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# Deep Interventions to Change How We Think and Act

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**Abstract**

This paper critiques the metaphor that currently guides sustainable HCI research, namely that of an input/output machine, which is inappropriately applied toward understanding human behavior. In its place, a new model is introduced based on cognitive psychology research about how the human mind actually works. This new model is then used to identify meaningful targets for sustainable HCI intervention, and widen our understanding of what might constitute a relevant research contribution toward sustainability in HCI. Two new points of intervention are proposed – intervening at the level of *values*, and/or at the level of *frames* – both with the potential to lead to significant behavior change. Finally, it is suggested that challenging frames has the potential to catalyze the most significant changes toward sustainability.

**Author Keywords**

Sustainability, politics, values.

**ACM Classification Keywords**

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

**General Terms**

Design, theory.

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## Introduction

Sustainable HCI appears to be tiring of persuasive approaches, in large part because they have produced very little evidence of desired behavior change. I have argued elsewhere (to be presented at the CHI'13 Student Research Competition) that one of the reasons persuasion has been so ineffective is because these technologies inadvertently undermine values that would foster sustainable behaviors, and instead appeal to and reinforce values associated with "Self-Enhancement", which in turn are likely to promote further unsustainable behaviors. But the larger problem this exposes is that sustainable HCI operates under the assumption – the *framing* – that people are rational, self-interested creatures, and that therefore it is best to provide people the facts about why behavior change will benefit them. (This assumption has been highlighted recently by others [1,3,7]).

Notably, this is the same ineffective approach characteristic of progressive modes of persuasion generally. Works such as [5,9] show that American Democratic campaigns tend to present rational arguments for the superiority of their *policies*, and tend to fare poorly against Republican campaigns that present passionate, non-rational arguments for the superiority of their *morals*. These authors' postmortem assessment of unsuccessful Democratic campaigns is that they fail to engage the 98% of our brain that does not actively process rational arguments.

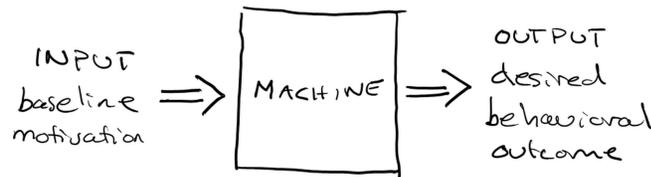
The fact that these campaigns target the "rational" brain is a symptom of a failure to understand – or perhaps an unwillingness to accept – that the human mind is not at all like Enlightenment thinkers insisted it was. For example, cognitive psychology tells us that

our behaviors (e.g. voting behaviors, consumption, etc.) are not the result of rational, cold (non-emotional) calculation of self-interest. Rather, *rationality is inherently irrational*, in the sense that "rational" decision-making a) is only possible thanks to emotions, values and metaphors, and b) does not necessarily maximize personal benefits. For example, as polling studies repeatedly show, self-interest is a poor predictor of voting behavior [9: p.120]. Democrats are continually surprised (and irritated) when the people who would benefit most from their policies – e.g. the poor – vote Republican; but this begins to make sense when you understand that people are not like the Post-Enlightenment caricature of *homo economicus*.

Such findings may help us diagnose the inefficacy of persuasive technologies: in short, the assumption central to persuasive technology approaches – that people make rational and self-interested decisions to behave as they do – is wrong. But what does this all mean for the future of sustainable HCI? In this paper, I argue that these findings offer insight into radically different targets of intervention for sustainable HCI.

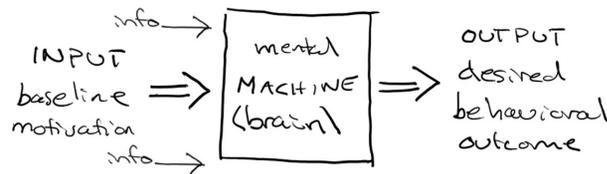
## The Problem with Input/Output

The current metaphor guiding persuasive approaches is "the input/output machine". (Perhaps this is unsurprising given the centrality of this metaphor to computer technology.) The idea is that, regardless of what people think about sustainability, or of whether or not they even care about the environment, a technology can be introduced that can produce a desired behavioral outcome. For this reason, the bulk of sustainable HCI research is has been devoted to the task of figuring out which "machines" (i.e. technologies) will output "sustainable" behaviors.



