaction design, grassroots innovation, participatory design, and future speculative visions for community food growing. Rachel was also a resident in the area where the study took place.

2 APPROACH: WHAT WE DID

The study took place between March – June 2018, and involved a series of four workshops in and around a community centre and garden, located in a local park within the neighbourhood. We developed the workshop activities as a way of engaging grassroots food growing communities in the co-design of sustainable urban futures, through experimentation and creative exploration.

Figure 1: Mark running training on wormeries

We sought an alternative approach to facilitating future thinking, to counter the unsustainable nature of the current food system, the socio-economic situation and facilitate the co-design of future visions. Our exploration led us to develop a situated participatory and speculative approach by employing fictional scenarios to integrate citizen perspectives with material and future imaginaries. Rather than focusing on a particular need or problem, such as reducing pollution or increasing crop yield through the use of smart technology, we were interested in exploring with citizens the important values in their current and future (e.g. outside of the current economic climate) community food practices. We designed the activities to elicit values, aspirations, and challenges to food growing in the area, and to use creative, speculative and participatory methods to explore possible "smart" food futures and the related technologies.

Participants were recruited using word of mouth invites, and posters put up in the neighbourhood and the community centre, to attend a skill sharing session followed by a creative workshop. The sessions were scheduled in the middle of the day and were designed as drop-ins so that people could come and leave. Each session lasted between 3-4 hours. The skill sharing introductions to the sessions, a free lunch, and free seeds for growing in the season acted as attractions for people to attend the workshops.

We partnered with Mark Ridsdill Smith, the founder of Vertical Veg, for facilitating the skill sharing sessions. Vertical Veg is an organisation dedicated to supporting people to grow food in small spaces. Mark helped us with recruitment, and joined in the activities both as a participant and a trainer. For example, he facilitated short sessions on "planning your garden", which touched on different vegetables and herbs that can be grown in specific months and climates, and on "home composting and wormeries".

The activities for each workshop were developed according to insights from previous sessions and used different activities e.g. mapping, walking, playing, and making as ways to instigate creative processes, discussions and reflection. With permission from participants we audio and video recorded each of the sessions, and photographed visual materials (e.g. drawings and notes). We later interviewed Mark to understand the value of

these approaches to his work. Audio data was verbatim transcribed and video data was annotated where speculative future thinking and interactions took place. We openly coded the corpus of data after each session and fed our insights into designing the activities for the following workshops.

Over the workshop series we worked with 12 different community members interested in urban food growing. Each workshop brought together between 4-8 participants. 3 of them attended every session and others dropped in to those sessions they expressed the most interest in, particularly around sessions for practical growing skills. The majority of attendees came from the local neighbourhood, and identified as English, Polish, Swedish, or Mexican. We had equal numbers of participation from women and men between the ages of 25-70, and most had been involved in the Vertical Veg and Greening Wingrove scheme over the past 5 years. Many of the residents lived in rows of terraced housing with small concrete backyards and limited front garden space. Many attendees highlighted ongoing challenges of limited growing space, wider engagement, and access to limited financial resources and time within the community as a key aspect of their food growing practice. We also attended 6 additional community events specifically organised by Vertical Veg and Greening Wingrove beyond the design workshops (e.g., a tree pruning session, a film night, a discussion on volunteering and funding, and a celebration of the year's produce) to understand more of the informal community dynamics around growing. These events attracted a much more culturally and ethnically diverse group of people such as teenagers and families, and those identifying with e.g., Pakistani, Indian, Bangladeshi, and Nigerian heritage.

2.1 Workshop 1: Participatory Mapping

Eight participants took part in the first workshop. We drew on traditions of participatory mapping from action research [7] asking participants to map their existing and future gardens, and other growing spaces in the area, onto a large rough map of the neighbourhood, which we prepared in advance by drawing the main geographical boundaries and landmarks on a large piece of blank paper. Within the mapping exercise we were looking to capture individual and community understanding of food growing, and issues around participation and belonging in the area. We asked people to populate the map by writing or drawing on the provided cards with prompts such as "How do people share food in the area?", "What food would you like to grow in the future?" "Draw your garden and where it is located?" and "Draw your future garden". We provided a large selection of arts and crafts materials that participants could use to complete the tasks. The exercise encouraged the participants to draw, paste, build and convert the map into a layered artefact of histories and future trajectories for the area under discussion.

