The development of a technology platform for implementing VTBC programs on large scale

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Outline

- Behaviour Change
- Persuasive Technology and Mobile Persuasion
- IPET platform: addressing environmental issues through technology
Introduction

- White Paper (2011)
Decarbonisation strategies

- **Technological strategies**
  - Alternative fuels
  - Low-emission systems
  - Electric Vehicles

- **Informational strategies**
  - Perception
  - Motivation
  - Knowledge
  - Norms

- **Behavioural Strategies**
  - Availability of alternatives
  - Costs of alternatives
  - Benefits of alternatives

- **Structural Strategies**
  - Reducing the distance and number of trips travelled by car

- **Directly decreasing emissions from transport**
Use **information and communication** to encourage a more efficient use of transport systems for decreasing private car use (distance travelled) and increasing the use of sustainable modes such as public transport and active modes.

Increasing the individuals’ knowledge and awareness about:

- existing travel mode alternatives (information)
- negative effects produced by car use (quantitative feedback) at personal and societal level
  - Travel time
  - Travel cost
  - \( \text{CO}_2 \) emissions
VTBC programs strengths

- **Personalisation** *(Gärling and Fujii, 2009)*
  - Direct and interactive contact with participants *(Fujii and Taniguchi, 2006)*
  - Detailed and continuous activity-travel data collection *(Stopher, 2005)*
  - Tailored travel suggestion provided - Personalised Travel Plan (PTP)
  - Feedback provision *(Shwanen and Lucas; 2011)*
  - Monitoring of travel behaviour

- **Information** *(Brög, 2000; Fujii and Taniguchi, 2006)*
  - Useful, usable and used
  - Easy to understand and rapidly acquired

- **Persuasion techniques** *(Cialdini, 2001)*

- **Based on Models of Behaviour and Theories of Change**
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High level of knowledge, analysis and commitment difficult to achieve on large scale at an acceptable cost.
Technology advantages

- **Technology** can contribute to facilitating the operational and functional aspects through the implementation of automated VTBC programs, **broadening their applicability** while maintaining **effectiveness**.

- **Personalisation**
  - Interactivity
  - High level of personalisation in data collection
  - Ease of information acquisition and analysis
  - Automation of the whole procedure for large scale implementation

- **Information**
  - Provision of real-time and timely personalized information
  - Repetition and reinforcement
  - Networking and comparison with others (Gamification)

- **Persuasion**
  - Technology itself can be persuasive in achieving a certain behavior: The Persuasive Technology (Fogg, 2003).
The IPET - Individual Persuasive Eco-travel Technology

IPET is a Mobile Persuasive application developed for implementing VTBC programs on large scale.

Main functions

- Monitoring and analysis of car users’ behavior
- Analysis and identification of a prospective sustainable alternative solution
- Personalized Travel Plan and feedback provision
- Dispatch of reinforcing message
- Gamification strategies application
Activity Locator: Tracking Actual Behaviour

Meloni and Sanjust, 2014
Server: Storing Information

GPS position points + attributes
Analyzer

**INPUT DATA**
- Activity Travel data
  - Spatial data
  - Temporal data
  - Activity Attributes

**OUTPUT DATA**
- Activity Travel diary
  - Activity
    - Location
    - Purpose
    - Duration
  - Trip
    - Origin
    - Destination
    - Mode

- Quantitative Feedback
  - Time spent travelling
  - Costs
  - Co2 emitted
  - Calories

**SERVER**

**ACTIVITY LOCATOR**

**SIMULATOR**
Actual Travel Behaviour

Feedback calculation
- Travel Time
- Distance Travelled
- Travel cost
- CO₂ emitted
- Calories burned

Home

Office

Mobile

Web Page
The Simulator

Tour analysis

- Tour type
  - HWC
  - WHC
  - BW
  - AW
  - WB
  - NWHB

- Tour mode
  - TP
  - Walking
  - Other modes

- Stop
  - Purpose
  - Duration
  - Company

Private car

Tour by car (CT)

PERSONALISED TRAVEL PLAN

Comparative feedback (Observed vs. Simulated)

Tour mode
- Public Transport
- Walking/Biking
- Park and Ride
- Car Pooling

Feedback
- Time spent
- Costs
- CO2 emitted
- Calories

Tour by car (CT) vs. Sustainable Tour (ST)

ANALYSER

INFORMATION DELIVERY

Sustainable Tour (ST)
Personalised Travel Plan

MOTIVATION

Observed behaviour

Feedback (Benefits)

Sustainable alternative

ABILITY

General tips
The Information delivery

- Observed behaviour
  - Activity – Travel diaries
  - Feedback
  - Spatial information

- Personalized Travel Plan
  - Sustainable alternative
  - Feedback simulated
  - Benefits

- Monitored behavior
  - Gamification
  - Reinforcement (Persuasive Messages)
Gamification strategy

- Observed behavior before and after the PTP provision
  - Daily avg. Distance travelled by car before PTP provision
  - Distance travelled by car after PTP provision every day

- Car use behaviour
  - ++ if the distance is reduces compared to the avg. Distance travelled by car before PTP provision (%)
  - -- if the distance is increased compared to the avg. Distance travelled by car before PTP provision (%)

- Use of sustainable modes
  - ++
Persuasive Messages

- **Regret**: Unsustainable behaviour observed
- **Congratulation**: Sustainable behaviour observed
Pilot test

- 15 people have been involved in the first pilot test for testing the platform in terms of
  - commitment
  - acceptability of the technology platform.

- The aim was to gather useful feedback for improving the VTBC program as a whole and in particular the persuasion tools (PTP and messages). We are not discussing here the results in terms of behaviour change.

Final questionnaire
- IPET usage,
- form and content of PTP,
- sustainable alternative proposed,
- persuasive effects of reinforcing messages and their form and content,
- and web page.

Problems
- rapid battery consumption of the device
- occasional crashes which meant the application had to be restarted.

Persuasive Messages
- text and a cartoon image
- text and a realistic image.
Future developments

- At the present time, implementation of the VTBC program is at an advanced stage.

- Future developments will concern continuation of the test phase, focusing on both single elements and the entire sequence of activities carried out by the platform.

- Effectiveness of the system in changing travel behaviour.
Thank you!
References


Meloni, I., Sanjust, B. (2014). Using a GPS active logger to implement travel behaviour change programmes. In Soora Rasouli and Harry Timmermans (Eds.) Mobile Technologies For Activity-Travel Data Collection And Analysis. Hershey, PA: IGI Global.


