

Radiators: mediators, Keeping you comfy and dumb!

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24 januari 2008

Tools are physical storage houses for human knowledge (Verbeek, 2005). Years and years of gradually evolved knowledge has been stored in the physical structure of a certain piece of technology. A typical user does not have know about the content of any of this underlying history of knowledge in order to be able to operate the machine in question. For example, the complex task of keeping ones house at a certain temperature, originally involved the gathering, preparing and lighting of firewood as well as sustaining and controlling the fire at the risk of burning down the entire house. This elaborate process has been transformed into turning a knob on a central heating radiator. In fact, the knowledge and skill underling the functioning of the radiator is even far more complex than the old-fashioned fire-place, but that doesn't matter because users need no knowledge of either subject in order to heat their house.

It could be said that through the central heating radiator as a mediating physical structure, human beings are able to solve an extremely complex computational task, i.e. warming up a house, with very limited (internal) computational resources. Central heating systems even *optimized* the original performance, warming up the house more reliably, at a fixed, desired temperature, in any room of choice and with less chance of dangerous malfunctioning.

Of course, from the perspective of society as a whole, one can still define the task of warming up todays Western homes as being a complex task involving complete factories where heating systems are fabricated, the logistics and installation procedures that gets the radiator in your house, perhaps even the whole economy making something like a central heating market possible (Latour, 2005). This complete description of what it is, exactly, that keeps your house at 19 degrees Celsius, today, is with no doubt computationally intractable. But there is *nobody* that needs to *solve* this problem. Describing it like this is purely descriptive. Each human being on its own does not *have* this problem. Individuals get along quite well without knowing anything about central heating industry. Assumably even central heating industries' CEO's do not know all that much about the complete network of interrelated factors that keeps their businesses going, nor do any of the individual workers and systems that together make up the total sociotechnical network that ensures the desired temperature in our comfy homes. In sum: although society as a whole might be faced with enormous complexity, no individual brain is actually in need of computational resources that can counter intractable problems. For the individual user, heating up a house just means turning the knob.

In human-product interaction literature this is known as 'mapping the original problem to a simpler one'. Tying ones' shoelaces is complicated, so children's shoes often have Velcro (NL: klitteband). Velcro transforms the problem into a simpler one with the same result: fastened shoes (Norman, 2002). Related is the notion of

‘epistemic action’ (Kirsh, 1994). An epistemic action is an action that does not solve a problem directly, but rather restructures the environment so that the problem becomes more easier. For example, human beings are good at visual pattern recognition, so if you can change a logical reasoning problem into a visual pattern recognition task, you help your brain a bit by presenting the problem in a representational format that it likes. For instance, in playing the game Tetris, it is much harder to reason whether or not a ‘zoid’ will fit into some part of the surface than it is to simply rotate the zoid multiple times, so that you can simply *see* whether it fits.

In a social system like human society, individuals often do not have to simplify their *own* problems, others will already have done so before you, often by slow, painstaking incremental histories of development involving many people. The ultimate end-result: a physically pre-structured environment, will contain valuable knowledge, hidden from view but still exercising its influence by helping you to do complicated things ‘the easy way’. In biology this is known as *stigmergy* (Google: stigmergy), which is known from research on termites and ant-colonies. And so there is not that much difference between us and the mindless bugs after all.

But *we* have central heating...

References

- Kirsh, D., & Maglio, P. (1994). On Distinguishing Epistemic from Pragmatic Action. In *Cognitive Science*, 18. p. 513-549.
- Norman, D. (2002) *The Design of Everyday Things*. New York: Basic Books (Perseus)
- Latour, B. (2005). *Reassembling the Social: An Introduction to Actor-Network-Theory*. Oxford: Oxford University Press.
- Verbeek, P.P. (2005) *What Things Do: Philosophical Reflections on Technology, Agency, and Design* [Dutch title: *De daadkracht der dingen*] Boom.