Figure 2: Drawing of a future garden (left), and participants populating the neighbourhood map (right) with cards.

2.2 Workshop 2: Walking the neighbourhood

Figure 3: Walking through back lanes and streets

Seven participants took part in the second workshop. We took the group of participants for a short walk around the neighbourhood, looking for existing signs of food growing, but also trying to imagine where and how food could be grown in the future city. The research team scripted future scenarios for discussion based on the outcomes of the first workshop and desk research on the theme of "community food growing", and current news and technology trends. We stopped at different places to discuss the possible future scenarios, visualizing and envisioning the space through the lens of the scenario that could impact on ways that food could be grown and shared, and we questioned the role of technology in these new ways of "doing" sustainable food. The fictional scenarios were a mix of positive and negative instances, such as "Can you imagine if the neighbourhood won an award from 'Grow Your Own' Magazine for best innovative 'green' food growing community? How do you think this could be achieved?", and "Can you imagine if the government introduces high taxes on meat and dairy to mitigate harmful effects of climate change? It could mean higher demand for fruit and vegetables and prices for these go up. How do you think you and your community could respond?" This activity was inspired by the idea of a walking interview around edible cities [13]. It also, grew out of reflections from the first workshop as a way to situate the speculation of the future of food growing in the neighbourhood by creating an embodied immersion within it.

2.3 Workshop 3: "The Game"

Building on the first two workshops, we decided to use participants' reflections on value systems, fears and problems faced within the community to develop a board game as a way of facilitating more creative and playful speculation about the future [5]. The game involved a series of lands, based on future scenarios that we had discussed in the previous workshops, for example, *Land of Brexit, Land of Climate Change, Land of Biodiversity, Land of Robots*, and were a mix of utopias and dystopias. The

participants rolled a dice and moved across the board crossing various lands and discussing visions of future food growing within these lands. The players also had to select a card from a deck that we designed to represent constraints on or opportunities for the future. These visions gave rise to discussions of suggested future scenarios, their probability and impacts. Key discussion points were captured on the board through post-it notes. Six participants took part in Workshop 3.

Figure 4: Board game design (left), participants playing the game (right), designed deck of opportunity or problem cards depicted by insects and animals related to food growing (below)

2.4 Workshop 4: Worldbuilding

Figure 5: Making food growing futures on a new planet

In the first three workshops we reflected that participants had found it a challenge to think expansively beyond their known, and often hard, reality of urban food growing. So, for the last workshop we sought ways to overcome these challenges by using a variety of materials, a fictional scenario, and a world-building task. The four participants were presented with a letter that described a fictional invitation for their community to inhabit a planet in a parallel universe and build an alternative food future. Participants were then asked to use craft, natural and man-made materials to build this new land in 3D. The exercise gave them the opportunity to start afresh and build a desirable imagined future. Different key words based on the community's values collected in previous workshops were also provided to the participants. To help them in imaging the land they were building, these key words later became indicators to describe the land they had built.

3. INITIAL FINDINGS

Here, we present the results from an initial analysis of the data from the workshops, reflections on the different approaches taken, and how they facilitated or undermined alternative visions of smart cities. We draw together insights on our approaches in detailing challenges in imagining futures, keeping potential futures open, and building on diverse embodied expertise.

