

Using Online Communities to Reduce Energy Consumption: A Field Experiment

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Abstract

This study investigates the potential of an online intervention, namely an online community, to reduce energy consumption among consumers. The study model, underpinned by Self-Determination Theory, explores how such an intervention can enhance consumer psychological needs of autonomy, competence and relatedness in the energy saving context. This would be highly beneficial to energy providers, such as our industry partner, for two reasons. First, satisfaction of these psychological needs drives intrinsic motivation to perform the behaviour and, subsequently, the performance of the desired behaviour and further that such behaviour is more likely to be sustained over time compared with extrinsically motivated behaviours. Second, this approach, if supported, represents a relatively low-cost communication approach compared to both traditional media at one extreme and one-to-one interventions at the other. The study involves an online field experiment across four time periods. Data is currently being collected and preliminary results will be presented at the conference.

Introduction

Prompted by concern for the environment, natural resource conservation is receiving considerable attention at global, national, industry and society levels. Indeed, organisations across many sectors including private, non-government and government entities are exploring ways to bring about more sustainable energy consumption behaviours (Kong *et. al.* 2002; World Economic Forum 2012). The utilities sector is a good example, with numerous initiatives designed to reduced customers' energy use. Many such initiatives use extrinsic motivational inducements, such as financial rewards, discounts and price penalties. Extrinsically motivated strategies can motivate change, as suggested by Skinner (1971). However, drawing on the work of others, Moller Ryan and Deci (2006) warn of several potential downsides to such strategies, including reduced psychological health (Ryan and Deci 2000) and defiance and resentment (Assor, Roth and Deci 2004). More to the point, where the desired goal is sustained behaviour change, external motivation strategies are relatively inefficient over the long-term (Deci and Ryan 1985). A further downside to a reliance on extrinsic controls is that they require ongoing promotion and implementation to remain effective.

In practical terms, this represents a potential cost burden to organisations that few can afford, particularly not in times of extreme financial pressure. Indeed, most organisations, including government energy utilities, are experiencing increased infrastructure costs, and consequently, are striving to balance these effects by seeking efficiencies in other areas. One area targeted is customer communication. Organisations are turning to online social networks and online communities to communicate with customers, often developing their own online communities to do so (Porter *et al.* 2011). Indeed it seems consumer interest is better generated through online discussions, such as forums, than through marketer generated information (Bickart and Schindler 2001).

Government agencies, such as energy utilities, which are trying to promote sustainable energy conservation, are likely to be particularly interested in the effectiveness of such online communities because of their durability and cost. This raises the question of how an organisation-sponsored online community can be effectively

used to promote consumers' long-term energy saving. Self Determination Theory can provide a foundation for the design of such a website and community as well as a theoretical model that can be used to test the effectiveness of the website.

Previous long-term behaviour change studies have focussed on intensive interventions involving a significant educational component, including regular follow up meetings and discussions (Williams *et. al.* 2002; Williams *et. al.* 2006). Such interventions are typically one-on-one and restricted to a small group of recipients and thus would be expensive for agencies to implement across a large group of people. The present study investigated the ability of a less intensive communication approach involving the participation of individual consumers as members of an online community to motivate long-term reductions in household energy consumption [Footnote 1]. No study, to our knowledge, has investigated technology-based communication approaches in place of human interactions in promoting greater self-determined *energy conservation* behaviours.

The Role of Self-Determination Theory (SDT)

SDT suggests motivation and, subsequently, behaviour are shaped by people's satisfaction with the fundamental psychological needs of autonomy, competence and relatedness (Deci and Ryan 2000). The theory suggests people are autonomous when they do something they find interesting and personally important and that autonomous motivation is derived from a sense of freedom of choice and volition as that person fully endorses their own actions. This is in contrast to controlled motivation and choice, where a person feels an external pressure to act. The need for competence reflects a desire for mastery in the physical and social worlds and comes from a "human desire to efficiently interact with one's environment so as to feel competent in producing desired outcomes and preventing undesired outcomes" (Vallerand and Ratelle 2002, p 48). Relatedness is a person's desire to feel related to significant others, to care for others and to feel cared for (Deci and Ryan 2000).