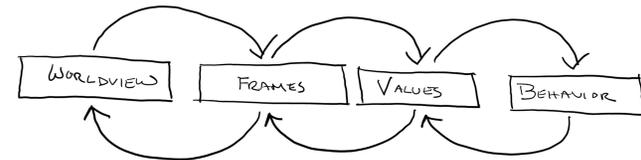
**Figure 1:** Input/output metaphor in persuasive technology.

This same basic model applies to the typical (unsuccessful) progressive political campaign; but instead of *creating* a machine, they instead simply make use of humans' inbuilt mental "machines" (i.e. brains), feeding into it the information needed for the "machine" to process into desired behavioral output.



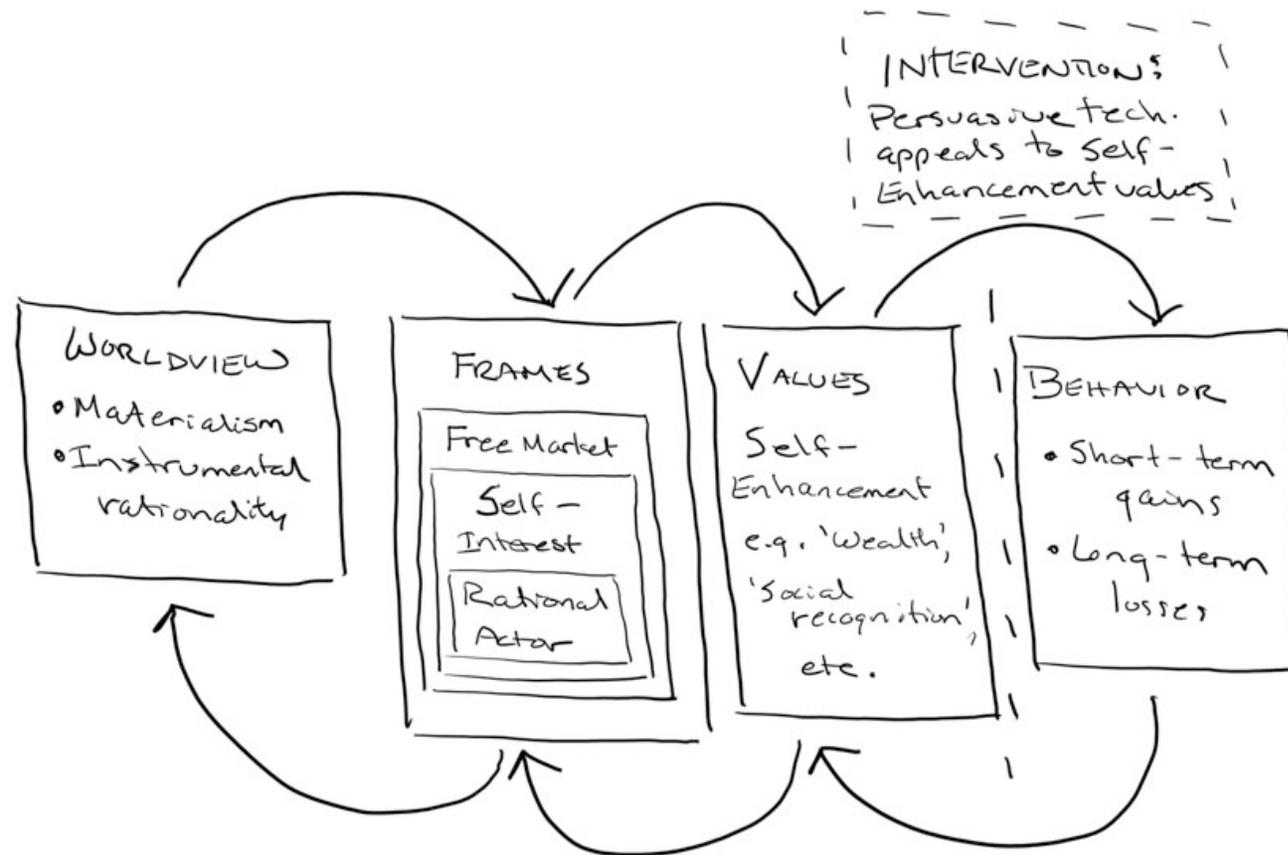
**Figure 2:** Input/output metaphor in politics.