Imagining positive futures is hard when the present sucks

Imagining positive futures was challenging for many participants. Against the backdrop of Brexit, incompetent government officials, funding cuts, loss of growing space (two allotment sites had been recently cleared, without replacement, by the local authority), and perceived "social tensions" (e.g. "*somebody moving in to this area might not have those [community] values, might just think I can [take the vegetables] therefore I will*" (P1)). Participants often expressed pessimism about the future. For example, with the board game, while we included a mix of utopian and dystopian scenarios, the dystopian ones generated the most discussion and seemed to be much easier for participants to engage with. As well as this, negative perspectives and experiences within the community were drawn upon to close down utopian proposals by demonstrating why they might be unrealistic or infeasible.

During the walk, when we prompted discussions by introducing fictional scenarios on winning a national prize for intergenerational food growing and working in alternative spaces with new technologies, participants tended to focus on the challenges associated with new ideas rather than opportunities to make change. Theft, crime, and anti-social behaviour were consistently quoted, as were the destructive powers and lack of support from local government. "*There used to be a lot more of [intergenerational skill-sharing] when there was community funding to send people into schools to do green things. And now I think if the schools have to do it themselves, they're just relying on everybody to be voluntary and nobody has the time*" (P1). While social media was discussed as a positive facilitator for future food-sharing scenarios, the importance of meeting face-to-face was described as being further hindered by the reality of funding cuts: "*unfortunately a lot of the funding has now been drained out of communal buildings. So they no longer exist*" (P1).

For many participants it therefore seemed difficult (or perhaps of no use) to imagine a better future when they were so immersed in a challenging present. For example, during the walk, when discussing quite a radical scenario for repurposing the back lanes to grow community food, P2 expressed how she had wanted to put a planter in the lane. "*The problem is you get people fly tipping. So would they dump rubbish into your planter? Would they destroy it?*" (P2). There were planters on the street, but they were overgrown and people filled them with litter. As P1 said, "*there's no budget for maintenance. Now it's completely voluntary. You spend more time emptying rubbish out of them, including stuff you don't want to touch, before you can do any maintenance at all*", while P2 continued, "*would you want to eat food from a dumping ground, could it be contaminated*?" (P2). Other participants also highlighted how food growing raises issues of power and vulnerability associated with land use and ownership "*if somebody takes the space away then you've got nothing left. You're forced to go begging literally for your food to elsewhere*" (P1).

Group dynamics in opening or closing potential futures

As facilitators, we tried to open up the conversation towards possible creative approaches to the future, but this was often met with resistance, and group dynamics seemed to play a role in taking the conversation in more conservative directions. While it was important to respect the challenging realities of neighbourhood experiences, it was noticeable that a small group

of participants who knew each other well tended to dominate the conversations and steer them towards negative futures, especially when in larger group discussions. For example, in the board game, some participants suggested running celebratory community events about food (for example, like a harvest festival), drawing on their experiences of other cultures, to bring people together to tackle some of the challenges they faced in the community. But the discussion quickly turned to the amount of people in the community who didn't have the same values and would therefore always take more than they should: "*It's human nature, unfortunately"* (P1). This negativity about the future contrasts sharply to the shiny optimism of neoliberal smart city visions.

As the "expert" grower, Mark had a positive presence in this dynamic, acting as a bridge between researchers and the participants. He was often the first to be able to come up with creative alternatives, inspiring others to riff off his ideas and come up with increments or new ideas, with the research team. Also, asking questions and finding exemplar projects to introduce to the discussion. For example, during the second walking workshop, we asked participants to imagine a redesign of the back lanes (which are typically a contested space, for parked cars and large communal waste bins). While participants struggled initially to imagine any potential redesign, Mark offered the idea of turning them into a massive growing space covered by polytunnel, painting the walls white to reflect the light and keep the heat in. This was a turning point, initially the response was *"you can't do that"*, because of the bins that filled the lanes but then participants were able to add to this vision, with a suggestion arising for a communal composter. Other things emerging from these ideas included polytunnels connected to heating vents from buildings (e.g. on rooftops, and from swimming pools and shopping centres) as a way of increasing the limited growing season and space.

