Fuel Poverty and the Work of Energy Advisors

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ABSTRACT

Fuel poverty affects millions of UK households, and more than 80% of the affected are vulnerable people. We propose an approach to address fuel poverty by engaging with and supporting the work of energy advisors provided by non-profit organisations such as charities. We outline our approach that consists of fieldwork to develop an understanding of fuel poverty; participatory design sessions with energy advisors; and iterative design, deployments and studies of interactive tools to support the everyday work of energy advisors. We present initial findings from fieldwork that suggests monitoring technologies can assist in identifying the causes of energy-related problems.

Author Keywords

Fuel poverty; vulnerable people; participatory design; sustainability; fieldwork; energy advisors; advice.

ACM Classification Keywords

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

General Terms

Human Factors; Design.

INTRODUCTION

Millions of households in the UK live in fuel poverty. A household is said to be in fuel poverty when they spend 10% or more of their income to maintain adequate heating. Reports of numbers vary between 3.5 Million households in 2010 [3] and 6.3 million (~24% of all households) according to a 2011 survey by YouGov [13]. Fuel poverty is reported to be a major social problem across Europe, with an estimated 50-125 million people affected by it [6]. Of course, these figures correlate with the upward trend in energy costs; for example the annual energy bill for an average household in the UK has risen from £660 to £1,131 between 2006 and 2011 Domestic energy cost has more than doubled in the last 8 years [8]. Vulnerable households (i.e., members are children, elderly, sick or disabled) are especially at risk of being affected by fuel poverty [10]; recent government statistics estimate 84% of vulnerable households are affected by fuel poverty [3].

Increasingly, public sector initiatives are starting to address fuel poverty not just through direct financial support or benefits provided to householders, but by providing support and advice services; for example on how savings can be achieved by reducing energy consumption, and by becoming more efficient by replacing old appliances with more efficient ones (even though upgrading may not always be an option in the face of poverty). In the UK context, this kind of work is often carried out by charities in partnership with government, local authorities and third sector organisations. We are interested in exploring how fuel poverty is dealt with in everyday life, and how interaction design might support efforts of addressing fuel poverty.

Some see a potential that smart meters can help to "eradicate fuel poverty" by a) providing real-time consumption feedback that may lead to behaviour change, and b) abolishing the need for suppliers to estimate energy bills [10]. In this work, we collaborate with the Centre for Sustainable Energy (CSE). CSE states their goal is to help meet "the twin challenges of rising energy costs and climate change". [1] The charity provides home energy advice to fuel poor households. Notably, in addition to providing advice face-to-face, their advisors provide and also help with the installation of real-time energy monitors. However, CSE's provision of face-to-face advice in home visits demonstrates a commitment to more than simply handing out energy monitors (or smart meters). In this joint work, we seek to develop an understanding of the socio-technical environment that situates fuel poverty, to learn about CSE's energy advice practices, co-design technology to support their work, and deploy prototypes in their clients' homes to study technology-in-use.

ENGAGING ENERGY ADVISORS

Designing and studying electricity consumption feedback is a prevalent topic of Sustainability in HCI [4]. However, the focus on techniques of 'persuasive computing' provides a narrow view of sustainability that often disregards social, cultural and economical contexts [5]. We propose a participatory design process with professional energy advisors. While most HCI work around sustainability is focused on tools for residents, working with advisors requires understanding and supporting their everyday work practices. We propose a three-step process to engage with energy advisors (see figure 1).

Understanding energy advice practices

Firstly, we engage in fieldwork to study the day-to-day work practices of the energy advisor. Observations especially of advisor-client interaction are key, but can be supplemented by interviews and document inspections, paying particular attention to the resources (technological or otherwise) used to accomplish their job. Following the tradition of CSCW [11] and Participatory Design [9], our aim is to ground the design in workplace studies.

Participatory design and seed prototypes

Secondly, we engage energy advisors and other domain experts in participatory sessions to co-design interactive tools to support their energy advice.