The trouble is, the metaphor is deeply flawed: the human mind does not work like a computer. Cognitive psychology tells us that behavior is the result of factors not accounted for in these models, such as values, cognitive frames, and the worldview on which these frames hang (cf. [2]).



**Figure 3:** Alternate model of human behavior, informed by cognitive psychology research.

Crucially, these factors involve continual feedback, which can either reinforce or undermine the system. To illustrate, let's consider persuasive technologies using this model. As many have noted (e.g. [1,3]), persuasive technologies are built on a particular framing of people as *homo economicus*, motivated by rational self-interest. This framing, as [3] argues, is the result of the reification of a worldview, i.e. distinctly modernist economic models of the world, premised on instrumental materialism. When researchers assume this framing, this in turn prescribes a particular solution space for sustainable HCI, namely to develop technologies that present users with information about how behavior change will benefit them (and their wallets). In other words, thinking people are rational and self-interested makes researchers more likely to appeal to a particular range of values (i.e. those to do with "Self-Enhancement"). This then feeds back throughout the system: it "activates" and reinforces these values in the users of this technology, which makes the designer and the user alike believe more strongly that people are selfishly motivated, all of which serves to reinforce and perpetuate a modernist, materialist orientation.



**Figure 4.** Feedback loop model for persuasive technology.

In summary, attempting to affect behavior without affecting the underlying motivations for this behavior is a Sisyphean task: no matter how much progress is made, there will be powerful forces working against success. Choosing instead to target the cause of unsustainable behavior would be to harness these

forces to propel and even accelerate change toward sustainability.

### **A New Target for Intervention**

Many voices these days argue that our current state of unsustainability is a byproduct of a materialist,

### Targeting Values:

How might we foster “Self-Transcendent” values? Below I list some of these values, which have been linked with sustainable behavior, as inspiration for thinking more broadly about what might constitute a relevant sustainable HCI intervention.

**Unity with nature:** Can we design technologies that enhance our experience of fitting into nature?

**A world of beauty:** Can we design technologies that feature and promote the beauty of nature and the arts?

**Equality:** Can we design technologies that foster a morality of equal opportunity for all?

**True friendship:** Can we design technologies that help people cultivate deep, meaningful friendships?

**A spiritual life:** Can we design technologies that enable people to engage in spiritual practices?

instrumental worldview (carried over from Modernity into Post-modernity) that conceives of the environment as resources for human exploitation. And while there is likely a considerable amount of truth to this assessment, it leaves us very little to *act on*. Are we to sit around and wait for this worldview to crumble under the weight of its own contradictions? Are we to hope that the environmental crisis reaches a point that it will eventually catalyze a new worldview? Would it help to renounce this worldview and appropriate the worldview of ostensibly sustainable, ancient societies? Is this even possible? Or instead of going backwards, can we engineer an entirely new worldview?

Even if any of these ideas were viable, what does that leave for sustainable HCI to *actively do*? Arguments of this kind are extremely de-motivating for a group of people who want to make a contribution within the skillsets they have. I suggest, however, that cognitive psychology provides insight into two alternative approaches that can serve as inspiration for new sustainable HCI research that *can* make a difference.

