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Everyday experimentation in energy transition: A practice-theoretical view

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ABSTRACT

Research on sustainable practices has attracted increasing interest as a way to understand energy demand and transitions towards sustainability. In this paper we elaborate on how practice theories can inform the discussion of experimentation. Practice theory suggests that the everyday life of people appears recalcitrant. Practices are robust, resilient and have multiple, historically formed constituents and are thereby difficult to destabilize and change quickly. The making and breaking of links inside and between practices is highlighted, as is the need for enduring, multi-sited change efforts. Practice theory further helps us to better understand the constitution of new, levelled forms of expertise, the distributed nature of experimentation and the enrolment of citizens as active participants in sustainability transitions. We have operationalized and examined these suggestions in a Finnish research project related to climate change mitigation and energy use in detached houses. We report specific modes of experimentation and innovation, including user innovations, and the shared resources of situated expertise, the collective and shared processes of empowerment and the ways in which normality is challenged by ruptures in everyday life. Based on the results, we derive suggestions for effective policy interventions. We also bring forward a set of generic suggestions for more sensitive, appreciative and effective public policies on sustainability transitions and cast experimentation in a particular and partial role in such policies.

1. Introduction

Overarching changes are needed in patterns of energy supply and consumption if climate change is to be mitigated. This requires investments both in energy efficiency and in new renewable energy technologies but arguably also changes the structure of consumption and production. While shortcuts to needed changes – such as heavy carbon taxation – are conceivable, their use appears hampered by the lack of a broad consensus. In much the same way, theories and approaches that build on individual choices summing up to a broad social change have been discredited (Shove and Walker, 2010; Hargreaves, 2011). More realistic policy options may be found by approaching climate change mitigation as a sociotechnical transition that consists of a gradual and polycentric change towards less carbon-intensive everyday practices (Brown et al., 2003; Hargreaves, 2011; Nevens et al., 2013; Shove et al., 2012).

Thus far, sociotechnical transitions research has highlighted how the requisite system change is characterized by gradual evolution in multiple overlapping areas that constitute the sociotechnical regime (Kemp et al., 1998; Geels and Schot, 2007; Weber and Rohracher, 2012). It has further outlined how technological niches can replace or reconfigure the dominant sociotechnical regime given simultaneous regime destabilization by landscape pressures (Geels and Schot, 2007). Together, the emergence of, growth of and support for niches have become a fervent area of research, including subareas such as the dynamics of grassroots innovation and their growth into the mainstream (Hargreaves et al., 2013; Ornetzeder and Rohracher, 2013), and the protection of novel alternatives in niches through shielding, nurturing and empowering them (Smith and Raven, 2012).

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Experimentation and embedded forms of social learning have surfaced to form a new approach to instantiate and support change within sustainability transitions (Brown et al., 2003). Rather than building on informed choices towards sustainability, experimentation is deemed to offer opportunities to assemble, trial and gradually develop workable, suitably easy and more sustainable alternatives. Literature on experimentation has highlighted the importance of limited scale (Brown et al., 2003), extended duration (Brown et al., 2003), particular arenas of experimentation (Nevens et al., 2013), and the multiplicity and heterogeneity of different actors (Brown et al., 2003; Scott et al., 2012). Accordingly, new, more sustainable solutions may emerge through trial and error, gradual alteration, co-creation and open-ended experimentation.

Such a notion of experimentation requires a clear conceptual differentiation between *experiments,* as in behavioural sciences, and *experimentation,* as part of theories of sociotechnical transitions. It also requires empirical studies of the forms and outcomes of everyday experimentation. In this paper we develop such a distinction by using a version of practice theory that Shove et al. (2012) have developed. We ask the following questions: 1) How does social practice theory guide researchers in the study of experimentation in sustainability transitions? and 2) What kinds of expertise does the practice-theoretical approach to sustainability transitions suggest, anticipate and allow? Beyond this conceptual effort we ask and provide empirical results on a further question: 3) What kinds of experimentation do citizens engage in the area of low-carbon living?

The theory of social practices has gained increasing recognition as a frame for sustainability research and policy (Shove, 2003; Gram-Hanssen, 2011; Spaargaren, 2011; Hargreaves, 2011; Strengers and Maller, 2012, 2014; Shove et al., 2012. These theories do not see society as consisting of human individuals and their attitudes, behaviours and choices (the implicit 'ABC' model of rational action theory [Shove and Walker, 2010; Shove et al., 2012]) but rather posit that it is practices — as intertwined configurations of material, competency, social relations and cultural meaning — that are the basic units of which society is made (Shove et al., 2012; Reckwitz, 2002; Nicolini, 2012). Practices are seen as relatively sustained and routinized ways of enacting a set of elements. It also follows that an overhaul of unsustainable practices faces great challenges as practices are often firmly anchored by multiple, overlapping ties to the social, technical and cultural fabric of everyday life. According to practice theory, much innovative and destabilizing work needs to be done before individuals can make choices towards sustainability in regard to their unsustainable practices (Scott et al., 2012).

