

DETC2011-48618

ENCOURAGING ENVIRONMENTALLY CONSCIOUS BEHAVIOUR THROUGH PRODUCT DESIGN:
THE PRINCIPLE OF DISCRETIZATION

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ABSTRACT

Lead user methods were applied to develop product design principles that encourage environmentally conscious behaviours in individuals. Old Order Mennonites (OOMs) were chosen as lead users because of their low resource consumption lifestyles. Ethnographic analysis revealed that discretizing resource consumption facilitates and encourages conservation behaviours in OOMs. An experimental study demonstrated the effectiveness of discretization in reducing water consumption. We postulate several distinct ways in which discretization encourages conservation behaviours. We conclude with insights on how discretization can be integrated into the design of modern products to encourage environmentally conscious behaviour in the general population.

1. INTRODUCTION

1.1. Environmentally Conscious Behaviour

Encouraging environmentally conscious behaviours, particularly the conservation of energy and materials, is an interesting and complex problem. The benefits of conservation are clear. Whether motivated by desires to reduce climate change or dependence on foreign sources of energy, successful reductions in domestic energy and materials use can have significant effect. For example, in 2008, United States households were responsible for 1,220 million metric tonnes of carbon dioxide emissions, which accounted for roughly 21% of total U.S. emissions (EIA 2009). Therefore, even small reductions in each household's energy and material usage can have a large effect on the overall energy emissions of a nation.

The field of Environmentally Significant Behaviour (ESB) was established by behavioural psychologists and ecologists to study peoples' motivations for performing environmentally conscious actions. Stern (2000) defined these behaviours as those that reduce the material and energy impact of human activities on the biosphere. These can range from public actions, such as involvement in environmental organizations (*environmental activism*), to changes in the personal use and

disposal of products (*private-sphere environmentalism*). Abrahamse et al. (2005) have examined many approaches to encourage environmentally conscious behaviour. Our aim is to determine new ways to encourage private sphere environmental behaviours by applying *lead user methods*.

1.2. Lead User Methods

Lead User Theory was initially articulated by Eric von Hippel (1986) as a way for product manufacturers to predict the needs of their users in the future. Von Hippel defined lead users as those who experienced needs well in advance of the mainstream population. These users could range from single individuals to entire corporations. For example, in the rapidly changing semiconductor industry, niche firms that use leading edge manufacturing processes and require extreme levels of precision could be considered lead users. On the other hand, individuals who use technologies well before their mainstream adoption, e.g., networked bulletin boards in the 1980's, could also be classed as lead users. Von Hippel's theory posited that the problems faced by these users could be used to forecast mainstream users' needs. In addition, solutions that lead users themselves devise also yield valuable insights.

Hannukainen & Hölttä-Otto (2006) expanded the definition of lead users to include those who perform tasks in a more limited capacity than the mainstream, namely disabled persons. Studying how blind and deaf users interacted with products such as cellular phones led to product features relevant to mainstream users that are *situationally disabled*, e.g., searching for a phone in the dark, or trying to communicate in a loud environment. Lin & Seepersad (2007) demonstrated that even temporary limitations in product interaction, e.g., imitating visual impairment using dark glasses, or dexterity impairment using gloves or mitts, can lead to useful insights about latent user needs. Noting the potential of this approach, we decided to apply lead user methods to identify ways to motivate individuals to engage in environmentally conscious behaviour. First, we sought to identify a group of people in which conservation behaviours were already practiced.