User-Centred Design Research: Home Energy Controls

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Home Energy Use

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http://progressivetimes.wordpress.com/2009/03/09/meters-can-make-us-all-a-little-smarter/
The Human Factor

- User choices can massively increase consumption.

- Commonly assumed that:
  - Change in knowledge & attitudes leads to change in behaviour
  - Cash is the most (only?) important incentive
  - People are mostly the same

- But, most of these devices end up in the attic very quickly
Domain/Person/Activity Specificity
What is to be done?

- Observing
- Interviewing
- Measuring
- Putting your own sense of the sensible aside. Try Method Acting. Beware of:
  - False consensus effect
  - Mistaking the plausible for the actual
  - Armchair psychology
False Consensus Effect

“Most important comedian of the past 25 years”


The Plausible & the Actual

- Lazarsfeld on Stouffer’s *The American Soldier*
  - Better educated men showed more psycho-neurotic symptoms than those with less education. (*The mental instability of the intellectual as compared to the more impassive psychology of the man-in-the-street has often been commented on.*) B, 439.
  - Men from rural backgrounds were usually in better spirits during their Army life than soldiers from city backgrounds (*After all, they are more accustomed to hardships.*) A, 94.
  - Southern soldiers were better able to stand the climate in the hot South Sea Islands than Northern soldiers (*Of course, Southerners are more accustomed to hot weather.*) A, 175.
  - As long as the fighting continued, men were more eager to be returned to the States than they were after the German surrender. (*You cannot blame people for not wanting to be killed.*) B, 561.

Armchair psychology

- Would you give electric shocks to this man?
  - Most people say they wouldn’t themselves (beware social desirability)
  - Most say that most people wouldn’t
  - 26/40 went all the way (450v)

Retrofit Project

• Goal
  – Reduce home energy consumption by improving the building fabric and changing behaviour through giving occupants information and control

• Partners
  – Architectural practice
  – Control systems company
  – Social Housing Trust
  – CU
Tenants are quite a diverse social mix. But often in financially difficult circumstances. Either because of:
  - Low or no income
  - Past debt problems
And representative of a subset of the wider population on various dimensions e.g.
  - Employment
  - Education
  - Technical experience?
On site observation
Interviewing

- Talking to those for whom you are designing a product makes sense as does talking to those who know them.

- Completely unstructured interviews can be helpful initially, but to make progress, focus is needed.

- Interview structure based on prior findings for this domain and this class of issue.
Theory of Planned Behaviour

Normative Beliefs → Subjective Norms → Intention → Behaviour

Behavioural Beliefs → Attitude to Behaviour → Intention

Control Beliefs → Perceived Behavioural Control → Actual Behavioural Control

- Experience of warmth & comfort
- Prior use of heating controls
- Understanding of heating control, time lags, etc

Findings

- Analysing this kind of data is far from simple.
  - Trends or the importance of outliers
- Control
  - Little sense of controlling the temperature.
  - At best a damage limitation exercise
- What others do
  - Vague understanding
- Value of money
  - Constraint vs cost
- Benefits from the change
  - Greater comfort at the same cost
Technology probes

- Observing & Interviewing around a candidate application can be very informative.
- The Victorian Farm
- Think aloud protocols, concurrent & retrospective

• Bad survey questions are very easy to write.
• Good interview material can be exploited to create good survey questions.
• Measures of social norms, attitudes, and control beliefs can give a broader understanding of whether or not interventions have been effective independently of behaviour change.