Despite similarities and cross-referencing vocabulary, sociotechnical transition and social practices literature posit a different outlook for experimentation. Sociotechnical transition calls for entrepreneurial niche–level actors to put forward alternative, more sustainable solutions. Even if authors such as Nevens et al. (2013) recognize citizens and users 'as a source of creation', innovation and experimentation are suggested to take place in niches, particular experimental sites or arenas and in conjunction with transition policies. Shove and Walker (2010) argue that as sociotechnical transition literature draws on innovation studies, it ends up endorsing a policy paradigm that centres around niche developments and the diffusion of technology. Transitions in practice, on the other hand, suggest that practices are performed and technologies are integrated into 'doable' and rhythmic mixes in everyday life (Jalas, 2006; Shove et al., 2012). Transitions in practice could be better argued to imply local innovative ways of taking technical solutions into use in everyday life rather than developing them in a particular (protected niche) selection environment, set apart from an everyday life context.

Practice theory may help create a new understanding of experimentation that complements existing literature. Aiming to develop this line of thinking in operational terms, we contribute to discussions on how to set up and organize research and engage with subjects and sites that are widely distributed and potentially contain the resources and solutions required for change. Such an aim affects the understanding of how to conceive of *experiments*, *experimenters*, *experimentation* and the knowledge created through experimentation. We anchor our discussion in a four-year research project 'Local adaptation and innovation-in-practice in energy efficiency and carbon neutrality' (LAICA), which focused on energy practices in Finnish detached housing and developed six interlinked research positions on experimentation in climate policy from a practice-theoretical orientation.

2. Everyday practices, practice theory and experimentation

Practice theory suggests that the everyday life of people is recalcitrant to traditional scientific experimentation. Practices are robust, resilient and have multiple, historically formed constituents and are thereby difficult to destabilize and change quickly (Shove et al., 2012). Individuals, on the other hand, are conceptualized as the carriers of social practices (Warde, 2005; Shove, 2003; Hargreaves, 2011) and can hardly to be expected to lead and cause social change. Rather, the sources of the change of practices lie within the practices themselves and the way the elements of practices are available and configured (Warde, 2005; Shove et al., 2012). Yet, the role of experimentation remains open: if practices are robust, self-reproducing and gradually evolving, what is experimentation and who has a leverage point in experimentation on practices? Warde (2005) offers the following two distinct sources of change in practices, which both imply differently skilled practitioners hacking and remodelling everyday life: a) the cross-fertilization of practices as individuals carry out and participate in several practices, and b) differences in the will and skill to reproduce practices.

While these suggestions do not necessarily imply conscious and active experimentation in everyday life, practice-oriented design research is more explicit and offers tentative answers. A shift from products to practices emphasizes 'doings' of different kinds and the active, ongoing integration of the elements through which user needs arise and normality is defined (Scott et al., 2012; Pettersen et al., 2013). As the object of design is redefined to be integration and co-alignment within and between practices, creativity and design authorship are also transferred from professional designers to individuals who are 'practicing everyday life' (de Certeau, 1984; Hartswood et al., 2008; Botero and Hyysalo, 2013; Pettersen, 2015; Pettersen et al., 2013). In terms of the role of the (design) researcher, practice-oriented design underscores engagement with the change and stability in the (re)integration of the elements of practice. This includes, for example, identifying likely moments when routine practice has a high propensity to change and the sites in which this happens (Jalas, 2006; Scott et al., 2012); surfacing, articulating and supporting innovative alternatives (Botero and Hyysalo, 2013; Scott et al., 2012); facilitating the local adaptation of generic technologies (Törpel et al., 2009; Heiskanen et al., 2010); and the remodelling and reconfiguring of everyday routines and schedules to fit new alternative solutions (Scott et al., 2012; Pettersen, 2015).

These premises entail two tenents that have been central to pursuits in collaborative design. First, researchers have to rely on and amplify practitioners' capacity to take design into their own hands, either in part or wholly (Törpel et al., 2009; Hyysalo et al., 2016). Second, as Scott et al. (2012, 286) note, 'practice-oriented design research should ideally be conducted using an iterative,

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