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I-Pet Individual Persuasive Eco-travel Technology: A tool for VTBC program implementation

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Abstract

Voluntary Travel Behaviour Change programs aim to improve both community information and awareness about personal contributions to the negative effects produced by private car use. Indeed, providing individuals with feedback (travel time and costs, CO2 emitted, etc.), as well as information about existing alternatives to the car, has been shown to motivate people to reduce car use.
This paper presents the architecture of a technology platform constructed for the purpose of automating phases and activities of a Voluntary Travel Behaviour Change program, with a view to extending it to the large scale, reducing the resource commitment and enhancing the efficacy of the implementation.

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Keywords: Voluntary Travel Behaviour Change programs; Persuasion; Persuasive Technology;

1. Introduction

Over the last decades the ever increasing use of the private car and the negative externalities resulting therefrom (congestion, local and global pollution, noise, safety and in general poor quality of life in urban areas) have led transport researchers to turn their attention to the issue of car use reduction.

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Several measures have been devised that aim to improve both community information and awareness about personal contributions to the negative effects produced by private car use, and about sustainable travel alternatives. They are known as Voluntary Travel Behavior Change - VTBC - programs (Ampt, 2003), and include information and persuasion techniques for influencing people to voluntarily reduce private car use (Bamberg et al., 2011).

So far, the implementation of VTBC programs has proven to be effective in reducing private car use (Brög et al., 2009) and analysis of the numerous projects conducted over the past 15 years has pinpointed the strengths and weaknesses of these measures.

In particular, the key factors identified for the effectiveness of a VTBC program are: target mobility context, target population, target behavior, personalization, information characteristics, communication and persuasion, the use of an integrated process model of travel behavior change.

- Target mobility context: identifying a certain local/transport promotion context, analyzing strengths and weaknesses of the transport system in general (level of service and capacity) and choosing the sustainable transport alternative to be promoted (Parker et al., 2007).
- Target population: segmenting individuals with respect to the alternative to be promoted. The new mobility style needs to be sustainable, advantageous and feasible for individuals involved in the program. This implies an in-depth knowledge of participants' socio-economic and attitudinal characteristics, of their activity-travel patterns and of any possible barriers to behavior change (Davies, 2012; Steg and Vlek, 2009; Sanjust et al., 2014b).
- Target behavior: selecting the most appropriate and feasible behavior change (Brög et al., 2002; Davies, 2012).
- Personalization: customizing the approach in a broad sense. Personalization is the most effective means of reducing or eliminating barriers to obtaining information and of promoting behavior change (Gärling and Fujii, 2009). The greater the level of information customization of a VTBC program (and the longer the data-collection period), the greater its effectiveness will be. In particular, when information and communications are addressed directly to a single user and provide personalized sustainable car alternative solutions, VTCB programs are known as Personalized Travel Plans (PTP). In practice, personalization affects:
  - the contact between the VTBC program team and the participants actively involved. Face to face communication is the most effective type of communication, since it allows a direct and personal contact and to interactively exchange information as opposed to one-way communication (Fujii and Taniguchi, 2006);
  - the mobility solution suggested. The personalized travel plan provided to participants needs to be customized on the basis of life style of each individual. This involves detailed and continuous (several days) activity-travel data collection for assessing the intra-variability of each individual (Stopher, 2005);
  - feedback provision. In general, individuals are not fully aware of the characteristics associated with the not-chosen alternatives (and even those chosen) and are unable to quantify the effects of their behavior, both at the personal (time, costs) and community level (extra-costs and CO2 emitted, for instance) (Shwanen and Lucas, 2011; Gaker and Walker, 2011). The feedback can be provided in the Personalized Travel Plan in relation to observed behavior (car use), highlighting the negative effects and to the proposed behavior (sustainable travel), highlighting the positive effects.
- Information characteristics: combining several types of information in order to influence directly the psychological factors that are determinants of behavior change. Information must be useful, usable and used: besides being accurate and reliable, it should also be visible, easy to understand and rapidly acquired. Brög (2000) and Fujii and Taniguchi (2006) also stress the importance of receiving the necessary information without expending too much effort and of avoiding overload (bounded rationality, bounded cognitive capacity; Simon, 1982). Further, information may be more effective if, for instance, it is repeated, as repetition reinforces the message (though, in some cases, may make it boring) (Fogg, 2003; Economic and Social Research Council, 2008).