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A socio-technical approach to improving retail energy efficiency behaviours

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ABSTRACT

In recent years, the UK retail sector has made a significant contribution to societal responses on carbon reduction. We provide a novel and timely examination of environmental sustainability from a systems perspective, exploring how energy-related technologies and strategies are incorporated into organisational life. We use a longitudinal case study approach, looking at behavioural energy efficiency from within one of the UK's leading retailers. Our data covers a two-year period, with qualitative data from a total of 131 participants gathered using phased interviews and focus groups. We introduce an adapted socio-technical framework approach in order to describe an existing organisational behavioural strategy to support retail energy efficiency. Our findings point to crucial socio-technical and goal-setting factors which both impede and/or enable energy efficient behaviours, these include: tensions linked to store level perception of energy management goals; an emphasis on the importance of technology for underpinning change processes; and, the need for feedback and incentives to support the completion of energy-related tasks. We also describe the evolution of a practical operational intervention designed to address issues raised in our findings. Our study provides fresh insights into how sustainable workplace behaviours can be achieved and sustained over time. Secondly, we discuss in detail a set of issues arising from goal conflict in the workplace; these include the development of a practical energy management strategy to facilitate secondary organisational goals through job redesign.

1. Introduction

Energy management has become a key part of organisational life across all industries and is proving an area of increasing interest as a response to carbon reduction targets (DEFRA, 2006). This interest is also reflected in the increase in Corporate Responsibility carbon commitments amongst UK retailers which detail far-reaching carbon reduction targets and strategies (Gouldson and Sullivan, 2012). Running alongside important ethical considerations associated with climate change action are gradual, long-term pressures such as rising energy prices and increasing fuel poverty (Rosenow, 2012).

In this paper we describe a qualitative two-year case study (2011–2013) carried out in a large UK retail organisation. The study explores energy management from a socio-technical perspective, and considers inter-relationships that have rarely been discussed together in a workplace environmental study. The study not only shares exploratory data around the interaction of energy efficiency tasks with wider organisational strategy, but also describes the subsequent formulation of an intervention strategy to improve energy efficiency based on the initial qualitative data. Further data are also provided to assess the initial impact of the change. In what follows, we review previous work on goal setting, work design and socio-technical systems thinking, followed by research which has looked at environmental behaviour, as a prelude to introducing the empirical study. In this study 'energy' refers to water and utilities, but predominately electricity.

1.1. Goal-setting theory and socio-technical systems

Goal-setting theory uses a range of moderators and mechanisms to explain levels of performance against a core goal, when that goal is difficult and specific (Locke and Latham, 2002). Example moderators include individual ability and commitment to the goal, the complexity of the task and the degree of feedback given (Smith,

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2006; Klein et al., 1999; DeShon et al., 2004). The mechanisms to drive goal performance are both individually-driven, such as effort and persistence, and organisationally-driven, with task strategy clarifying how the end goal should be achieved, for example through training and tools. Most working individuals have more than one goal, but performance problems have been identified when multiple goals are in perceived to be in conflict (Austin and Bobko, 1985; Locke et al., 1994; Slocum et al., 2002). Goal-setting and environmental behaviours are frequently discussed in the domestic context (Rabinovich et al., 2009), particularly in the area of energy efficiency, with strong emphasis on the role of the feedback mechanism through home energy monitoring systems (Abrahamse et al., 2007; Hargreaves et al., 2010). There are only a handful of papers that discuss the implications of environmental work behaviours and goal setting in the workplace (Carrico and Riemer, 2011; Unsworth et al., 2013), but as yet practical case studies are relatively scarce.

The adoption of a socio-technical systems approach involves understanding the interdependencies and interconnections between technology (e.g., tools and equipment), work tasks and processes, and organisational culture (Cherns, 1976, 1987; Clegg, 2000). An important implication of this approach to work systems and environments is that changes to one part of the system will impact another (Challenger and Clegg, 2011). A series of guiding socio-technical principles includes: simple design informed by the end-user, congruence between all parts of the system and with organisational goals, integrated task perspectives and the enabling of local experts to problem-solve and adapt systems appropriately (Clegg, 2000). Most organisations begin looking at energy management from either efficiency (technology) or maintenance perspectives (Sweeney et al., 2013) and energy management is traditionally placed within an engineering/maintenance function in most organisations. This technical focus can downplay the behavioural elements around energy management, leaving them to be designed around the system without necessarily being considered as part of the primary design. Using a socio-technical systems approach research to challenge existing systems in the energy space helps to identify disconnects between technology and behaviours that are systemically supported by the organisational design.