#### *Intervene at the values level*

As alluded to earlier, there is a significant body of research (much of which is publically available at <http://valuesandframes.org>; see [4]) that shows that certain, so-called “Self-Transcendent” values are conducive to pro-environmental and pro-social behaviors, while others (“Self-Enhancement”) are associated with reductions in these behaviors. If sustainable HCI wants to catalyze a positive feedback loop for sustainable behaviors (what is known as “positive spillover”), perhaps it is worth considering what kinds of interventions might best reinforce people’s inherent, but often latent or suppressed, “Self-

Transcendent” values. The sidebar provides some food for thought about how intervening at this level opens up a whole vista of research opportunities that we might not otherwise see as relevant to sustainable HCI.

#### *Intervene at the frames level*

I suggest that a more radical approach would be to target the *frames* that underpin values. Frames that are evident as inspiration for current persuasive technology research are “Rational Actor” (the belief that the mind is a rational machine that people use to determine the optimal decision), “Self-Interest” (the belief that people use their rational capacity to maximize their own personal benefit), and “Free Market” (the belief that a society of people seeking to maximize their own self-interest in turn maximizes the benefit of all). (These terms are the elements of what [3] identified as neoclassical economic thinking in sustainable HCI; see also [2].) These align with a particular set of values – notably those known as “Self-Enhancement values”. I propose that unless we challenge this underlying conception (this *framing*) of humans, our technological interventions are likely to continue to privilege values that undermine sustainable behaviors.

But there is another reason to target frames, namely that they might feedback and start affecting change at the level of worldview. I provide the following example to illustrate the power of challenging frames.

The Grameen Bank (see <http://www.grameen-info.org>) is a micro-credit bank developed to help get people out of an endless cycle of debt by lending small amounts of money that ordinary banks would not see as worth the paperwork (i.e. economically). The bank fundamentally challenges the assumption (the *frame*) that people are

motivated by their economic self-interest. It loans money to one woman (or man) in a community, and if she repays this debt, then the bank will lend to the next woman in her community. The idea is that the woman cares not just for herself, but also for the welfare of others in her community. Suddenly this introduces as relevant to our understanding of the world *a wider spectrum of human values* [6], including the importance of trust and community affiliation. It also widens our vision of what is relevant to sustainability, including issues such as social and personal meaning [8].

### **Conclusion**

My suggestion for a new path for sustainable HCI is that we begin to dissect sustainability initiatives that challenge frames, such as the Grameen Bank example, to understand what they are *getting at*. Once we isolate these kernels, we may use these as inspiration for radically different approaches to sustainable technologies, or modes of technological intervention for sustainability, that have the potential to affect significant and systemic shift.

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### **References**

- [1] Brynjarsdóttir, H., Håkansson, M., Pierce, J., Baumer, E. P., DiSalvo, C., and Sengers, P. Sustainably unpersuaded: how persuasion narrows our vision of sustainability. In *Proc. CHI'12*, ACM (2012), 947–956.
- [2] Darnton, A., and Kirk, M. *Finding Frames: New ways to engage the UK public in global poverty*. Bond, London, January 2011.
- [3] Dourish, P. HCI and environmental sustainability: the politics of design and the design of politics. In *Proc. DIS'10*, ACM (2010), 1–10.
- [4] Holmes, T., Blackmore, E., and Hawkins, R. *The Common Cause Handbook*. Public Interest Research Centre Ltd, Machynlleth, Wales, 2011.
- [5] Lakoff, G. *The Political Mind*. Viking, New York, 2008.
- [6] Michaels, F. S. *Monoculture*. Red Clover, Canada, 2011.
- [7] Strengers, Y. A. Designing eco-feedback systems for everyday life. In *Proc. CHI'11*, ACM (2011), 2135–2144.
- [8] Walker, S. *The Spirit of Design*. Routledge, London, 2011.
- [9] Westen, D. *The Political Brain*. Public Affairs, New York, 2007.