Building on diverse grounded expertise

We tried to encourage speculation through both discussion as well as embodied and material techniques that drew on participants' experiences. For example, in the final workshop, people engaged in craft-based world-making (e.g. P3's world made communal re-use of plastics as a valuable resource for growers in the future). We also tried to ground the speculation in local understandings of the neighbourhood (e.g., by basing the first workshop on a physical map of the neighbourhood). We therefore built on participants' expertise by designing activities that drew attention to their familiar experiences. For example, we used postcard questions and informal discussion in the first mapping workshop to prompt people to design their own garden space of the future. Sometimes, as facilitators, we asked questions and wrote down people's answers on the cards if they were reticent to commit pen to paper. Many, however, took particular pride in their sketches and carefully crafted responses to the map with a range of materials despite expressing frustration with the overall lack of growing space in the community. We went further by trying to physically embody the speculative activities themselves in the neighbourhood by, for example, locating the workshops in a community space, organising speculative imagining as part of a walking tour, and encouraging participants to use materials from the physical surroundings (like soil, wood and other natural material) in the making exercises.

Mark's relationship with the community, and his passion and motivation for growing, acted as a catalyst to help infuse and inspire others on many occasions during the workshops. His presence also appeared to have greater impact as he grounded his ideas in his everyday knowledge and sensory experiences of growing. For instance, during the walking workshop when he was describing potential new ideas, he would use his arms animatedly to draw out possibilities in the sky, pointing to potential locations on the street that could accommodate new innovations. He would also highlight particular species of edible plant on the streets that could be grown in specific conditions, sometimes picking at plants and inviting people to smell or taste them. This created a convivial, embodied sociality within the environment where people could discuss and explore their local area for its rich potentialities. Further to this, Mark regularly spoke of the transformative potential of food growing in response to the many soulless, concrete spaces of the city, such as the back lanes, which are "*devoid of life. It's really horrible and soulless…. And one of the things I loved about growing things was as soon as I started growing stuff in my backyard, bees started to come… Once the insects start coming in the birds start coming in as well*" (Mark). Mark's perspective however was not just grounded in an overly positive view of the benefits of growing but was also mindful of the precarity and politics of food and land. As Mark did not live in the neighbourhood he did not focus on the specifics of local concerns, but focused specifically on his own experiences, providing an alternative tone of potentialities rather than limitations.

4. DISCUSSION

We found our speculative participatory design approach to be effective in understanding and negotiating urban food futures with our case study community. It was particularly significant for this community experiencing the impacts of austerity in tangible and palpable ways through limited access to land and resources to grow. Speculative and participatory design practice is commonly associated with working through the uncertainty of unknown futures often generating feelings of vulnerability, fear and fragility [4,12] avoiding singular claims to probable realities [1]. In this final section we discuss potential learning from our approach to explicate how, in dialogue with participants and an SME, we were able to open up or close down particular kinds of futures with the group. We offer these insights for design researchers seeking to engage in urban community food growing as an alternative to a neo-liberal smart city agenda.

Nurturing speculation as embodied, situated imagination

The range of activities worked well, allowing participants to walk, make, or play alongside each other, fostering valuable, if sometimes challenging, conversations between community members. The particularity of growing food is quite literally located in and of the ground and within very specific spaces associated with contested local histories of land. Therefore, stories, metaphors, and materials used for futuring needed to both generate new possibilities while at the same time respect the local context. The combination of different performative modalities in sharing possible futures further engaged with situated, specific bodies and materials in relation to the future, offering opportunities for turning the 'everyday into the future' [11], through bottom-up engagement.

The framing of the activities was significant, since it either placed the community as experts in the driving seat, or as spectators in a future over which they had no part in conceptualizing. For instance, while the mapping and world-building workshops drew explicitly from participants' individual experiences, expertise, and imaginings, the neighbourhood walk and board game workshops focused on discussing responses and collectively suggesting futures in response to scenarios that we, as researchers, had expressed in relation to our collective interests, current news items that we deemed to be topical, and our interpretations of what people valued. The latter appeared to bring out some participants' sense of fear and lack of agency within the community. For us as facilitators it highlighted obstacles to be overcome in navigating between the super-local and the broader possibilities of what a more desirable future could look like. But also, going forward, they exposed perceived issues that would need to be negotiated in order to transition to any such desirable futures. The mapping and world-building workshops, on the other hand, appeared to offer scope to openly script potential new opportunities for individuals and the community (e.g. what do I want my garden to look like?). The difference was that rather than have situations or stories about the future imposed on them (and their associated realities to be already scripted), the first and final workshops offered more potential for alternative ideas to percolate over time through making and drawing.