Moller *et al.* (2006) argue that, when people have greater autonomy, their behaviours are likely to be consistent with their own competencies and continue significantly longer than under

controlled conditions. Thus, fully autonomous behaviours that involve choice and in which a person feels competent and a sense of relatedness to others are most likely to be sustained in the long-term (Green-Demers, Pelletier and Menard 1997).

The availability, rather than a lack of availability of conditions that support the satisfaction of an individual's needs for autonomy, competence and relatedness, is a core factor affecting a person's well-being (Deci and Ryan 2000). Thus, people pursue goals, relationships and activities that contribute toward this needs-satisfaction goal. Further, Deci et al. (1991) argued intrinsic motivation is closely associated with autonomy, competence and relatedness because intrinsically motivated behaviours are based in people's needs to feel competent and self-determined. Thus intrinsic motivation is the prototype of self-determined activity (Deci and Ryan 2000).

Given these suggestions, the effectiveness of an online energy saving intervention, such our website and forum, can be examined by measuring changes in people's autonomy, competence and relatedness and seeing whether it leads to an increase in people's intrinsic motivation to save energy as well as their energy saving intentions and behaviours. This view led to a model that can be seen in Figure 1.

The model suggests:

- a) The environmental stimulus of the website, which is designed to engage

energy consumers, enhances perceived autonomy, competence and relatedness in this context.

- b) These needs enhance intrinsic or self-determined motivation to save energy.
- c) Such motivation increases energy saving intentions and behaviours.

The model follows Vallerand's (2000) causal sequence of the environment influencing perceived autonomy, competence and relatedness, which leads to motivation which, in turn, leads to outcomes. While the online intervention plays an indirect and distal role in generating energy saving behaviours, we are interested in the extent to which the intervention has a direct effect on people by improving their satisfaction of these psychological needs, leading them to save energy on their own volition.

Method

An online experiment, which included an experimental group with access to an online intervention and a control group which did not, was used to test the suggested model. Energy users in Western Australia were contacted through two online panel providers and invited to participate [Footnote 2]. Online panels are commonly used for market research. Such panels are increasingly representative of the population because of the greater incidence of Internet access (Poynter 2006) and the response quality of such respondents is well established (Deutskens, de Ruyter and Wetzels 2006). As the

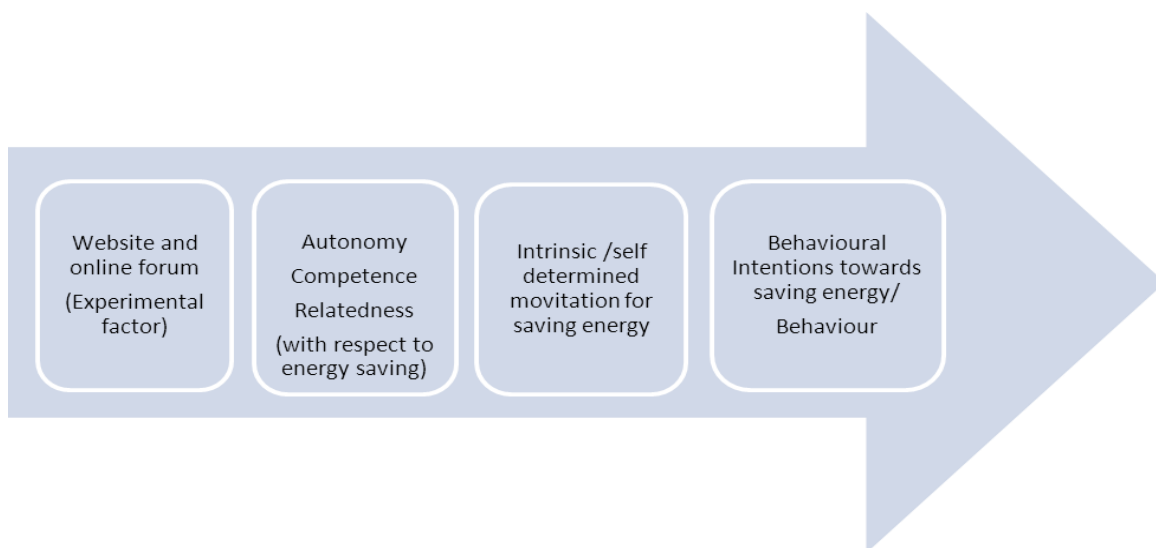


Figure 1: Study Conceptual Model of a Technology Intervention on Enhancing Energy Saving Behaviours

