Example Concepts generated using the DwI method to encourage closing curtains at night to conserve heat

Concept for new or redesigned interface or product	Patterns/techniques
Curtains/windows/ heating system that can inform user about their state. Use potential benefit compared with past behaviour, etc. Could use windows/curtains as interface, e.g. projecting information / graphics	Interface capabilities Self-monitoring
Reducing hassle/effort required by users to close curtains – e.g. a weighted system or combined mechanism closing multiple curtains	Reduction
Suggest/simulate closing curtains at exactly right moment – when users about to go to bed, or when they enter room and switch lights on, or if significant heat outflow detected	Simulation Kairos Condition detection
Rewarding user for closing curtains by providing praise, 'delight' reward, or explicit display of money saved	Operant conditioning
Helping user develop habit of closing curtains by association with another event, e.g. going to bed; embedding 'trigger' in environment	Respondent conditioning
Interface which gets users to commit to a goal of a particular energy use improvement	Commitment & consistency
Interface which points out how well user doing (e.g. "Your insulation is only 65% effective because curtains are still open in three rooms.")	Self-monitoring
Interface which points out energy/financial waste of not closing curtains	Scarcity Self-monitoring
Demonstrate to users 'precious warmth' and how they'll feel warmer if they close curtains	Scarcity, Self-monitoring

with pros/cons, and example implementations, for each.

The method's been developed and refined through a series of workshop sessions, evolving from a tree structure ('too prescriptive' as a service design consultancy to whom I demonstrated it said) through more visual 'idea space' diagrams, to the stage where I hope to be able to produce an online 'Design with Intent handbook', which can be used as a guide and reference for inspiration in this area in the near future.

Next step: Applying the method

The second stage of the project will involve building functional prototypes of concepts suggested by the method in response to a particular home energy use brief (probably something like a kettle where user behaviour is a major determinant of the amount of electricity used) and running comparative user trials over, say, a month, to find out which techniques actually have the biggest effects on behaviour in practice (energy use is easy to measure!). It might turn out that a networked kettle with a clever social interface, comparing your overfilling habits with your friends', is more effective than one which continually asks "Are you sure?" every time you fill it, but that a simple more prominent cups/mugs scale is better still.

The results of the trials – which techniques work best, in what situations, and why (both technologically and in human factors terms) – will be fed back into the method to refine it further and, I hope, produce a useful tool for designers involved in influencing user behaviour, especially to reduce environmental impact.

References

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My PhD

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My PhD

Design for sustainable behaviour

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Figure 1 A student using the DwI method to generate concepts for improving home lighting use efficiency, in a recent workshop session.

Motivation for my research

As technological advances make everyday consumer products more efficient, it's often human behaviour that's the 'weak link'. We buy 'energy-saving' lights and then leave them on all night. We boil a kettle-full of water even though we only need a mug-full. We stick with the default setting on the washing machine, afraid of investigating the others.

Behavioural decisions (or the lack of them) can be responsible for 26–36% of household energy use [5][8] – this is a big issue, and while governments often favour social marketing campaigns to 'solve' it, in many ways it's really an HCI problem. It's about people interacting with technology: how and why they do it, and how that interaction might be influenced (if indeed it should).

Lots of disciplines involve influencing people's behaviour, with varying degrees of 'strength' - from urban planning to advertising. I'd been researching the idea of 'architectures of control', how the design of the systems around us influences what we do, subtly or not, but while a lot of this stuff was fairly negative, often shaping public behaviour for someone else's benefit (political or commercial), I could see there was potential for helping people. Energy conservation seemed a good place to start, since it would save consumers money and help society in general. So in September 2007 I returned to Brunel to try and apply some of the ideas to 'Design for Sustainable Behaviour' [3].

The 'Design with Intent' method

I started by collecting examples of intentional behaviour change through design – 'Design with Intent' – from different fields [4], and trying to draw out common themes. My thinking was that if certain techniques have effects on user behaviour unintentionally, they could also be applied intentionally. (Equally, there's nothing innately 'special' about more environmentally friendly user behaviour: it's often simply about using a system effectively – thus largely a usability problem.)

Despite differences in design approach between environments, products (hardware/software) and services, many techniques or their analogues recur across the board. It ought to be possible to abstract certain techniques from one field, and apply them in others – e.g. forcing functions, popularised in HCI by Don Norman [6], recur in medical and industrial contexts with safety interlocks, but also in manufacturing engineering as part of Shigeo Shingo's poka-yoke quality methodology [7]. Russell Beale's idea of slanty design [1] (a great way of visualising the idea) can be seen as intentional manipulation of affordances (perceived or actual) to make certain 'desired' behaviours easier than others.

From various kinds of energy feedback user interfaces to physical techniques such as segmentation (and interface analogues of these), I've so far identified around 50 design patterns/techniques for influencing user behaviour, grouped into five 'lenses' (Architectural, Error-proofing, Persuasive, Cognitive and Security) representing different approaches (e.g. the Persuasive lens draws on B.J. Fogg's work [2]). The patterns are mapped to particular 'target behaviours' via a series of diagrams, so a design team briefed with influencing a particular kind of user behaviour can use this 'Design with Intent' method to be presented with a range of relevant design patterns, along