Tensions between speculation and reality as a space for ideation

Rather than sustainability being reduced to techno-driven seamless services, improved efficiency, and increased productivity, as is so often inherent in visions of smart city futures (e.g. through cloud services, big data and networked devices) our study highlighted the value of everyday, mundane technologies to the food growing communities with which we worked. Distrust in new technology and feelings of not being tech savvy led participants to believe in existing technology they already worked with or incremental changes in things such as social media and email, suggesting opportunities for repurposed technologies rather than new innovations. Our approach further alluded to the complex entanglements of food in urban space, involving culture, politics, economics, health, and biodiversity. The tensions that sometimes arose between the speculative and the more everyday were useful in opening up space for sharing perspectives. For example, participants envisaged polytunnels connected to heating vents from buildings as a way of increasing the growing season, such as on rooftops, and from swimming pools and shopping centres. In contrast, Mark spoke of a simple, mundane online spreadsheet that he uses for coordinating a global network of people who swapped seeds.

Adaptation and flexibility when speculating about urban futures

The value of linking the workshops to each other by basing their design on the outcomes (findings and challenges) of previous ones, emerged as an important methodological finding. Apart from the first workshop, we mostly did not plan the activities of the workshops before the series began. Our rationale was that we were trying to understand what approaches would be effective for supporting citizens in speculating about urban futures. However, this flexibility and adaptability with workshop design was important for two main reasons. Firstly, it enabled us to tailor activities to focus on subjects that were highlighted as important to participants, such as destinations on our walk, and "lands" in our board game, helping us to keep the future speculations grounded in what was important to the citizens living in the local neighbourhood. It allowed us to be purposeful, and to understand what purpose was appropriate, for example "mapping" or "playing" or "being practical" or "being speculative". Secondly, it allowed us to build up the process of speculation by assessing how comfortable and engaged participants were with the task. Speculating about the future can be difficult and hindered by various factors, and our approach allowed us scope to reflect on this and tailor activities to address limitations of previous workshops. For example, in our case study, negativity (stemming from assumptions about the present-day neighbourhood that evoked fear and cynicism) had a very limiting effect on the alternative futures that participants could imagine. As such, we experienced the success of the workshops as ebbing and flowing according to the positivity of the participants and we were able to control or counter this by basing the design of future workshops on our experiences of the previous ones. In essence, this was a process of us as researchers becoming more familiar with the community, and the workshop participants becoming more familiar with our role and expectations as researchers. We do not view this as something that could have been bootstrapped in advance or that could be more firmly structured based on our experiences, but see it as a necessary part of the process of co-creating the future of a community that involves "doing" and reflecting, whilst negotiating the commitments of both participatory and speculative design approaches.

5. CONCLUSION

In this paper we have reported on a study that engaged grassroots urban food-growers in the co-design of food futures within a deprived neighbourhood in a city in the north-east of England. We took a speculative participatory design approach as a way of countering the neoliberal visions of top-down, technocentric, and efficiency-led approaches to sustainable smart cities. Our approach devised a series of creative and embodied workshops, as a way of stimulating critical questioning and elaboration in participant-led discussions around food futures that incorporated technological possibilities. Initial insights indicate how the approach surfaced new design imaginaries that contrast sharply with the dominant technocentric visions of sustainable smart cities. We presented challenges and opportunities that we believe will be useful for other researchers working in similar contexts. In future work, we aim to consolidate the methodological aspects of the workshops, and develop the approach by testing it with others such as families, local government officers, and businesses.

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