Conventional real-time energy feedback often relies on relatively expensive equipment, and requires broadband, access to a computer, as well as computer/internet literacy. These requirements probably already exclude a large proportion of the vulnerable population. New approaches are needed to engage this population.

We will seed prototypes developed in previous projects and encourage their re-configuration, and re-purposing. For example, we have developed a low-cost temperature logger (see figure 2) that does not require broadband to transmit the data. The data is uploaded to a website and analysed to provide personalised home heating advice [12]. We are currently designing a similar device for electricity logging. The advisors can easily deploy our low-cost loggers, they are robust and virtually require no maintenance. The logged data can then be analysed by energy advisors to develop a personalised energy usage profile that can be used to give more tailored, relevant advice. For example, to give energy tariff recommendations based on household usage patterns [7], or to identify the impact of appliances and activities [2] (see figure 3).

Iterative development and deployments

Finally, iterative development and field studies of deployments help us answer a range of research questions:

- Do the tools support the energy advisor in their everyday work? In which way do they appropriate the technology? Does it improve the quality of the energy advice?
- Does the improved advice lead to, or contribute to improvements/reduction in the level of fuel poverty? How can these improvements be accounted for (e.g., measurements, self-reports etc.)?
- What can be learned about the design of technology to support energy advisors? Should this approach be complimented by direct support for vulnerable people?

THE WORK OF THE ENERGY CHARITY

CSE provides energy advice through three key forms of engagements: home visits, drop-in surgeries, and the advice line. While the advice line offers perhaps the broadest kind of advice, our collaboration focuses on drop-in surgeries held in local community centres and especially home visits; in order to learn about the range of client problems, to study the way energy advice is given face-to-face, to identify how interactive technologies might support the advisor, and to recruit people on the spot for deployments of prototypes. Most of the visits tend to be to homes of vulnerable people who are seen to benefit from support to make better use of what they have. While the energy-related problems discussed at home visits are manifold, they are often to do with dampness, having a ‘cold home’, or high bills.

Whilst we can only provide a superficial account here, the observation of a single home visit and subsequent conversation with the energy advisor suggests the visit is organised to a certain template structure (supported by a ‘home visit survey’ document). For example, the advisor first establishes the specific **main concern** of the home visit (e.g., high electricity bills). This is followed by an inspection of the likely **major contributors** to this problem (e.g., storage heating and appliances) throughout the property, followed by a **bill inspection**. Depending on the problem, the advisor **suggests various ‘remedies’,** such as contacting the client’s energy provider or the landlord on their behalf and takes the necessary steps (signing of various permission forms, making phone calls), as well as direct practical advice, e.g., regarding heating usage. The advisor may also set up and demonstrate an **energy monitor** and hand it over to the client. The visit is concluded by an oral summary, and a hand-over of more written advice material and a promise to follow up by letter on progress of actions taken by CSE. The visit may be preceded by preparatory paper work and followed up by more paper work, phone calls and email to accomplish the actions promised during the visit.

The necessity of the visit presupposes the client’s uncertainty as to the causes of the problem at hand, and lack of knowledge or other barriers to self-sufficient action to investigate and address the causes of the problem. Before the advisor can take or suggest courses of action to address the problem, during the visit the advisor takes actions to **reduce the uncertainty** of what caused the client’s main concern. In the case of high electricity consumption at least, monitoring technologies are suited to assist the advisor in identifying the major consumers in the client’s household. It appears that an interactive inspection of the client’s usage profile may help the advisor to reduce uncertainty and as a result give more targeted, relevant advice. In future participatory activities with advisors we are aiming at exploring monitoring and analysis technologies to assist in identifying the causes of energy-related problems, including automated approaches driven by computational ‘intelligence’ and interactive visualisations of usage.

