
Engaging Community with Energy: Challenges and Design approaches

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Abstract

Community engagement is part of a common vocabulary among authorities and other stakeholders associated to energy conservation in the UK. And it has been a concern also for technology designers. In this paper, we present three stories of technology design for energy conservation and the need to engage people with that. We introduce some possible approaches, creating a scenario for discussions among the workshop participants.

Author Keywords

Community engagement, Energy awareness, sustainability, sustainable neighbourhood, user-centred design.

Introduction

Technical innovations have played a fundamental role in the current societal need to promote a more sustainable way of living. Examples of that include applying technology to: i) mediate how people perceive the nature environment, promoting new worldviews; ii) empower people, helping them to change habits/behaviour/attitude; iii) aggregate people with similar interests; v) offer new services that optimise the consumption of natural resources.

Although the role of HCI practitioners in this scenario of promoting sustainability within communities and creating smart environments is mostly focused on new technology design, sociocultural and economic aspects must be considered, as already recognised by the HCI

Sustainability

Sustainability itself is expressed as

“meeting present ecological, societal, and economical needs without compromising these factors for future generations.” [2].

Therefore, sustainable living can be explained as living within the innate carrying capacities that are defined by the triple bottom line: social commitment, environmental aspects and economy, see Figure 1 below.



Figure 1. The three pillars of sustainability that must be considered in technology design [what do you mean by technology design?](#)

community [1]. Social commitment, environmental aspects, and economy are actually the main pillars of the concept of sustainability (as presented in box in the left).

In order to achieve any social impact by means of a technology introduction, people in the community need to perceive its value, adopt and engage with the technology and with the social issue behind it. The design has to take these aspects into account.

Therefore, we recognise the need to contextualise the design, understand some social dynamics in play, as well as values and other non-rational aspects of potential users of a technology in the community.

In communities, though, be they physical and/or virtual, people relate to each other in different ways (Figure 2), assuming different roles. Sub clusters evolve, people with common needs or shared interests create sub groups. Some people assume leadership and responsibilities, some act by engaging other people, while others need to be guided [3].

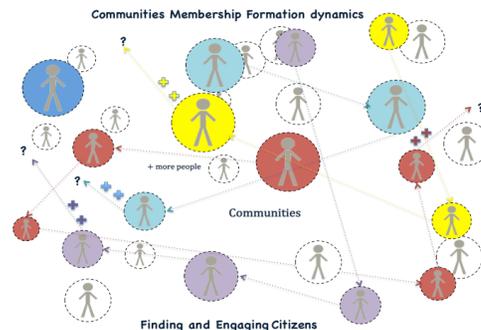


Figure 2. Community membership formation dynamics. The colours represent different interests/roles assigned by members

Engaging communities in the UK with energy savings and renewable energy generation has been targeted by

many initiatives launched by either governmental or environmental stakeholders, or by the community itself (e.g. [5,6,7]). Beyond dealing with usual financial challenges [4], strategies like pledge campaigns, incentives, and rewards, etc. have been applied to motivate engagement. But establishing a systematic way to engage communities with energy savings is still an open issue.

When we critically consider involving new technologies in this process, we identify three main, but not exhaustive, research questions (RQs) that can affect technology appropriation and engagement:

RQ1: What are the forces that motivate (or not) people to be engaged with the energy issues in a community?

RQ2: How can we make use of these forces in technology design?

RQ3: How do we identify the right people to help disseminating the technology?

Reporting some stories, in the next section we instantiate these RQs as community-related design problems.

Design Problems

Three stories illustrate some challenges of engaging people with energy. In the sequence, these stories are discussed within the HCI perspective, with the purpose of triggering discussions around possible approaches to tackle these design problems.

Story 1: Bridging online and real community

A community leader wants to install solar panels in the local school. Beyond supplying the school with the energy generated, the spare energy can be sold to the utility and the money returned to the community. To do so, he needs to engage the community to join this

crowd-funded initiative, to discuss details for the installation, schedule, etc. Regular community meetings can place this discussion, but he knows that residents' participation is very limited in that meetings and leaflets or door-to-door approach are not effective either. Thus, he is seeking for social tools that could help him to reach and engage people in the neighbourhood, complementing the face-to-face strategy.

Story 2: Energy consumption feedback

Transforming energy awareness raised by using the consumption feedback devices into effective collective savings – that is the target of an energy monitoring devices provider. Different types of technologies have been launched to provide feedback, monitor and compare consumptions, develop energy literacy, etc. Much was observed and learned in terms of design guidelines and users' behaviour [8,9,10]. Yet, the society still faces the lack of information, and even motivated people do not know exactly what to do to conserve energy without compromising their personal values (e.g., comfort, family protection, etc.) [10,11]. Can social technology play a role in promoting energy savings supported by the energy monitors? Can it transform individual knowledge into collective achievement in terms of savings?

Story 3: Creating a scenario for providing smart environments

For building smart cities that take advantage of big data and technologies to improve people's lives, researchers need to create a scenario to explore possibilities. A community can host this scenario by sharing their data extracted from monitors, sensors, or input by users. Engaging people in a community to

provide this data, eventually installing new technologies in the domestic environment or mobile applications, is a then a crucial step that involves trust, dealing with privacy, and again, engagement. By creating this dataset, which can include energy consumed or generated, for instance, analysis can be performed to suggest new services and technologies, and to inform policy makers about eventual needs and opportunities for improvement that have not been observed yet. Figure 3 illustrates that.



Figure 3. Creating a research scenario based on community data

Some related HCI Challenges

The three stories show the emergent need of designing tools considering sociotechnical aspects, which can connect people in a community and bridge their interests with those from stakeholders such as policy makers, NGOs, research centres, etc. The three cases require user-centred approaches to understand the communities' scenarios with regard to technology usage, energy consumption, motivational forces, and so on. We enumerate then some approaches to design we have applied (or intend to apply soon) targeting people's engagement:

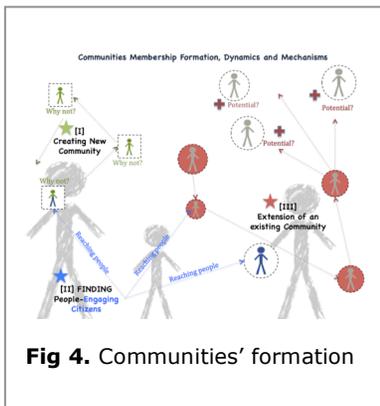


Fig 4. Communities' formation

- Identifying extrinsic motivations [10] and collective values, such as values shared within a family [11], as forces that guide interest and behaviour. Considering that, people would be willing to review current way of living. We want to target conservation without compromising shared values.
- Understanding how a behaviour change process happens from a social sciences perspective in order to provide appropriated incentives to leverage behaviour change collectively [12].
- Relying on user-generated content and collective knowledge building on practical and contextualised hints for energy conservation [10,12].
- Establishing partnerships with communities' leaders to build trust among people in a community.
- Identifying sub groups of related interest (i.e. parents of students, gardening groups, etc.). By involving these groups in user-centred or participatory design activities we can promote the technology appropriation (Figure 4).
- Analysing the status in terms of how green a community is - and finding ways to develop the scenario -, bringing aspects of urban planning towards creating a "green neighbourhoods". Standards promoted by Building Research Establishment Environmental Assessment Methodology (BREEAM) and Leadership in energy and Environmental design (LEED) can guide this approach [13].

These strategies, though, are restricted to the authors' experience and do not represent the wide variety of approaches in HCI literature. The intention is actually to point directions and trigger deeper discussion among practitioners of Sustainable HCI.

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