In this paper, we adapted a socio-technical framework (Davis et al., 2013) to probe deeper into the interaction between environmental behaviour, goals and buildings and infrastructure. The framework uses similar themes, but is developed to fit the nature of the organisation, the research question and the novel use of using a socio-technical framework approach to address goal-setting issues. The framework is designed to generate observations which in turn contribute to the exploration of multiple goal conflict, the design of an intervention, the identification of existing conflicts or gaps (Davis et al., 2013) and to contribute to the development of theory and practice (Challenger and Clegg, 2011).

1.2. The role of behaviour in energy reduction

Environmental behaviour research has historically largely focused on domestic energy use (Greaves et al., 2013; Carrico and Riemer, 2011), with little examination of the role of environmental behaviour and energy reduction within a larger organisational context. Within the domestic (home) environment, a wide range of issues has been explored to explain energy behaviours, including: financial motivations (Abrahamse et al., 2005); goal setting (Abrahamse et al., 2007), information and knowledge building (Jackson, 2005; Lorenzoni et al., 2007); intrinsic motivations (Osbaldiston et al., 2003), and embedding environmental behaviours into everyday habits and routines (Warde, 2005). Whereas pro-environmental attitude was once viewed as a primary means to effect behaviour change (Guagnano et al., 1995), research is beginning to challenge the need for a pro-environmental attitude as a pre-requisite for pro-environmental behaviour (Young et al., 2013; Owens and Driffill, 2008). The much discussed 'Value-Action' gap additionally reveals that even where pro-environmental attitudes are present, appropriate energy-related behaviours are not guaranteed, as knowledge or belief is not always a predictor of action (Kollmuss and Agyeman, 2002). Research has therefore identified the need to expand existing behavioural frameworks for application in large organisations (Tudor et al., 2007), and moved to consider alternative factors that can act as barriers or enablers to pro-environmental behaviours amongst the general public, either in addition to, or despite the individual's personal environmental commitment (Lorenzoni et al., 2007). Little work of this nature, however, has been conducted in a workplace context, therefore in this paper we attempt to identify specific organisational barriers and enablers to energy efficiency behaviours.

The design of our research and subsequent intervention is derived from an existing socio-technical model (Davis et al., 2013 – Fig. 1). We also draw from previous environmental research that emphasises a systematic approach to promoting behaviour change through identifying key behavioural tasks and associated barriers and enablers and then using these to build an appropriate intervention, rather than applying a generalised approach potentially derived from dissimilar contexts (Steg and Vlek, 2009; Geller, 2002). Our interest in socio-technical systems in workplace energy usage also has resonance with the worldview of 'Practice Theory', which also has a strong theoretical emphasis on context (Cetina et al., 2005). Practice Theory has gained in popularity in sustainability research over recent years primarily in domestic energy usage (Sweeney et al., 2013). This perspective discusses the systemic feasibility of sustaining infrastructures required by our ingrained routines and technologies, despite the ecological damage that is being caused (Gram-Hanssen, 2009). Work in this area is exemplified by analysis of ingrained everyday practices, and the challenges inherent in transitioning into a more pro-environmental practice regime (Shove and Walker, 2010).

1.3. Study objectives

Our overall aim is to describe a case study involving a large UK retail organisation's work to build on energy efficiency improvements through job redesign. We focus specifically on three main objectives in the paper:

1. To describe a case study involving behavioural energy use in non-domestic environments through a socio-technical lens;
2. To explore specific socio-technical challenges, enablers and barriers involved in implementing an energy efficiency strategy within the retail organisation, currently under-researched in the socio-technical field;

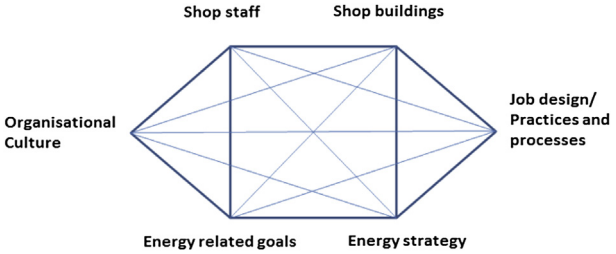

Fig. 1. Retail energy management adapted socio-technical model (adapted from Davis et al., 2013).