An appropriate interface for speed limit advice for older drivers

Mike Bradley, Suzette Keith, Catherine Wicks, Irena Kolar, Reg Goodwin

Middlesex University
Who we are...

Project team:

**Middlesex University**
Product Design and Engineering
Computing Science

Project Partners:

**Brunel University**
Design Group

**Ford Motor Company**
Human Factors Department
Part of SPARC project…

‘The advanced technology needs, desires and requirements of older drivers’

• User led approach
• Categorisation of older drivers/users
• Opportunities of advanced technology for older drivers
• Interfaces for advanced technology for older drivers
• ‘Bridging the technology/user led divide’
Research questions

• What issues do older drivers have with driving?

• What do older drivers think of the potential of new technologies in cars?

• What are their experiences of advanced technology interfaces in cars?

• How can we design new technology interfaces more appealing to older users?
What have we done so far?

- Older People Panel
  - Drivers aged 50+
- Questionnaires, focus groups, interviews
- Selected three areas for further investigation
  - Speeding
  - Parking
  - Interaction with new interfaces
- Pilot prototype testing -> users as co-designers
New interfaces...
An appropriate interface for speed limit advice for older drivers

New interfaces...
Our approach...towards participation

• Users are design partners
  – defining ‘the need’
  – iterative development process
  – dissemination
Primary Research

- Questionnaires, focus groups, interviews

QUOTES FROM FOCUS GROUPS

“My car is an extension of me, I don’t know what I would do if I couldn’t drive”

“There are so many things I wouldn’t be able to do without my car”
Primary Research

- SPEEDING -

“I think it is important not to break the law”

“I think it is important for safety”

“I feel in control of the car even when I exceed the speed limit”

“I would be mortified if I were prosecuted for speeding”

“I check my speedometer all the time”

“It’s becoming much easier to break the law”
Legislation

• How fast is too fast?
  – Any speed in excess of the prescribed limit

• Prosecution
  – Fine of up to £1,000
  – 3-6 penalty points (possible disqualification)
  – 12 points total within 3 years -> disqualification for minimum 6 months.

• Criminal Offence
Speeding, Why?

84% of people disapprove of speeding but 70% admit to doing it (Stradling et al, 2003)

• 45% react to speed camera by braking automatically regardless of their speed (Datamonitor, YouGov, 2006)

• Most popular reason for speeding is that it is ‘unintentional’ (Silcock et al, 2000).
How fast am I going?

• The Car
  – Modern vehicles: safer, quieter, more comfortable

“It is difficult sometimes… 30mph in the modern car is nothing”
“Before you know it you can reach 43 in a 30mph zone”
“I find it difficult to stick to 30 as I have a powerful car.”

• External Factors
  – Speed of other drivers
  – Surroundings and type of road
How fast am I going? – The speedometer

• Benefits
  – Fixed and continuous display of information
  – Normal, familiar – No behavioural change required.

• Problems
  – Overloading of visual sense
  – Visual Accommodation - Refocusing
  – “Eyes off the road”
Alternative modalities

- Auditory
  - Useful, familiar, non-visual
  - Intrusive, irritating
  - Competition with other systems (SatNav etc.)

- Haptic
  - Continuous
  - Unify control and display
  - Instant, natural, easy to process feedback.
Technology

• Active Cruise Control
  – ‘Automated’ speed control
  – Doesn’t account for new speed limit zone

• Intelligent Speed Adaptation
  – Digital Speed Maps – Intelligent
  – Informative systems acceptable
Ideas

Counterc-force Accelerator Pedal

- Sound effect of over-revving engine
- Vibrating seat
- Sound of rushing wind
- Flashing blue light in car
- Vibrating steering wheel

Acts directly through point we wish to affect – Unifies

Visual Display

IDEAS

Good comparison of 2 different systems vibration and force

Counter-force Accelerator Pedal

- Sound effect - cabin rattles with high speed
- Engine overheating and smoke from bonnet

Vibrating Accelerator Pedal

- Vibrating steering wheel
Visual Concepts
Haptic Interface

Counter force pedal
- Pedal ‘pushes back’
- Inc. force – easy over-ride
- Informative only

Vibrating Pedal
- Pedal vibrates
- Informative only
Test Vehicle
Pilot user testing
Pilot indications

• Checking speedometer manually concern for all participants
• Strong interest in assistance with speed checking task
• Modifications suggested for next design iteration
• Diversity of participant preference for concepts
• Desire for personalisation of interface characteristics
Next Stages

• Continue with participatory design methodology
• Create a more immersive and interactive test environment
• Test visual and haptic displays in combination