SUMMARY

In this position paper we described ongoing research to address fuel poverty by engaging with and supporting the work practice of energy advisors. Despite that more cases need to be studied to present a more complete picture, initial observations of energy advice given in home visits suggest the process is amenable to technological augmentation aimed at reducing the uncertainties of the causes of the client’s energy related problems.

ACKNOWLEDGEMENTS

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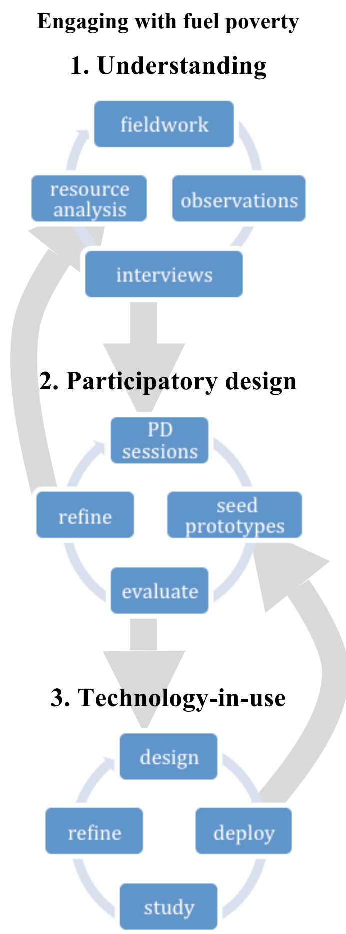

Figure 1. Approach to engaging with fuel poverty.

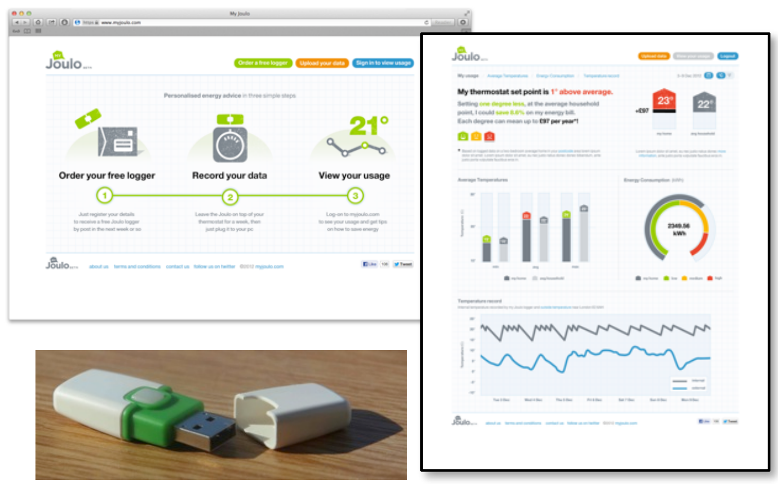

Figure 2. The myjoulo logger and interactive analysis enables personalised heating advice based on temperature logs (see myjoulo.com).

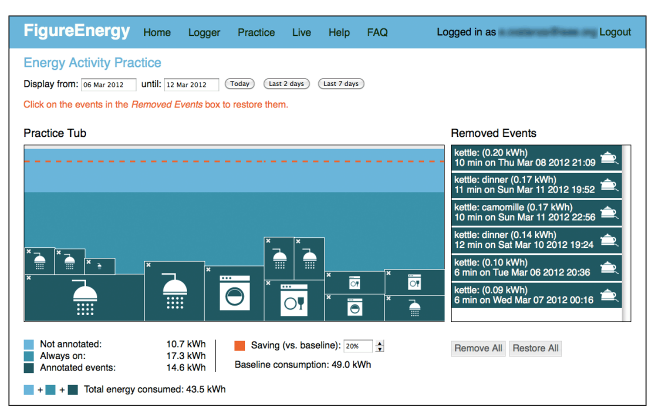

Figure 3. FigureEnergy can be used to make electricity data more meaningful by annotating with appliance and activity information.