Grassroots innovation in low energy digital fabrication

Centre on Innovation and Energy Demand

Research Councils UK Energy For a Low Carbon Future

Emergence

Studying a limited number of emerging and promising low energy innovations with the aim of better understanding the mechanisms and processes involved and conditions for success

Project Lead
Dr Adrian Smith
University of Sussex

Researchers
Dr Sabine Hielscher
University of Sussex

Rapid advances in open-source, small-scale digital design and fabrication technologies are opening up new possibilities for decentralised, networked, user-led manufacturing. A confluence of new technologies (e.g. the 3-D printing 'revolution'), new business models (e.g. 'personalised manufacturing'), and new social movements (e.g. 'open-source'), are prompting claims about the 'reconfiguration' of production and consumption.

Currently these technologies are used within community-based workshops, so called FabLabs, Hackerspaces and Makerspaces, where people join collaborative projects. They innovate and learn together, using online networks to connect to open-source designs, tutorials and workshops globally.

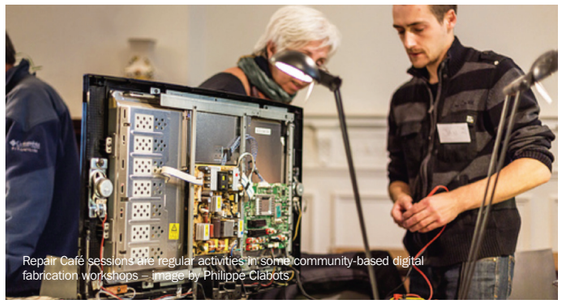
As yet, there has been no independent, social scientific analysis into the emerging possibilities in this area and their limitations, particularly for low energy production and consumption. Whilst digital fabrication could potentially enable local production, remanufacturing and increased longevity in goods, it could also lead to throwaway, personalised manufacturing that intensifies energy demand.

Research aim and questions

Our aim is to understand why there is so much interest in these developments and how they are shaping material developments, leading to the following research questions:

1 What activities, narratives and mobilisations emerge through grassroots digital fabrication, and what evidence is there for the incorporation of issues of energy demand?
2 How are activities within community-based digital fabrication workshops manifesting or confounding different mobilisations of grassroots digital fabrication (and vice versa)?
3 What dynamics and tensions arise between existing activities, narratives and mobilisations, and how are they negotiated? What role do they play for normative goals such as energy demand?

A visit to Manchester FabLab – Image by Adrian Smith



Repair Café sessions are regular activities in some community-based digital fabrication workshops – image by Philippe Ciabots

Methodology

Up to now, research activities have consisted of reviewing the literature on community-based digital fabrication workshops in order to identify existing themes and conceptualisations in the current slim research literature. Additionally, we developed a database of UK workshops with descriptive information about the spaces and conducted a content analysis of web-based materials, including their mission statements to examine the evidence of low energy innovation activities. Future activities will focus on participant observations during practitioner events and in community-based workshops and will include practitioner engagement activities.

Expected outputs

So far, we have produced two SPRU working papers, submitted two journal articles, organised a World Café conference session on community-based digital fabrication workshops at the 6th Living Knowledge Conference, produced blog posts and research briefings, presented our work at the SCORAI conference, and participated in activities organised by practitioners. Some of these materials can be found on the CIED (www.cied.ac.uk) and Grassroots Innovation (www.grassrootsinnovations.org) websites. In the future, we will continue with these activities and plan to actively engage practitioners in the research process.

Early findings

The literature review and content analysis of web-based materials on community-based digital fabrication workshop has shown that:

- Existing research points to an emerging field of social activity based in and around community-based digital fabrication workshops that is very dynamic and heterogeneous.
- Some of the existing research is pointing towards deeper analytical possibilities, but the potential is only glimpsed currently through a wider literature that is more technical, descriptive, and rhetorically orientated.
- Claims about the possible influence of community-based digital fabrication workshops on issues of low energy innovation seem to be speculative. It is still relatively unknown to what extent such issues feature in the day-to-day activities and discussion within workshops.

Engagement and impact

Engagement activities, particularly those with practitioners, are a central element of our project. We are not only interested in disseminating our work through the research project but strive to engage with practitioners early in the processin order to increase the relevance of our research outputs. These activities are ongoing and have culminated in the organisation of a conference session with practitioners, meeting with practitioners to discuss our research, and joining practitioner events. We are keen to continue with these activities and broaden our research for a range of academic and non-academic audiences.

CIED is a collaboration between researchers from the Sussex Energy Group (SEG) at SPRU, University of Sussex; the Transport Studies Unit (TSU) at the University of Oxford; and the Sustainable Consumption Institute (SCI) at the University of Manchester and is one of six Research Centres on End Use Energy Demand funded by the RCUK Energy Programme.

Emergence. Diffusion. Impacts.