wider study, which includes the present project, is being conducted across four time periods during a calendar year and because we expected a drop-out rate of over 60% over the study period (e.g. Grégoire, Tripp and Legoux 2009), 2000 panel members were recruited so that more than 200 respondents would remain in the experimental and control groups at the end of the study. At the end of stage 2 (March 2012), over 400 respondents remained in each of the groups. To enhance response rates, respondents who complete the four surveys will be entered in a prize draw and have a chance of winning one of four \$400 shopping vouchers.

Those responding to the initial invitation to the online survey were qualified in terms of their willingness to complete four surveys over a 12-month period. Those in the experimental group were also required not to be involved in any other study being conducted by the State's energy provider and to give permission to the research team to track their online activity, including their postings on the forum, through a screen-name developed for this study.

The website and forum were designed in conjunction with an industry partner to reflect best practice of government energy utilities across the world (e.g. in Canada, the UK and Europe). The website was designed to engage energy consumers to think about energy saving and the community forum designed to encourage participants to interact and share experiences about their energy use. The online intervention was also designed to enhance autonomy and competence through access to and knowledge about energy saving products and education. Online calculators that can be used to understand possible energy saving opportunities are a specific example of this, as were expert case studies and educational videos about household energy saving. Relatedness was facilitated through respondents' ability to discuss and share energy 'stories' with others, to take part in the polls and such as the temperature at which a fridge is set.

Both groups completed an initial questionnaire about their energy attitudes, intentions and behaviours, as well as their perceptions of autonomy, competence and relatedness with respect to energy, and their motivations towards energy saving before the website was opened. Measures used in the survey were derived from well-established scales. Basic psychological

needs (i.e., autonomy, competence and relatedness) were measured using items from Ilardi et al. (1993) and Deci et al. (2001). Motivations or behavioural regulations were measured using items from Pelletier et al (1998) and intentions were measured using items from Perugini and Bagozzi (2001). Energy saving behaviour was collected through self-report items, while actual energy (measured retrospectively) will be obtained through our industry partner for respondents who give appropriate permission.

The experimental group was then invited to visit and take part in the website and forum for the duration of the project, while the control group did not have access to the website. Both groups will have responded to three further questionnaires at two monthly intervals by the end of the study. Website and forum analytics are also being collected for each member of the experimental group (e.g. number of visits, length of time on site, number of comments posted, content of comments, plus other site activities). These data will enable the model shown in Figure 1 to be tested cross-sectionally and longitudinally. The web analytics will also enable us to develop a more nuanced understanding of how the use of various aspects of the online intervention enhance people's autonomy, competence and relatedness, as well as their motivation to save energy and energy saving behaviours. As the study is in progress, some initial results will be presented at the conference.

Discussion

The present study followed Press and Arnould's (2009) argument for experimenting with marketing stimuli to see if people's demand for energy and energy saving devices could be influenced. With the support of our industry partner, an energy utility in Western Australia, we are investigating how an online intervention, rather than one-on-one interventions or traditional mass media promotional approaches increases people's perceived autonomy, competence and relatedness and, subsequently, their intrinsic energy saving motivation and behaviours. If the suggested model is supported, it is likely the study will lead to a relatively cost efficient way to promote and enhance *sustained* energy saving.

Footnotes

- 1 The use of an online community to enhance energy saving enables the integration of resources by the individual and the focal organisation in the co-creation of value and, thus, this research is consistent with the Service Dominant Logic paradigm (McColl-Kennedy et al. 2012).
- 2 The significant increase in population in Western Australia, largely due to the present resources boom, the associated increase in demand for energy and the State's dependency on carbon intensive energy sources makes this state a particularly appropriate environment for this study.

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